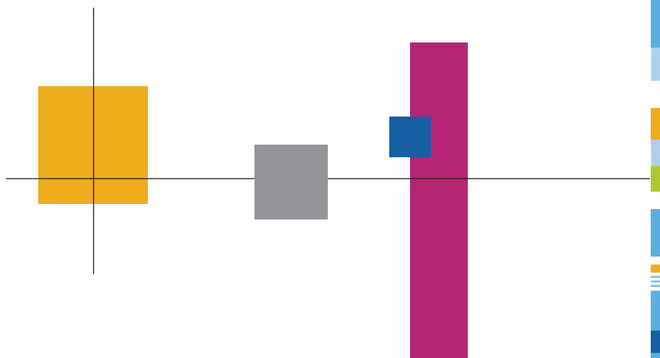
ROSATOM

PERFORMANCE OF STATE ATOMIC ENERGY CORPORATION ROSATOM IN 2020

Table of Contents



Report Profile

The Public Annual Report of State Atomic Energy Corporation Rosatom (hereinafter referred to as the Corporation or ROSATOM) for 2020 (the Report) has been prepared on a voluntary basis and is intended for a broad range of ROSATOM's stakeholders.

The 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 social policy and other aspects of sustainable development;
- The economic, environmental and social impact on the external and internal environment;
- ROSATOM's management approaches to various aspects of its business.

Given a wide variety of target audiences, this Report has been prepared in a modular format: it consists of several chapters:

- A Strategic Report;
- A Business Development Report;
- A Social Report;
- A Report on the Development of Nuclear Towns and Cities;
- A 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

GRI 102-54

The Report has been prepared in accordance with the following documents:

- The Uniform Industry-Wide Public Reporting Policy of ROSATOM;
- The Uniform Industry-Wide Methodological Guidelines (Standard) on Public Reporting of ROSATOM and Its Organisations;
- The International Integrated Reporting Framework (International <IR> Framework);
- The Global Reporting Initiative Sustainability Reporting Standards (GRI SRS, Core option);
- The AccountAbility AA1000 Series of Standards (AA1000 AP (2018), AA1000 SES (2015));
- The Conceptual Framework for the Development of Public Non-Financial Reporting in Russia;
- The Recommendations of the Russian Union of Industrialists and Entrepreneurs (RSPP) for Use in Governance Practice and Corporate Non-Financial Reporting (basic performance indicators).

ROSATOM's internal regulations stipulate an annual reporting cycle. The Report covers the Corporation's operations during the period from 1 January 2020 through 31 December 2020.

GRI 102-50
GRI 102-51
GRI 102-52

Report boundaries

GRI 102-45
GRI 102-46

The Report contains information on the operations of ROSATOM and its organisations in Russia and abroad. Given the special characteristics of ROSATOM's operations and the obligation to protect state secrets, the scope of information disclosure on the day-to-day operation of the Nuclear Weapons Division is restricted.

The Report covers several scopes of consolidation (the lists of organisations included in different scopes of consolidation are published as appendices to this Report at report.rosatom.ru).

Performance indicators are disclosed mainly for the Corporation's organisations included in the part of the scope of ROSATOM's consolidated IFRS financial statements for which information is publicly available. GRI disclosures that belong to the Environmental Category are reported for all organisations within ROSATOM which provide information on their environmental performance using corporate reporting forms (123 organisations).

In accordance with international standards, some disclosures in the Report and related performance indicators (international cooperation, ROSATOM's activities in nuclear towns and cities, environmental protection, etc.) include information on the operations of ROSATOM's key partners, counterparties and other stakeholders.

GRI 102-46
GRI 102-47
GRI 102-48

Process for determining the Report content

The 2020 Report has been prepared in accordance with international reporting standards: the Global Reporting Initiative Sustainability Reporting Standards (GRI SRS) and the International Integrated Reporting Framework (International <IR> Framework). There have been no restatements of information.

Both standards require that material topics to be disclosed in the Report should be determined.

The materiality of information was determined through the following process:

- The Communications Department compiled a list of material topics related to ROSATOM's operations;
- The Corporation's management and representatives of major stakeholder groups took part in a questionnaire survey assessing the materiality of the topics taking into account the materiality of ROSATOM's impacts and its influence on stakeholders' opinions and decisions;
- Following the 'two-stage filtering', a list of material topics to be disclosed in the Report was compiled;
- A discussion was held in the form of an online dialogue (a foresight dialogue on materiality), and the list of material topics to be disclosed in the Report was finalised.

33 people were involved in the prioritisation of material topics, including 15 managers of the Corporation and 18 external stakeholders (9 employees[1] of ROSATOM's Divisions, 4 representatives of educational and research institutions, 2 representatives of environmental organisations, 1 representative of the business and expert community and 2 representatives of non-governmental organisations).

Out of the 42 topics proposed for assessment, 29 topics were included in the scope of material topics.

As part of the discussion during the foresight dialogue, the participants decided to expand the list of material topics by adding another five topics that had not received a sufficient number of votes in the questionnaire survey but had been recognised by the participants of the dialogue as material topics, namely:

- 16. Business diversification;
- 20. Combating corruption;
- 21. Procurement and supply chain management;
- 29. Work of ROSATOM's Public Council;
- 30. Respect and exercise of human rights.

In addition, 10 new topics were proposed during the online questionnaire survey. The participants of the foresight dialogue approved the inclusion of the following five new topics in the list of material topics:

- 43. Development of herd immunity against COVID-19;
- 44. Volunteering;
- 45. Adaptation to climate change and greenhouse gas emissions;
- 46. Personnel management, planning, training, retraining and knowledge transfer (mentoring);
- 47. Personnel education.

As a result of the materiality assessment procedure, 39 material topics to be disclosed in the Report were identified.

The decision to include various GRI SRS performance indicators and performance indicators stipulated in ROSATOM's Public Reporting Standard was based on the materiality of the topics to which the indicators are related. The boundaries of information disclosure on various aspects were determined by the Communications Department.

[1] Hereinafter, the term 'employee' has the same meaning as in the GRI Sustainability Reporting Standards (GRI SRS).

GRI 102-49

Materiality matrix

Industry-specific topics and governance

1. Implementation of ROSATOM's strategy
2. Nuclear and radiation safety
3. Prospects for the development of the nuclear power industry
4. RAW and SNF management and addressing 'nuclear legacy' issues
5. Development of the Northern Sea Route
6. Emergency preparedness
7. Participation in international 'mega science' projects
8. Performance of government functions
9. Performance of the Nuclear Weapons Division
10. ROSATOM's knowledge management system and protection of intellectual property
11. Corporate governance

Economic impacts

12. Development of international business and international cooperation
13. Traditional and new markets
14. Financial and economic performance
15. Innovation and scientific and technological advancement
16. Business diversification
17. Business risks and opportunities
19. Performance of ROSATOM's Divisions
20. Combating corruption
21. Procurement and supply chain management
22. Import substitution
23. Performance of the ROSATOM Production System (RPS)

Social impacts

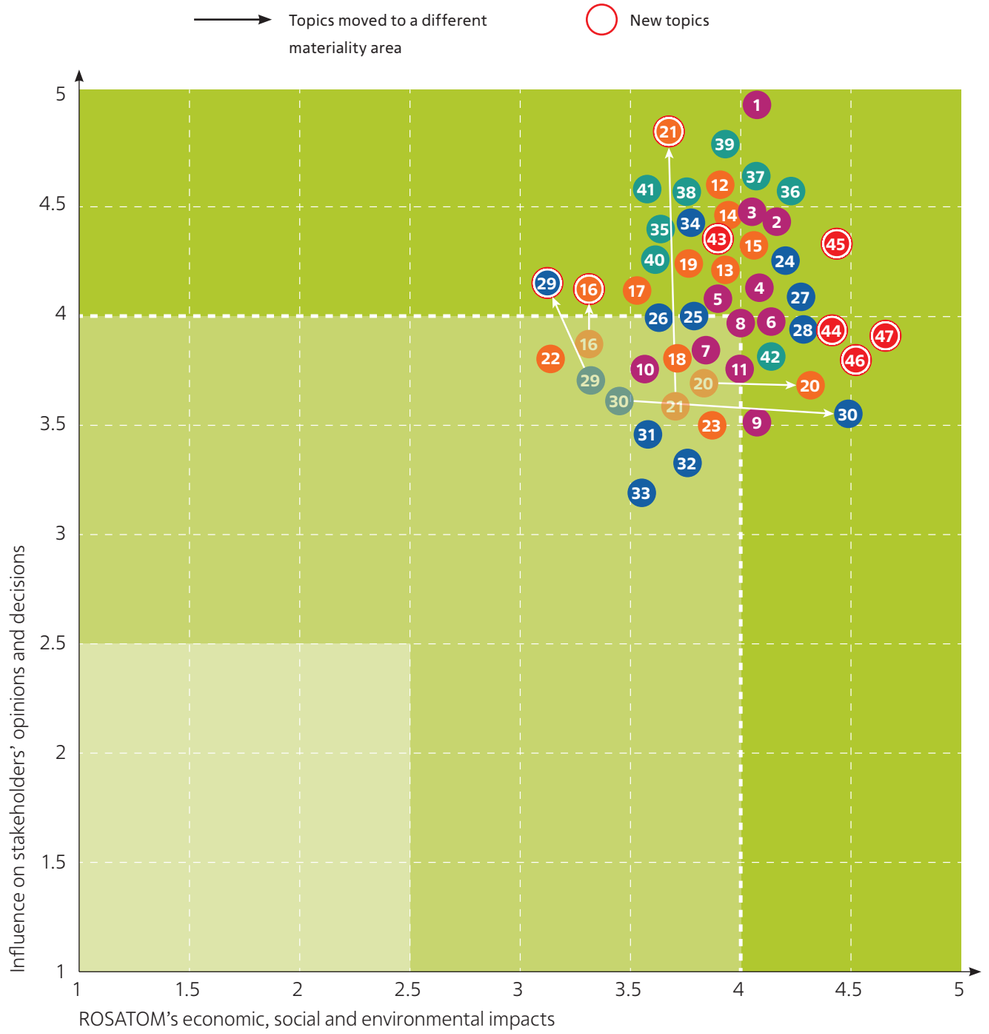
24. Social and economic impact on the regions of operation (including CATFs) and local communities
25. Provision of access to energy
26. Occupational health and safety
27. Cooperation with universities and recruitment of young professionals
28. Personnel management, social policy and corporate culture
29. Work of ROSATOM's Public Council
30. Respect and exercise of human rights
34. Response to the pandemic (business continuity, personnel, external stakeholders)

Environmental impacts

35. Radiation impact on the environment
36. Development of technologies reducing the environmental footprint
37. Environmental protection and environmental performance
38. Emissions and discharges
39. Management of effluents and waste
40. Compliance with environmental and technical standards
41. Energy efficiency
42. Management of disturbed and contaminated areas

New topics

43. Development of herd immunity against COVID-19
44. Volunteering
45. Adaptation to climate change and greenhouse gas emissions
46. Personnel management, planning, training, retraining and knowledge transfer (mentoring)
47. Personnel education



List of material topics

High materiality (34 topics + 5 additional topics)	Significant topics (8 topics)
1. Implementation of ROSATOM's strategy	7. Participation in international 'mega science' projects
2. Nuclear and radiation safety	10. ROSATOM's knowledge management system and protection of intellectual property
3. Prospects for the development of the nuclear power industry	18. Digital products and contribution to the digitisation of the Russian economy
4. RAW and SNF management and addressing 'nuclear legacy' issues	22. Import substitution
5. Development of the Northern Sea Route	23. Performance of the ROSATOM Production System (RPS)
6. Emergency preparedness	31. External communication projects
8. Performance of government functions	32. Organisational change management
9. Performance of the Nuclear Weapons Division	33. Industry media coverage
11. Corporate governance	
12. Development of international business and international cooperation	
13. Traditional and new markets	
14. Financial and economic performance	
15. Innovation and scientific and technological advancement	
16. Business diversification	
17. Business risks and opportunities	
19. Performance of ROSATOM's Divisions	
20. Combating corruption	
21. Procurement and supply chain management	
24. Social and economic impact on the regions of operation (including CATFs) and local communities	
25. Provision of access to energy	
26. Occupational health and safety	
27. Cooperation with universities and recruitment of young professionals	
28. Personnel management, social policy and corporate culture	
29. Work of ROSATOM's Public Council	
30. Respect and exercise of human rights	
34. Response to the pandemic (business continuity, personnel, external stakeholders)	
35. Radiation impact on the environment	
36. Development of technologies reducing the environmental footprint	
37. Environmental protection and environmental performance	
38. Emissions and discharges	
39. Management of effluents and waste	
40. Compliance with environmental and technical standards	
41. Energy efficiency	
42. Management of disturbed and contaminated areas	
43. Development of herd immunity against COVID-19	
44. Volunteering	
45. Adaptation to climate change and greenhouse gas emissions	
46. Personnel management, planning, training, retraining and knowledge transfer (mentoring)	
47. Personnel education	

Stakeholder engagement

To improve transparency and accountability and to determine the materiality of information to be disclosed, the Report was prepared in cooperation with stakeholders in accordance with international standards (AA1000SES (2015), GRI SRS, the International <IR> Framework). The Corporation conducted a survey to identify material topics to be disclosed in the Report, held dialogues with stakeholders (in an online format) and collected written comments on the draft Report from the participants of the dialogues. The Report incorporates key requests and recommendations made by stakeholder representatives.

For more details on stakeholder engagement, see the section 'Strategic Communications'.

Verification of reporting information

- The reporting information was certified as reliable by an independent auditing organisation which assured the Report's compliance with the GRI SRS Standards (the Core option) and the International Integrated Reporting Framework (the International <IR> Framework), as well as ROSATOM's compliance with the AccountAbility AA1000AP Standard (2018)[2].
- ROSATOM's Internal Audit Department conducted an internal audit of the business process 'Public Reporting Procedure in ROSATOM' (*see the Appendix 'Report of the Internal Audit Department of State Atomic Energy Corporation Rosatom'*).

Representatives of key stakeholders provided public assurance of the Report in accordance with the AA1000SES (2015) Standard, which confirmed the materiality and completeness of information disclosed in the Report and the Corporation's responsiveness to stakeholders' requests when preparing the Report (*see the section 'Statement of Public Assurance'*).

[2] The independent auditor's report is available at www.report.rosatom.ru.

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.

About ROSATOM

GRI 102-1
GRI 102-5

ROSATOM 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, mechanical engineering, NPP design and construction, power generation, decommissioning of nuclear facilities, spent nuclear fuel and radioactive waste management.

GRI 102-7

The Corporation comprises over 300 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 Russia's largest power generation company 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 life cycle of a nuclear power plant spans approximately 100 years:

- NPP construction: 5 to 7 years;
- NPP operation: 60 years;
- NPP decommissioning: 20 to 45 years.

ROSATOM is also developing new businesses outside its core production and process chain (which involves construction and operation of large NPPs). These include wind power, nuclear medicine, advanced materials and technologies, 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 in the sphere of nuclear power is the Proryv (Breakthrough) Project, 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.

№1
in the world

in terms of the overseas NPP construction project portfolio (36[3] power units)

№1
in the world

in terms of uranium enrichment (36% of the global market)

№2
in the world

in terms of uranium production

№2
in the world

in terms of uranium resources

№3

on the global nuclear fuel market

20.3%

share of electricity generation in Russia

The world's only

nuclear-powered icebreaker fleet

356[4]

organisations within the Corporation

RUB 397.45 billion

expenditure on corporate and social programmes for employees in 2020

RUB 26.93 billion

expenditure on environmental protection in 2020

276,100

employees

[3] Including power unit No. 1 of the Belarusian NPP, which was synchronised with the power grid and started to supply electricity to the integrated power system of the Republic of Belarus on 3 November 2020.

[4] According to data in the Automated Property Management System of ROSATOM.

GRI 102-14

Statement of the Chairman of the Supervisory Board

Sergey Kirienko
Chairman of the Supervisory Board of ROSATOM

Dear colleagues,

2020 marked the 75th anniversary of the Russian nuclear industry. I would like to congratulate all employees of ROSATOM and its organisations on this occasion once again!

Anniversary celebrations were held under the motto 'Ahead of the Times'. Indeed, in 2020, ROSATOM exceeded all key performance targets, further cementing its reputation as a reliable and responsible company.

The state defence order was fulfilled in full. A power unit equipped with a VVER-1200 reactor unit was put into operation at the Belarusian NPP, and the power start-up of power unit No. 2 was completed at Leningrad NPP-2. The Corporation provided uninterrupted energy supply to consumers, setting a new record for electricity output. Moreover, cargo traffic along the Northern Sea Route also reached a new all-time high of almost 33 million tonnes, which is 4 million tonnes above the target set for the federal project.

In 2020, ROSATOM joined the UN Global Compact. This sends an important signal to all countries where ROSATOM does business, indicating that the Corporation is willing to share responsibility for the future of our planet, is working to achieve sustainable development goals and subscribes to sustainability principles.

Russia is currently faced with a formidable task set by President Vladimir Putin: to become a leader in the renewable energy sector. ROSATOM is playing an important role in accomplishing this task: the Corporation has already become a renewable energy supplier by launching the Adygea and Kochubeyevskaya Wind Power Plants. It is partly due to ROSATOM's efforts that the share of green energy in Russia has matched and even exceeded that of many developed economies.

Becoming a leader will be a challenging task, but this has never discouraged our specialists, our enterprises or ROSATOM as a whole.

I am sure that in 2021, the Corporation will further consolidate its positions on the Russian and international markets by developing new businesses and new technologies that create value for all its stakeholders.

I would like to thank all employees, suppliers and contractors of nuclear organisations, as well as our partners both in Russia and abroad for their concerted efforts.

Financial and Economic Results[5]

Key financial results, RUB billion

Indicator	2018	2019	2020	2020/2019
Revenue	1,033.9	1,151.9	1,207.4	**+4.8%**
Assets	3,802.2	4,295.6	4,722.4	**+9.9%**
Intangible assets	194	170.9	199.6	**+16.8%**

A 4.8% increase in revenue compared to 2019 was achieved mainly by boosting revenue from R&D and design work, sales of uranium products and enrichment services; the growth was also driven by an increase in revenue from electricity and heat generation and capacity.

Profitability ratios, %

Indicator	2018	2019	2020
Return on sales (ROS)	20.34	11.55	13.00
Return on assets (ROA)	5.53	3.10	3.32
Return on equity (ROE)	8.45	5.10	5.58

Profitability ratios increased in 2020, primarily due to a year-on-year increase in profit in the reporting period.

[5] Data have been provided on the part of the scope of IFRS consolidation of ROSATOM for which information is publicly available.
Data for 2019 have been recalculated in order to reflect the effect of fair value measurement of assets and liabilities recognised as at the date of acquisition of control over TITAN 2 IC ICTAS.

CHAPTER 1

STRATEGIC REPORT

GRI 102-14

Statement of the Director General

Dear colleagues,

This Report presents the operating results of ROSATOM and the organisations that it manages for 2020. Despite the pandemic, which posed major challenges, we successfully achieved all our production targets. In the reporting period, performance against ROSATOM's key performance targets set by the Supervisory Board stood at 105.5%.

The pandemic necessitated a major revision of our approaches to doing business. We had to promptly learn to live and work in a new way, complying with all sanitary restrictions.

We started to use new work management methods and ensured the safety of critical operating personnel. 1,700 employees operating nuclear reactors and nuclear facilities were isolated and accommodated at health resorts; they were transported to the workplace and back under a special procedure. These employees were also the first to be vaccinated in late 2020. We created more than 40,000 mobile workplaces and introduced regular testing.

Ensuring operational continuity at our overseas sites was an important challenge for us. We arranged employee rotation and set up PCR testing laboratories.

Alexey Likhachev
Director General of ROSATOM

In addition to health and safety measures, during this period people had an unprecedented need for support. A communication system was set up in the industry, and executives started to publish weekly video messages addressing employees' concerns at the peak of the pandemic.

We attach special importance to vaccinating our employees. Herd immunity in the industry is currently estimated at 70%, with 90% of critical personnel already vaccinated.

ROSATOM spent a total of more than RUB 11 billion on COVID response. These funds were used to open 20 PCR laboratories and provide hospitals and infirmaries in nuclear towns and cities with the necessary medical equipment. We continue to cooperate with the FMBA of Russia to improve the quality and reliability of medical equipment. People's health is invariably our top priority.

Major highlights of 2020 included the approval of a comprehensive programme titled 'Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024' pursuant to an order of the President of the Russian Federation. The programme includes activities focused on developing new nuclear, fusion and plasma technologies, upgrading and expanding research capabilities and pilot industrial facilities, designing and building innovative NPP power units.

In the reporting year, ROSATOM updated its Business Strategy until 2030, which states that contribution to the achievement of the 17 UN Sustainable Development Goals is one of ROSATOM's top priorities. The Corporation joined the UN Global Compact Network, which unites sustainable businesses across the globe. In the reporting year, ROSATOM also approved the Unified Industry Policy on Sustainable Development.

Speaking of major operational achievements in 2020, I would like to highlight that electricity output reached 215.7 billion kWh, which is an all-time high in the history of Russia's nuclear power industry. The share of nuclear power in the country's energy mix currently stands at 20.3%, which is also a record high in recent history.

Key events of the year included the commissioning of a new power unit of the Belarusian NPP, the power start-up of power unit No. 2 of Leningrad NPP-2, the launch of two wind power plants (the Adygea and Kochubeyevskaya WPPs) and the commissioning of the flagship icebreaker, *Arktika*. Despite having to operate in a challenging environment, we continued to fulfil all our obligations to our partners and customers.

2020 marked a double anniversary: that of the Victory in the Great Patriotic War and the 75th anniversary of the Russian nuclear industry. Dozens of celebratory events, award ceremonies and concerts were held in Moscow and across nuclear towns and cities. We are proud to have preserved the memory of the founders of our industry and the outcomes of their efforts over the decades. We would like to express our sincere thanks to everyone who contributed to holding the anniversary celebrations, especially to industry veterans.

By engaging in a dialogue with people and fully mobilising our team, we achieved record-breaking results, and we will continue to work towards our ambitious goals for the benefit of society and the environment.

I would like to thank all of ROSATOM's employees for their outstanding work and professionalism, which enabled us to achieve such impressive results, and I wish them every success in attaining our shared goals for the future.

Key Results in 2020

GRI 102-7

Key performance indicators set by the Supervisory Board

Indicator	2018	2019	2020	2020/2019
Adjusted free cash flow of ROSATOM, RUB billion	321.5	328.7	335.0	**+1.9%**
Year-on-year increase in labour productivity[6], %	-	-	113.6	-
Unit semi-fixed costs (as a percentage of revenue), %	24.6	25.3	26.9	**+6.3%**
Power generation, billion kWh	204.3	208.8	215.7	**+3.3%**
Performance against the targets of JSC Rosenergoatom's investment programme, %	101.5	104.3	103	**-1.2%**
10-year portfolio of overseas orders, USD billion	133.2	140.1	138.3	**-1.3%**
Portfolio of overseas orders over the entire life cycle[7], RUB billion	-	203.3	204.0	**+0.3%**
10-year portfolio of orders for new products (outside the scope of the Corporation), RUB billion	1,082.6	1,169.1	1,602.1	**+37%**
Revenue from new products (outside the scope of the Corporation), RUB billion	196.7	227.9	261.6	**+14.8%**
Integrated innovation KPI[8], %	114.4	114.4	112	-
Fulfilment of government orders, %	100	100	100	-
Number of events rated at level 1 or higher on the INES scale	0	0	0	-

[6] The KPI was introduced in 2020.

[7] The KPI was introduced in 2019.

[8] The calculation includes the number of foreign patents, revenue from sales of innovative products and the results of implementation of ROSATOM's new innovative development programme. The target for the reporting period was set at 100%.

Key Events in 2020

- Electricity output at 35 power units of 10 operating NPPs and the power unit of the floating thermal nuclear power plant with two reactor units totalled 215.7 billion kWh, with the share of NPPs in Russia's energy mix totalling 20.3%.
- The floating thermal nuclear power plant (FTNPP) in Pevek (Chukotka Autonomous District) commenced commercial operation.
- Power start-up was completed at power unit No. 2 of Leningrad NPP-2, and power unit No. 1 of the Belarusian NPP, which comprises new generation 3+ nuclear power units with VVER-1200 reactors, was put into operation.
- The flagship multipurpose nuclear icebreaker, Arktika, was accepted into service.
- The 150 MW Adygea Wind Power Plant and the 210 MW Kochubeyevskaya Wind Power Plant started to supply electricity.
- ROSATOM signed contracts for the supply of nuclear fuel and its components for NPPs and research reactors in the Czech Republic, Egypt and India.
- Targets for the Northern Sea Route Federal Project were achieved, with cargo traffic totalling 33 million tonnes.
- Six new digital products came on the open market: the Infrastructure Platform for the Hosting of Modular and Containerised Data Centres; Atombot. Procurement; the Multi-D Unified Time Schedule; Logos Strength; the Mobile Data Centre and the Pilot Access Control System.
- 4 intergovernmental agreements and 12 interdepartmental agreements were concluded.
- An amendment to the Agreement Suspending the Antidumping Investigation on Uranium from the Russian Federation was signed. This will enable ROSATOM to remain a major supplier of nuclear fuel cycle products to the US.
- ROSATOM initiated the design of environmental technology parks for hazard class 1 and 2 waste management.
- ROSATOM updated the Innovative Development and Technological Modernisation Programme.
- ROSATOM's team won the WorldSkills Hi-Tech National Competition for the sixth time.
- ROSATOM joined the UN Global Compact.
- The Unified Policy on Sustainable Development of ROSATOM and Its Organisations was approved.
- ROSATOM reached agreement with a major Russian bank on raising a sustainable loan to finance the second stage of a 340 MW wind farm, with the price terms of the loan linked to the achievement of sustainable development targets at the construction and operation stages of the project.

1.1 Development Strategy

1.1.1. Business context

Trends in the development of the nuclear industry

The nuclear industry is influenced by a number of factors, including[9]:

- Global population growth from 7.8 billion people in 2020 to 8.5 billion people by 2030 and an increase in the share of urban population from 56% to 60%;
- Global GDP growth averaging 2.4% to 3.0% per year;
- Growth of global electricity consumption. Global electricity consumption is expected to increase by 23% compared to 2020 and reach 32.8 TWh as early as in 2030, with the Asia-Pacific Region accounting for two thirds of this increase;
- Accelerating greenhouse gas accumulation. The global energy sector accounts for about 60% of man-made emissions, generating about 33 billion tonnes of carbon dioxide per year.

The COVID-19 pandemic resulted in a 6% decrease in emissions from the energy sector; however, analysts predict a rapid recovery and further increase in emissions. The development of low-carbon power generation, including nuclear power, is a necessary prerequisite for reducing emissions and achieving international climate targets. In recent years, environmental aspects of the electricity industry have come under closer scrutiny, which has driven an increase in the share of low-carbon power in the global energy mix. The levelised cost of electricity (LCOE)[10] for renewable energy sources has almost matched that of conventional power generation facilities, ranging from USD 60 to USD 80 per megawatt-hour.

These factors contribute to the long-term demand for nuclear energy. Leading global think tanks predict an increase in installed capacity in the nuclear power industry by 2030. The International Energy Agency, UxC consulting company and the World Nuclear Association expect to see an increase in the capacity of operating NPPs under the base case scenario to 420 – 440 GW.

[9] Data from the World Bank, the UN, the IEA World Energy Outlook 2020 (Stated Policies Scenario), IEA's Net Zero by 2050 Report, EIU, the IAEA, the Energy Research Institute of the Russian Academy of Sciences, the General Layout Plan of Power Facilities until 2035 and McKinsey have been used.

[10] The levelised cost of electricity (LCOE) is the net present value of the unit cost of electrical energy over the life cycle of an NPP.

The global nuclear power industry will remain competitive in the long run compared to other energy sources. Thermal power generation will yield to nuclear energy primarily because of CO2 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. Furthermore, if CO_2 capture systems are installed, the LCOE of thermal power plants increases by 40% to 60%, which makes them economically unviable. Unpredictable prices for raw hydrocarbons are yet another major disadvantage of thermal power generation.

Regarding renewable energy, even if energy generation becomes significantly cheaper, further traditional backup facilities or energy storage systems will need to be built to secure stable supplies of energy. This, in turn, will entail an increase in capital expenditure on the power grid.

ROSATOM has identified two groups of factors that have the most significant impact on the Corporation's global operations:
1. The economic and geopolitical situation. Although global economic growth outpaces that of the Russian economy, as a global company ROSATOM sets itself higher growth targets, given persisting political pressure and a general trend towards growing protectionism.
2. The technological landscape. The Fourth Industrial Revolution that is currently underway across the world makes a significant impact on both global and local businesses. Its key elements, which ROSATOM takes into account when updating its business strategy, include:

- Large-scale automation of production through active introduction of manufacturing solutions based on fully automated machine work;
- Customisation of production in order to fully meet the customers' individual needs;
- Consolidation of manufacturing enterprises into integrated 'smart' networks and the development of the Internet of Things in the manufacturing industry, which involves the fullest possible digitisation of information exchange;
- Accelerated development and commercialisation of technologies; a shorter life cycle of technologies and products.

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 wa-

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 model) and building project infrastructure (legal framework, employee training, community relations, etc.).

ter-cooled water-moderated power reactors (VVERs) have proved their reliability over one thousand reactor-years of fail-free operation. In 2020, ROSATOM was the largest global player in terms of the portfolio of overseas NPP construction projects (36[11] power units).

For information on ROSATOM's main competitors, see the section 'Markets Served by ROSATOM'.

GRI 103-1
GRI 103-3

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 2020 and approved by ROSATOM's Supervisory Board on 28 April 2020.

ROSATOM's mission is to leverage the achievements of nuclear science and modern high technology for the benefit of humanity.

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), as well as strengthening the export potential of Russia's nuclear technologies (construction of nuclear power plants abroad, rendering uranium enrichment services, nuclear fuel fabrication, etc.).

ROSATOM's mission reflects the development model that it has prioritised: the Corporation leverages the research, technological and manufacturing capabilities that it has developed over the years and continues to create new technologies that can help to improve the standard of living around the world.

ROSATOM's operations facilitate the implementation of the global sustainable development agenda. The Corporation contributes to the achievement of the UN Sustainable Development Goals through its product line and its efforts to ensure the sustainability of internal environmental, social and governance processes.

For details, see the Sustainability Report.

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

[11] Including power unit No. 1 of the Belarusian NPP.

ROSATOM's vision is to become a global technological leader. Accordingly, the Corporation intends to expand the scale of its business to match existing global technological leaders.

By 2030, ROSATOM intends to increase its revenue to RUB 4 trillion, with the share of new products in revenue expected to reach 40%; the Corporation also intends to expand its overseas footprint, with at least 50% of revenue to be generated by the overseas business.

The vision provides an industry-wide focus on developing modern high technology and sets ambitious goals for each of the prioritised areas. Thus, the overall goal of expanding the scale of business is decomposed. In the sphere of nuclear power generation, this helps to maintain the continuity of strategic goals, enabling ROSATOM to remain an undisputed leader in the global nuclear industry.

The vision 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.** To assert its leadership on the global nuclear power market, ROSATOM is currently expanding its footprint in over 50 countries around the world and the long-term portfolio of overseas orders and increasing the corresponding revenue;
- **To reduce production costs and the lead time.** In order to develop the most competitive products, ROSATOM will take further steps to reduce the duration of NPP construction and the levelised cost of electricity (LCOE);
- **To develop new products for the Russian and international markets.** Given the accumulated knowledge and technologies of the 'nuclear project' in civilian sectors, ROSATOM plans to increase the share of new businesses in revenue significantly by 2030;

GRI 102-4

The COVID-19 pandemic was a major external factor in 2020, whose impact extends beyond the short term. ROSATOM views long-term impacts of the pandemic as providing opportunities for development due to:

- Heightened public interest in a number of product areas within ROSATOM's sphere of competence;
- Growing demand for and accelerated adoption of effective digital solutions for a variety of applications;
- Heightened interest in the global environmental agenda and sustainability initiatives.

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

- **To achieve global leadership in state-of-the-art technology.** ROSATOM seeks to extend its global leadership beyond the nuclear industry. The Corporation intends to leverage its existing capabilities, the understanding of nuclear technologies and accumulated experience in order to diversify into new segments. In the future, ROSATOM aims to rank among international companies perceived as global technological leaders.

For details on steps taken by ROSATOM in order to increase its international market share, see the section 'International Cooperation' and the chapter 'Business Development Report'.

GRI 103-2

In order to implement the strategy, the following objectives must be met:

- Ensuring safe use of nuclear energy;
- Non-proliferation of nuclear technologies and materials;
- Minimising the negative environmental impact;
- 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, including the Law on State Secrets.

GRI 102-15
GRI 103-3

Key strategy implementation risks

Key risks that can influence the achievement of strategic goals include:

- 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 and reputational risks);
- Operational risks (including the risk of losing critical knowledge of existing and newly created products);
- Political risks;
- Technical (project) risks;
- Technological risks (including the risk of shortcomings in technology).

For details on the key risks, see the section 'Risk Management'.

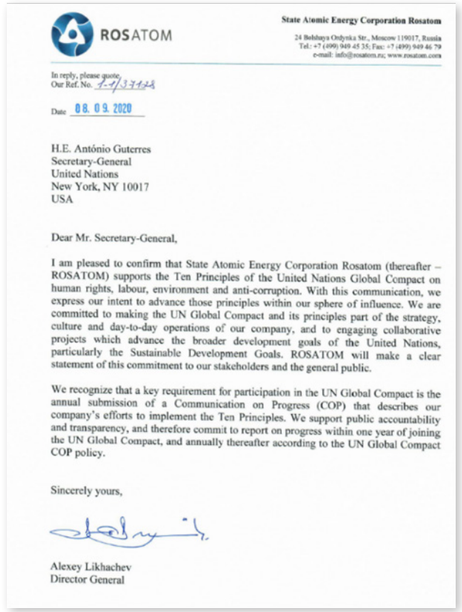
1.2

Sustainable Development Management

1.2.1. Key results in the sphere of sustainable development

GRI 102-12
GRI 103-1

In the course of its operations, the Corporation is guided by global sustainable development priorities and adheres to the 10 principles of the UN Global Compact. ROSATOM contributes to the achievement of the UN Sustainable Development Goals (SDGs) through its product line, its financial and economic performance and its efforts to ensure the sustainability of internal environmental, social and governance processes.



ROSATOM

State Atomic Energy Corporation Rosatom
24 Bolshaya Ordynka Str., Moscow 119017, Russia
Tel.: +7 (499) 949 45 35; Fax: +7 (499) 949 46 79
e-mail: info@rosatom.ru; www.rosatom.com

In reply, please quote
Our Ref. No. 1-1/3742

Date 08.09.2020

H.E. António Guterres
Secretary-General
United Nations
New York, NY 10017
USA

Dear Mr. Secretary-General,

I am pleased to confirm that State Atomic Energy Corporation Rosatom (thereafter – ROSATOM) supports the Ten Principles of the United Nations Global Compact on human rights, labour, environment and anti-corruption. With this communication, we express our intent to advance those principles within our sphere of influence. We are committed to making the UN Global Compact and its principles part of the strategy, culture and day-to-day operations of our company, and to engaging collaborative projects which advance the broader development goals of the United Nations, particularly the Sustainable Development Goals. ROSATOM will make a clear statement of this commitment to our stakeholders and the general public.

We recognize that a key requirement for participation in the UN Global Compact is the annual submission of a Communication on Progress (COP) that describes our company's efforts to implement the Ten Principles. We support public accountability and transparency, and therefore commit to report on progress within one year of joining the UN Global Compact, and annually thereafter according to the UN Global Compact COP policy.

Sincerely yours,

Alexey Likhachev
Director General

In 2020, ROSATOM confirmed its commitment to sustainable development by joining the UN Global Compact, the world's largest corporate sustainability and corporate social responsibility initiative managed by the UN, with over 15,000 corporate participants from more than 160 countries. As part of this step, ROSATOM sent an official letter confirming its commitment to integrating the 10 principles of the UN Global Compact in the sphere of human rights, employment, the environment and anti-corruption into its operations. In December 2020, ROSATOM also joined the UN Global Compact Network Russia (the Association 'National Network of the Global Compact').

In July 2020, the Corporation approved the Unified Industry Policy on Sustainable Development, which sets out the position of ROSATOM and its organisations on sustainable development matters, including the goals, objectives and key principles of their efforts in the sphere of health, safety and the environment, in the social sphere and in the sphere of corporate governance.

Unified Industry Policy of ROSATOM and Its Organisations on Sustainable Development

In order to systematise sustainability initiatives across the industry, ROSATOM has developed and approved the Uniform Industry-Wide Methodological Guidelines on the Management of Sustainability Initiatives.

Other highlights of 2020 in the sphere of sustainable development include the following:

- ROSATOM reached agreement with a major Russian bank on raising a sustainable loan to finance the second stage of a 340 MW wind farm, with the price terms of the loan linked with the achievement of sustainable development targets at the construction and operation stages of the project. This is the Corporation's first project involving the use of a sustainable financing mechanism;
- ROSATOM contributed to the preparation of Russia's Voluntary National Review on the Achievement of the Sustainable Development Goals, which was presented at the UN High-Level Political Forum in July 2020 in an online format. The document highlights the contribution of nuclear organisations in terms of managing greenhouse gas emissions, developing the urban environment, providing environmental solutions and managing waste. The Review is available on the UN website at: *https://sustainabledevelopment.un.org/index.php?page=view&type=30022&nr=1686&menu=3170*.

GRI 103-2
GRI 103-3

1.2.2. Contribution to climate action

GRI 103-1

ROSATOM has singled out the climate agenda as a major priority both because it is an important aspect of sustainable development and given the scale of the contribution of the nuclear power industry to reducing the carbon footprint in Russia and globally.

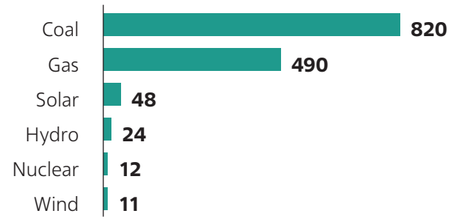
Nuclear power generation is a source of low-carbon energy that meets base load power demand. Nuclear power generation does not produce direct CO_2 emissions, which puts it on a par with renewable energy sources. The nuclear power industry produces the second lowest amount of greenhouse gas emissions over the life cycle, outperformed only by wind power generation, with emissions totalling 12 grams and 11 grams of CO_2 equivalent per kilowatt-hour respectively. The operation of NPPs in Russia helps to prevent emissions totalling over 100 million tonnes of CO_2 equivalent per year, while the operation of all Russian-design NPPs globally helps to prevent emissions exceeding 210 million tonnes of CO_2 equivalent per year.

Nuclear power is currently the largest source of low-carbon green energy in Russia: in 2020, ROSATOM produced 215.7 billion kWh of electricity, accounting for 20.3% of the total electricity output in the country and setting an all-time record in the history of the Russian nuclear power industry.

GRI 103-2
GRI 103-3

In order to expand the range of clean energy solutions, the Corporation has been developing the wind power business since 2017. Its first project in this area is the 150 MW Adygea Wind Power Plant, which started to supply electricity to the wholesale market in March 2020. Later, in December 2020, the 210 MW Kochubeyevskaya Wind Power Plant was put into operation and started to supply electricity to Russia's integrated power system in January 2021. It is currently the largest wind power plant in the country. The portfolio of wind power plants to be built by ROSATOM by 2024 totals 1.2 GW, or more than 30% of the Russian wind power market.

Greenhouse gas emissions*



Source: IPCC.

* Over the life cycle (g of CO_2e / kWh)

GRI 103-2
GRI 103-3

The Corporation attaches great importance to developing low-carbon hydrogen energy production, which is a promising area. In 2018, hydrogen energy production was included in ROSATOM's list of prioritised areas of scientific and technological development. The Russian nuclear industry has extensive technological and research capabilities for developing key hydrogen production techniques: electrolysis, which is one of the most environmentally friendly hydrogen production techniques, and steam methane reforming, which involves the use of CO_2 capture technology. The Corporation is focused on developing technologies for low-carbon hydrogen production and storage and participating in pilot hydrogen projects both in Russia and abroad. Given the global objective of decarbonising transport, industry and the energy sector, this area provides considerable opportunities for international cooperation.

1.2.3. Sustainable products

ROSATOM's product portfolio comprises more than 80 existing and future-oriented high-technology products and services. All of these products are aimed at improving the quality of people's lives and contribute to the achievement of the UN Sustainable Development Goals, each in their own way (*see the section 'Contribution to the Achievement of the UN SDGs' of the Appendix 'Sustainability Report'*). When developing new businesses, ROSATOM focuses particularly on environmental impacts, value creation for end users and assessment of product solutions in terms of their alignment with the UN SDG priorities.

Examples of sustainable products include:

- *Nuclear power plants:* affordable low-carbon power, job creation and industry development;
- *Environmental solutions:* waste management and site remediation;
- *The Smart City:* digital solutions for the urban environment and infrastructure development;
- *Nuclear medicine and isotope products:* protecting people's health and improving the standard of living;
- *Water treatment and desalination:* access to clean water and sanitation;
- *Multipurpose irradiation centres:* alleviating hunger, protecting people's health and improving the standard of living;
- *Development of the Northern Sea Route:* logistical solutions and development of maritime infrastructure.

For details, see the Appendix 'Sustainability Report'.

1.2.4. Sustainable operations

The Corporation's sustainable development initiatives involve continuous process improvement, implementation of health, safety and environmental projects, corporate social responsibility initiatives and volunteering, development of a supply chain management system, as well as personnel management and development of the talent pool.

Environmental aspect (E). ROSATOM seeks to align its operations with the 'Do No Significant Harm' principle, which involves minimising pollution, the negative impact on ecosystems and risks to human health.

The Corporation has adopted the Uniform Industry-Wide Environmental Policy (2008[12]). As part of its implementation, the Corporation annually takes measures to improve environmental safety and preserve the environment in the course of operations of nuclear organisations. To monitor progress and assess the efficiency of sustainable development processes in the sphere of environmental protection and environmental impacts, ROSATOM uses such key indicators as the volume of pollutant emissions, water withdrawal, the area of restored land, the share of organisations that have undergone certification in accordance with the ISO 14001 standard, etc.

The Social aspect (S) is another major aspect of sustainability of ROSATOM's business. It includes ensuring occupational and process safety, protecting the life and health of employees in the industry and developing human potential. The Corporation implements social projects aimed at supporting employees in the industry and the residents of nuclear towns and cities and driving systematic improvements in the standard of living for employees and their families, local communities and consumers of the Corporation's products in its regions of operation.

ROSATOM has adopted the Uniform Industry-Wide Social Policy (2013) and the Uniform Industry-Wide Policy on Occupational Safety and Health (2013). Key indicators used for assessing the efficiency of sustainable development processes in the social sphere include the LTIFR, the personnel turnover rate, the number of employees who have undergone training, the gender balance, the number of employees engaged in NPP construction, etc.

As part of the *Governance aspect (G)*, the Corporation is building an integrated system of industry regulation and sustainable development standards and ensures the transparency of its business by disclosing as much information as possible. In its production processes, ROSATOM focuses on making the procurement system transparent for suppliers and building a 'sustainable' supply chain, including a requirement for compliance with environmental and social standards. ROSATOM implements anti-corruption measures and introduces the principles of ethical business conduct on an ongoing basis.

The ROSATOM Production System has been developed and adopted in the industry; it is designed to promote a lean manufacturing culture. A quality management system has been introduced, and international standards such as ISO 14001 and ISO 9001 and other standards are applied.

[12] The years of approval of the first versions of the documents are stated.

Public sustainability reports are an integral part of ROSATOM's practice to ensure the transparency of its business; they also serve as a stakeholder engagement tool. Starting from 2010, the Corporation and its Divisions annually publish non-financial reports in accordance with the international GRI Standards.

ROSATOM has adopted the Unified Industry Policy on Sustainable Development (2020), the Uniform Industry-Wide Public Reporting Policy (2009), the Uniform Industrial Procurement Standard (2009), the Uniform Industry-Wide Anti-Corruption Policy (2015) and the Code of Ethics and Professional Conduct (2016).

To monitor the efficiency of sustainable development processes in the sphere of corporate governance, ROSATOM uses such key indicators as the findings of external audit of performance of the internal control system, the share of employees who have undergone anti-corruption training, the share of organisations that have implemented measures for monitoring and recording social and environmental standards across the supply chain, etc.

For details, see the Appendix 'Sustainability Report'.

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. Realising the importance of its operations for the economy and society, 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 scheme 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 capitals 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 ROSATOM uses in its operations. ROSATOM acknowledges that some of the available capitals are owned jointly with other stakeholders (e.g. natural resources or public infrastructure). 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.

ROSATOM's business model

Capitals available as at 31 December 2019

- Financial capital
- Manufactured capital
- Intellectual capital
- Human capital
- Social and relationship capital
- Natural capital

Governance system

Value creation in core businesses

Third core

- Radiation technologies
- New businesses in Divisions

Second core

- Uranium mining
- Conversion and enrichment
- Nuclear fuel fabrication
- SNF processing
- NFC
- NPPs
- NPP operation and power generation
- NPP construction
- NPP decommissioning
- Mechanical engineering
- R&D

First core

- NWD
- Atomflot
- NRS

Key products (results in 2020)

Revenue under IFRS
RUB 1,207.4 billion

Power generation in the Russian Federation
215.7 billion kWh

Nuclear fuel production
>1,000 tonnes of heavy metal (tHM)

Uranium production
7,100 tonnes

Commissioning of
2 power units

Cargo traffic along the NSR
33 million tonnes

Strategy — **Strategy**

Mission and values — **Mission and values**

Capitals available as at 31 December 2020

- Financial capital
- Manufactured capital
- Intellectual capital
- Human capital
- Social and relationship capital
- Natural capital

GRI 102-7

Value creation results

Indicator	2018	2019	2020	2020/2019
Financial capital				
Adjusted free cash flow, RUB billion	321.5	328.7	335.0	+1.9%
Revenue under IFRS, RUB billion	1,033.9	1,151.9	1,207.4	+4.8%
Manufactured capital				
Number of power units in operation during the year, pcs.	37	36	36[13]	-
Capacity factor of Russian NPPs, %	79.9	80.4	81.07	+0.8%
Intellectual capital				
Intangible assets under IFRS, RUB billion	194.0	170.9	199.6	+16.8%
Share of innovative products in revenue, %	17.5	20.6	25.0	+21.4%
Number of foreign patents obtained by ROSATOM, applications for foreign patents submitted and registered under the established procedure, registered trade secrets (know-how), pcs.	417	439	784	+78.6%
Human capital				
Average headcount, '000 people	255.4	266.4	276.1	+0.04%
Personnel turnover rate, %	12.7	13.2	12.0	-9%
Average training hours per employee	23.70	28.40	30.65	+58.3%
LTIFR	0.12	0.10	0.09	-10%
Social and relationship capital				
Level of support for nuclear power in Russia, %	74.5	73.7	75.2	+2%
10-year portfolio of overseas orders, USD billion	133.2	140.1	138.3	-1.2%
Taxes paid, RUB billion	188.2	207.4	249.9	+20.5%
Natural capital				
Uranium resources (Russian assets), '000 tonnes	520.7	512.7	509.4	-0.6%
Uranium resources (foreign assets), '000 tonnes	197.1	192.0	187.0	-2.6%
Water withdrawal from natural sources, million m^3	7,317.8	6,531.3	6,059.2	-7.2%

Benefits provided to stakeholders in 2020[14]
Government level Tax payments to budgets of all levels **RUB 249.9 billion** Number of agreements with regional governments in Russia **2 new agreements** (Sverdlovsk and Smolensk Regions) and **6 protocols on the implementation of agreements (**Kaluga, Murmansk, Rostov, Sverdlovsk, Voronezh and Kursk Regions) National projects involving ROSATOM: **11**
Corporate level Electricity generation in Russia **215.7 billion kWh** Number of events rated at level 1 or higher on the INES scale **0** Expenditure on scientific research **RUB 37.98 billion** Procurement from SMEs **RUB 165.2 billion.** Average monthly salary **RUB 90,000 per month** Expenditure on corporate social programmes for employees **RUB 397.45 billion** Total number of students studying at universities under arrangements with nuclear organisations **1,358 people**
Social level Jobs created **1,912** The Smart City platform is being rolled out in **17 nuclear towns and cities** Expenditure on environmental protection **RUB 26.89 billion** Energy cost savings **RUB 2,945.97 million** Gross greenhouse gas emissions **6,095.43 tonnes** Waste processed by ROSATOM's enterprises **24,696,400 tonnes**

[13] 35 power units of NPPs and the power unit of the floating thermal nuclear power plant (FTNPP).

[14] *ROSATOM's stakeholder groups are listed in the section 'Strategic Communications'.*

1.4 Markets Served by ROSATOM

In 2020, ROSATOM ranked:

- First in the world in terms of the number of NPP power units in the portfolio of foreign projects (36 power units, including power unit No. 1 of the Belarusian NPP);
- First on the global uranium enrichment market (36%);
- Second in the world in terms of uranium production (15% of the market);
- Third on the global nuclear fuel market (17%).

GRI 103-3
GRI 103-1

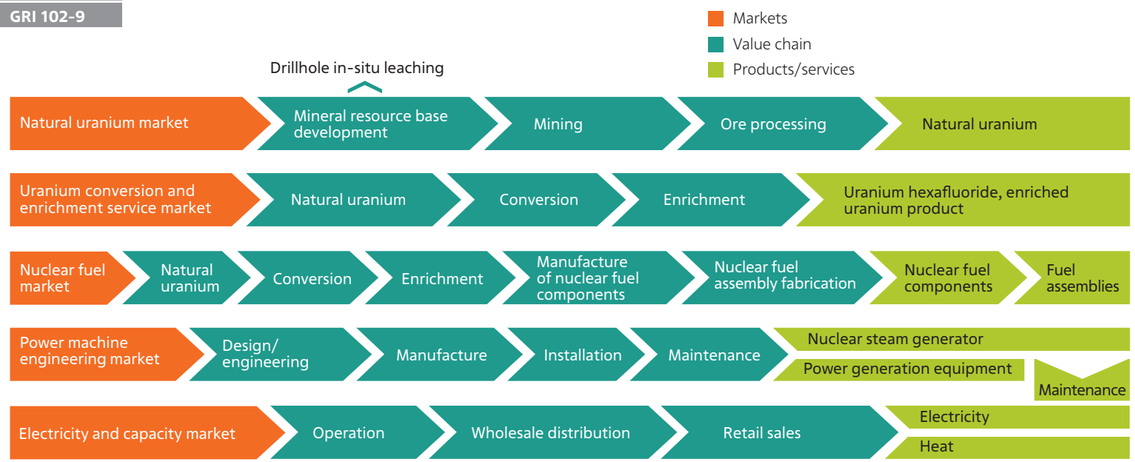
ROSATOM's vision is to become a global technological leader. Accordingly, the Corporation intends not only to develop its business in traditional segments, but also to take active steps towards entering new high-technology markets as a leading research and technology company.

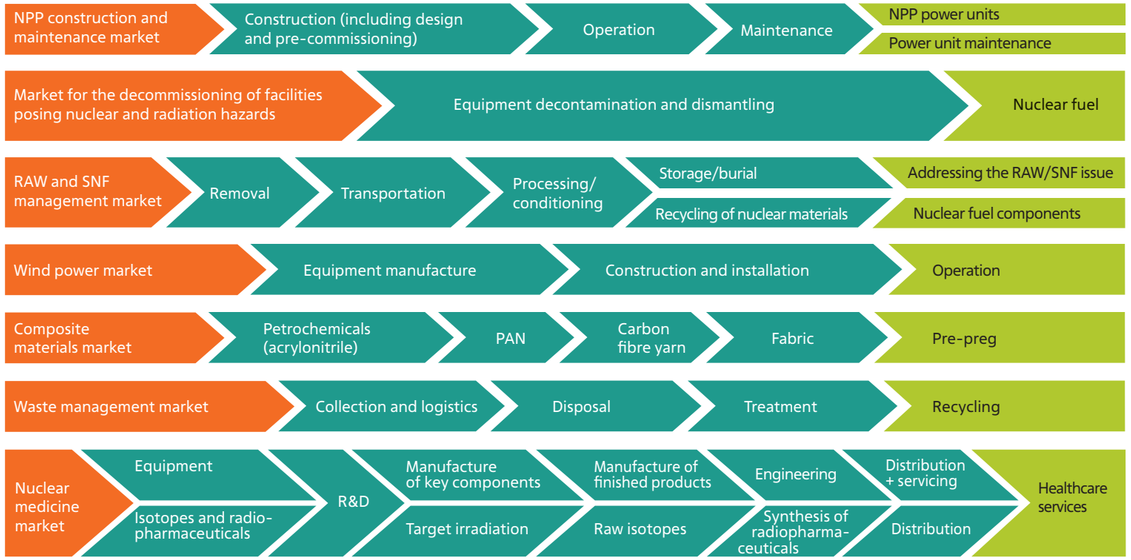
GRI 103-2

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.

GRI 102-2
GRI 102-6
GRI 102-9

Markets served by ROSATOM and value chains





1.4.1. Traditional markets

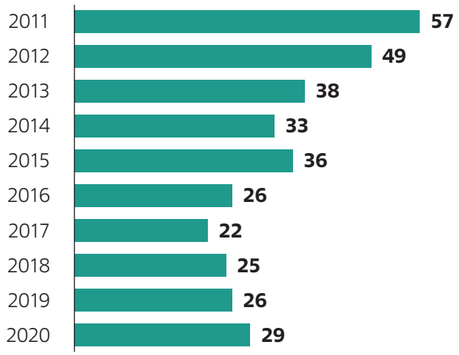
Natural uranium market

Forecast for changes in uranium demand by 2030

After 2011, there was a significant drop in prices on the nuclear fuel cycle front-end markets, including a long-term decline in quotations for natural uranium.

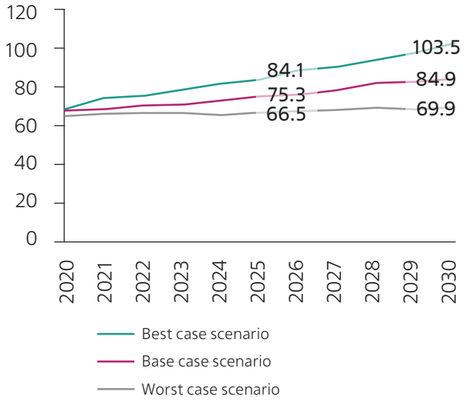
The COVID-19 pandemic had a direct impact on the spot market for uranium in 2020. As major uranium mining companies announced suspension or curtailment of production due to the risk of spread of the coronavirus infection, in March and April 2020, prices and volumes traded on the spot market soared unprecedentedly. As a number of uranium mining enterprises resumed operations by the end of the year, this partly offset the rise in spot prices. In the reporting year, spot market quotations averaged USD 29.49/lb of U_3O_8, up by 14% year on year.

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



Sources: input data from UxC[15]; average values have been calculated by JSC Atomredmetzoloto.

Forecast for changes in uranium demand by 2030, '000 tonnes



Source: World Nuclear Association, 2019.

In 2020, global reactor demand for uranium totalled 61,800 tonnes. At the same time, global demand taking into account commercial and strategic stockpiling not intended for current consumption is estimated at 69,600 tonnes.

The uranium market fundamentals remain favourable. In the medium and long term, demand for natural uranium is expected to increase due to the commissioning of new power units at 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 75,000 tonnes by 2025 and to 85,000 tonnes by 2030.

[15] 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/).

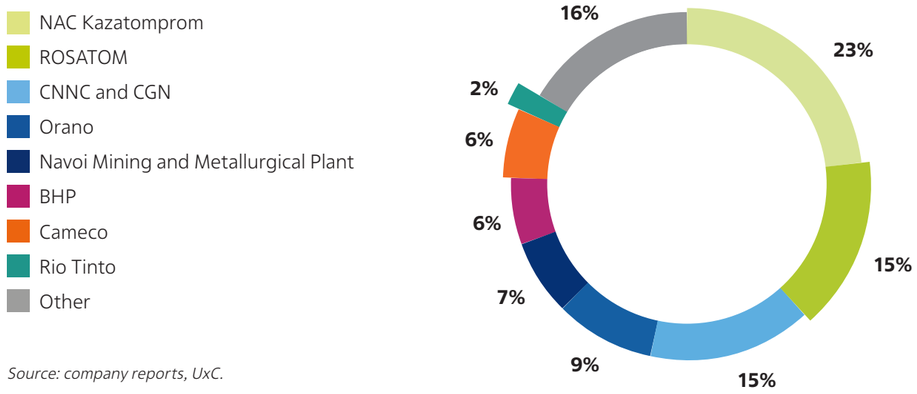
Natural uranium market overview

In 2020, global uranium production fell by 13% year on year[16] to 47,500 tonnes[17] amid production curtailment by major producers due to the COVID-19 pandemic. Global production was impacted primarily by suspension of mining operations at the Cigar Lake mine in Canada and suspension of mine development by enterprises in Kazakhstan. Progress on most projects developed by junior companies remained slow due to difficulties with raising funds and arranging product sales.

Supplies from secondary sources (inventories of energy companies and some states, repreparation of depleted uranium hexafluoride, reprocessed uranium, etc.) in 2020 were estimated at 25,000 tonnes of natural uranium equivalent.

A stable group of leaders has emerged on the natural uranium market. At year-end 2020, along with ROSATOM (15% of the global output), the group also included NAC Kazatomprom (Kazakhstan, 23%), CNNC and CGN (China, 15%), Orano (France, 9%), Navoi Mining and Metallurgical Plant (Uzbekistan, 7%), BHP (Australia – United Kingdom, 6%), Cameco (Canada, 6%) and Rio Tinto (Australia – United Kingdom, 2%). The eight largest market players account for 84% of the total uranium output.

Largest players on the natural uranium market in 2020



Source: company reports, UxC.

[16] Taking into account the restatement of data on global uranium production for 2019 following the disclosure of data on mining volumes by Navoi Mining and Metallurgical Plant.
[17] Report by UxC (UxC UMO Q1 2021).

According to the UxC forecast, in 2021, global uranium production will total 49,000 tonnes, while supply from secondary sources will total about 19,000 tonnes. Global production of natural uranium is expected to increase by 2030 due to rising demand. Supply from secondary sources will total about 8,000 tonnes of natural uranium equivalent in 2030.

Uranium conversion and enrichment market

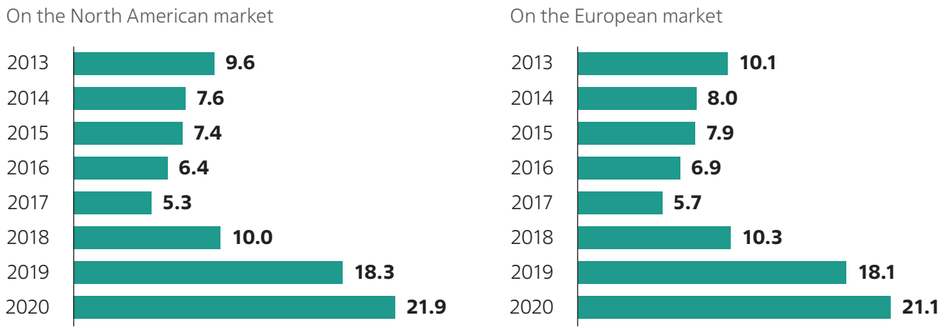
Products offered on the market include uranium hexafluoride (UF_6), uranium conversion services, enriched uranium product and uranium enrichment services measured in separative work units (SWU).

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 totalled about 65,000 tonnes.

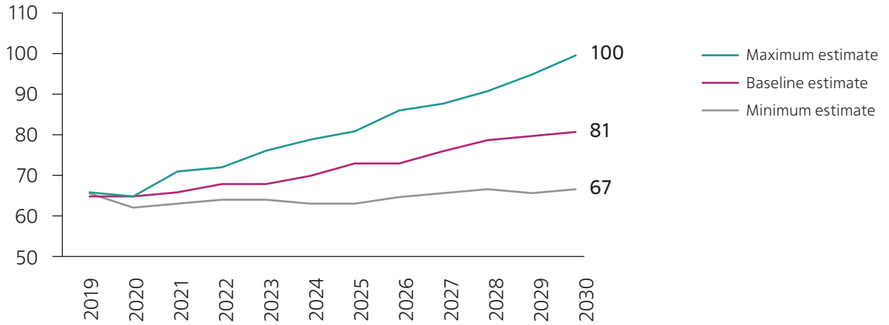
In 2020, average annual spot quotations on the North American and European markets rose by 20% and 16% respectively, while average annual long-term quotations on both markets increased by 9%. This was the result of primary supply deficit combined with significant buying interest.

Average annual spot market quotations for conversion services, USD/kg of uranium



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 scenario of the World Nuclear Association, global demand for conversion services will grow to 70,000 tonnes by 2024 and 81,000 tonnes by 2030.

Forecast for changes in demand for uranium conversion by 2030, '000 tonnes



Source: World Nuclear Association, 2019.

Forecast for changes in demand for uranium enrichment services by 2030

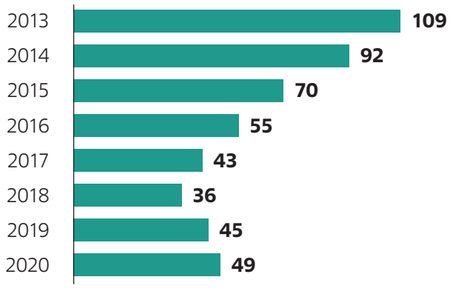
According to ROSATOM's estimates, global reactor demand for enrichment totalled about 55 million SWU in 2020. Amid gradual rebalancing of supply and demand on the uranium enrichment market, in 2020, average annual spot market quotations rose by 8%, while long-term quotations increased by 17%.

The development of nuclear power generation until 2030 will have a positive impact on the market for natural uranium enrichment services. According to the base case scenario of the WNA, global demand for enrichment will grow to almost 58 million SWU by 2024 and 67 million SWU by 2030.

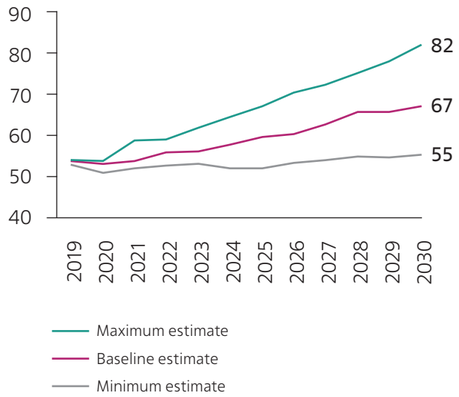
Uranium conversion and enrichment market overview

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

Average annual spot market quotations for enrichment, USD/SWU



Forecast for changes in demand for uranium enrichment by 2030, million SWU



The main players on the global market for uranium enrichment services include ROSATOM (36% of the global market), Urenco (UK, Germany, Netherlands; 30%), Orano (France; 14%) and Chinese companies (12%). Together, they control slightly more than 90% of the market. At present, all players use modern gas centrifuge technology for uranium enrichment.

Nuclear fuel fabrication market

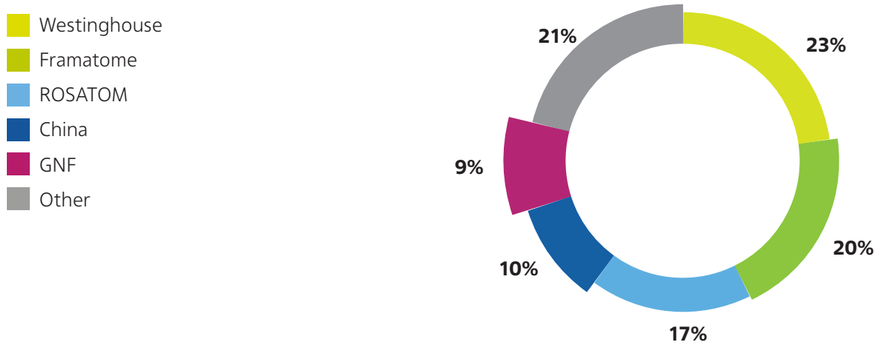
According to ROSATOM, in 2020, the global nuclear fuel market capacity totalled about 11,000 tonnes of heavy metal (tHM). This includes:

- Fuel for light-water reactors requiring uranium enrichment accounting for approximately 7,000 tHM (including over 1,000 tHM of fuel for water-cooled water-moderated power reactors (VVERs));
- Fuel for heavy-water reactors accounting for approximately 3,000 tHM.

As the reactor fleet will be expanding, the demand for fabrication services may increase to 12,000 tHM or more by 2030.

Global suppliers on the fabrication market include Westinghouse (with a market share of 23%), Framatome (AREVA until 2018; 20%), Global Nuclear Fuel (9%) and ROSATOM (17%).

Shares of players on the nuclear fuel fabrication market, %



In the reporting year, Russian nuclear fuel fully met the demand of Russia, the Czech Republic, Slovakia, Hungary, Bulgaria and Armenia for reactor fuel. ROSATOM also partially met the demand of Ukraine, Finland, India and China for reactor fuel. The Corporation, in cooperation with Framatome, also supplies fuel and components from reprocessed uranium to Western European NPPs.

Entering new nuclear fuel markets

In 2020, ROSATOM continued to take steps towards entering the market for fuel for Western-design power reactors, and fuel and components for Western-design research reactors.

A separate promising area is the manufacture of fuel for fast neutron reactors. In the reporting year, fuel assemblies for the first full reloading of the BN-800 reactor core with MOX fuel were produced and underwent acceptance testing; this step will enable the start of a transition of the BN-800 reactor to fully operating on MOX fuel.

ROSATOM continues to implement the Proryv (Breakthrough) Project. It involves building a fuel fabrication/refabrication module, which will produce mixed nitride uranium/plutonium fuel. In 2020, installation of process equipment of the fabrication/refabrication module was initiated, and the construction of building structures and roofs of the main buildings was completed.

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

Power machine engineering market

Power machine engineering is one of the most high-technology industries in the world. Power engineering projects are capital-intensive and time-consuming. The key objectives in the power machine engineering market are to improve energy efficiency, reduce the environmental footprint and promote economic growth by commissioning new power generation capacities.

In 2020, installed capacity of power plants globally increased by 233 GW[18]. The growth was driven by solar and wind power plants, which accounted for about 75% of newly commissioned capacities; combined with hydropower plants, their total share exceeded 80%. The large size of the share of renewable energy sources is due to the environmental agenda and postponement of commissioning of large fossil fuel power plants until 2021; among the latter, natural gas-fired thermal power plants demonstrated the largest increase in installed capacity, accounting for 15% of the total newly commissioned capacity. Over the past year, the share of coal-fired thermal power plants in the total installed capacity decreased from 31% to 30%. The share of nuclear power generation in the global installed capacity remained at around 6%.

Long-term forecasts predict that by 2030, global electricity consumption will increase by 24%.

The post-pandemic economic recovery will be accompanied by industrial growth and a growing importance of zero-carbon energy. Carbon emissions can be reduced to zero by developing hydrogen and renewable energy and abandoning fossil fuels, but this process will be resource-intensive. In the medium term, demand for liquefied natural gas (LNG) and natural gas may increase further, and they might gradually replace coal in the energy mix. In the nuclear power industry, the development of the market segment focused on small-scale reactors is supported by the development of distributed power systems. Overall, nuclear power generation can play a greater role both in the short term, by supporting economic recovery, and in the long term, by meeting stricter environmental standards.

In 2020, the Russian power machine engineering market was affected by the pandemic, which caused a postponement in project implementation. The DPM-2 modernisation programme remained a key market driver, as its active implementation led to an increase in the production of new power generation equipment in Russia in physical terms by 173%, or 3.25 GW[19]. This growth was driven primarily by an increase in the production of steam turbines, which totalled 430% in 2020. The rate of production of other types of main power generation equipment decreased: the hydraulic turbine segment declined by 61%; the production of gas turbine units fell by 21%, while the production of steam boilers and nuclear reactors plunged by 76%.

[18] IEA, Electricity Market Report — December 2020.
[19] Data from the Federal State Statistics Service.

In 2020, industrial output in Russia contracted by 3%[20] due to the pandemic; this trend also affected the power machine engineering market. However, the positions of key players on this market remained unchanged. Moreover, the share of the Mechanical Engineering Division in terms of revenue on the Russian market increased to 42%[21].

The Division produces all main equipment for Russian-design VVER reactors; it also participates in designing and producing equipment for research reactors and small-scale nuclear power plants and is expanding its capabilities in order to enter the market for equipment for Western-design reactors. To enable ROSATOM to remain a leader on the Russian power machine engineering market, in addition to its core business, the Division is also expanding its non-nuclear business segments and sets ambitious goals in terms of expanding into new markets.

NPP construction and operation market

In recent years, key trends in the development of the global electricity market include heightened scrutiny of environmental aspects of the 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. As a result, nuclear power generation is currently one of the most reliable, cheapest and most environmentally friendly sources of electricity. The World Nuclear Association (WNA) forecasts that by 2030, the global installed capacity of NPPs will reach 431 GW[22], which reflects steady growth of nuclear power generation.

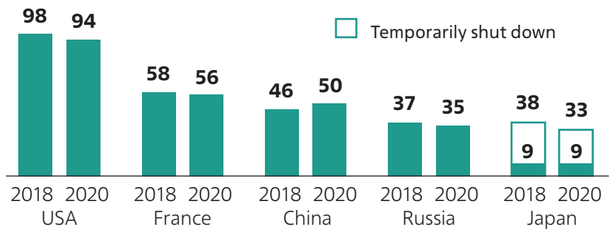
In 2020, the nuclear power industry accounted for 10%[23] of the global electricity supply. According to the IAEA[24], in 13 states, more than a quarter of electricity demand is met by nuclear power generation. Countries with the largest share of nuclear power generation include France, Slovakia and Ukraine.

According to the IAEA, as at 31 December 2020, 442 power reactors with a total capacity of 392.6 GW were in operation (including the suspended Japanese reactors). Another 52 reactors were under construction. In 2020, 35 power units of NPPs and the power unit of the floating thermal nuclear power plant equipped with two reactor units were in operation in Russia, with their installed capacity totalling 29.3 GW. In 2020, ROSATOM ranked second among nuclear power generation companies globally in terms of installed NPP capacity, surpassed only by the French EDF.

Light-water reactors (VVER, PWR, BWR, LWGR) are the main type of reactors currently in operation in the world. They make up 92% of the global market (as a percentage of the total installed capacity).

[20] Data from the Federal State Statistics Service.
[21] Calculated in accordance with the methodology used by JSC Atomenergomash.
[22] WNA, World Nuclear Performance Report 2020.
[23] IEA, Net Zero by 2050
[24] Power Reactor Information System (PRIS) developed by the IAEA (https://pris.iaea.org).

Leading countries by the number of operating NPP power units* in 2018 and 2020



* Excluding the floating thermal nuclear power plant.

According to the IAEA, new nuclear power generation capacities connected to the grid globally in 2020 totalled 5.5 GW.

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 overseas market as a major global player with a 75%[25] market share in terms of the number of overseas NPP construction projects in its portfolio.

NPP servicing market

ROSATOM provides NPP maintenance services covering the entire life cycle: it assists in the development of nuclear infrastructure, 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, Belarus, Bulgaria, Hungary, Egypt, India, China, Slovakia, Turkey, Finland and the Czech Republic.

In the reporting year, the portfolio of power units serviced by ROSATOM comprised 49 Russian-design NPP power units abroad.

ROSATOM 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.

[25] Excluding projects being implemented by companies operating only on the domestic market, heavy-water reactors and contracts for the construction of power units with a capacity of less than 1,000 MW. Data on ROSATOM include power unit No. 1 of the Belarusian NPP, which was synchronised with the power grid and started to supply electricity to the integrated power system of the Republic of Belarus on 3 November 2020.

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, Orano).

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 or establishing subsidiaries.

For instance, 2020 saw the launch of European Power Services Ltd. (Hungary), a joint venture of JSC Rusatom Service and MVM Group servicing Paks and Paks II NPPs, NPPs equipped with VVER reactors in Central and Eastern Europe, as well as other energy facilities in Hungary and across Central and Eastern Europe. In 2021, the Corporation plans to register and launch a subsidiary in the Republic of Belarus that will service the Belarusian NPP and operate in adjacent markets.

ROSATOM is also considering diversifying into the Western-design NPP servicing segment by 2030.

For details, see the section 'International Business Development'.

Market for RAW and SNF management, processing and disposal

In 2020, the volume of spent nuclear fuel (SNF) accumulated globally exceeded 300,000 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.

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 an 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.

1.4.2. New markets

NPP decommissioning market

By 2020, more than 190 power units had been shut down in the world. According to ROSATOM's estimates, by 2030, the number of shut-down power units will reach approximately 300.

A growing number of countries, including the Russian Federation, are adopting the 'immediate dismantling' strategy, as its total cost is lower compared to 'deferred dismantling'. For instance, the US, Germany and Sweden are already decommissioning some of their NPPs; some European Union countries (e.g. Belgium) are also making statements about 'accelerated decommissioning'. Other countries are considering a range of possibilities, including the 'deferred dismantling' of the reactor island, where most radioactive materials are concentrated.

Key market players include ROSATOM, Energy Solutions (US), Westinghouse, Orano, Bechtel (US), Studsvik (Sweden), AECOM (US), GNS, Cavendish Nuclear (UK), North Star (US), Siempelkamp (Germany), Onet Tech (France) and Holtec (US).

ROSATOM is preparing to decommission power units of Novovoronezh, Leningrad and Beloyarsk NPPs, is participating in NPP decommissioning in a number of European countries and is decommissioning nuclear fuel cycle facilities, namely enrichment, conversion and fuel fabrication plants.

For details, see the section 'International Business Development'.

Electricity and capacity market in the Russian Federation

Expansion on the electricity and capacity market remains one of ROSATOM's top priorities. The Corporation is one of the key power generation companies in Russia. In addition, the local market is important in terms of obtaining references for new technological solutions for their subsequent global implementation.

Between 2010 and 2019, electricity consumption in Russia grew at a moderate rate of about 0.6% per year. In 2020, electricity consumption in Russia decreased by 2.3% amid the coronavirus pandemic and totalled 1,050.4 billion kWh. Nevertheless, nuclear power plants maintained their role in terms of meeting base load demand; following the commissioning of a new power unit at Novovoronezh NPP-2 in late 2019, nuclear power generation reached an all-time high in the history of the Russian nuclear power industry and totalled 215.7 billion kWh in 2020. As a result, in the reporting year, the Corporation remained a leader among power generation companies, with its share in the total electricity output in Russia amounting to 20.3% (19% in 2019).

Once the COVID-19 pandemic has subsided, annual electricity consumption in Russia is expected to recover in the next few years, followed by moderate growth at a rate comparable to recent years. ROSATOM's key goal remains to ensure reliable operation of nuclear power plants and remain a leader in terms of its share in the country's energy mix.

In addition to NPP construction and operation, ROSATOM also sells electricity. In the reporting year, JSC Atom Energy Trade continued to operate as the power supplier of last resort in the Kursk, Tver, Smolensk and Murmansk Regions. JSC Atom Energy Trade provides services to more than 55,000 enterprises and more than 2 million individual consumers in Russia.

In 2020, retail electricity sales by the branches and standalone divisions of JSC Atom Energy Trade totalled 14.9 billion kWh, down by 4.6% compared to 2019 (15.7 billion kWh). The decrease in sales was caused by the impact of the pandemic and the fact that a number of consumers entered the wholesale electricity and capacity market. At the same time, net electricity supply to households (and equivalent categories of consumers) in 2020 increased by 3% year on year to 4.3 billion kWh.

For details, see the Appendix to the Report on the performance of the Power Engineering Division in 2020.

Wind power market

The global wind power market is actively developing; installed capacity of wind power plants (WPPs) is expected to increase significantly, from 0.7 TW in 2020 to about 1.1 TW and 1.8 TW in 2025 and 2030 respectively[26].

The market is highly competitive and consolidated, with the top five players accounting for 56% of the total capacity of onshore and offshore WPPs commissioned in 2020[27].

[26] Source: BNEF, Bloomberg, Capacity&Generation.
[27] Source: BNEF, Bloomberg, Wind Turbine Market Shares.

Onshore WPPs with a total capacity of 3.4 GW are expected to be commissioned in Russia by the end of 2024 under renewable energy capacity supply agreements on the wholesale market, with the existing competitive selection mechanism to be used with regard to investment projects for the construction of power plants. According to ROSATOM's estimates, by 2024, the total installed capacity of onshore WPPs might reach 3.6 GW, with annual turnover totalling about USD 1.4 billion.

By the end of 2024, the portfolio of wind power plants to be built by ROSATOM will total 1.2 GW, or more than 30% of the Russian wind power market.

For details, see the sections 'Sustainable Development Management' and 'Business Diversification'.

Composite materials market

Until 2030, the global market for polymer composite materials (PCMs) is expected to grow by 4-5% per year, while the growth rate of the Russian market is projected at around 8%. In addition, the global carbon fibre market is expected to grow[28] by 11% per year, while the growth rate of the Russian market is expected to range between 11% and 20% per year (in physical terms).

Successful implementation of the Road Map for Developing a Technology for New Materials and Substances High-Technology Area in the Russian Federation (including the Polymer Composite Materials product area) will make an important contribution to the expansion of the Russian PCM market.

A further increase in the global use of composite materials is expected due to replacement of conventional materials and expansion of the areas of application. The following five high-technology industries make up about 80% of demand for carbon fibre, with consumption expected to grow exponentially by 2030:

- Wind power generation;
- The aerospace industry;
- The sports goods industry;
- The automotive industry;
- The manufacture of high-pressure gas cylinders.

Key characteristics of the market include the following:

- Composite fabrics and semi-processed materials account for 75% of demand from manufacturers of finished products;
- The maximum profitability of composite products is achieved in the final processing stages (finished products).

[28] In physical terms (tonnes).

The world's largest carbon fibre manufacturers include Japanese (Toray, Teijin, Mitsubishi Chemical), US (Hexcel, Cytec), European (SGL, DowAksa, Solvay) and Chinese (Hengshen, BlueStar) companies.

ROSATOM is the key Russian manufacturer of carbon fibre.

For details, see the section 'Business Diversification'.

Nuclear medicine market

In 2020, the global nuclear medicine market totalled USD 13.3 billion and is expected to reach USD 33.3 billion by 2030 (this figure refers to the total value of healthcare services provided globally).

The global market for nuclear medicine equipment totalled USD 2.6 billion and is expected to reach USD 3.3 billion by 2025.

The volume of the Russian nuclear medicine market totals about RUB 94 billion, and the market is expected to actively develop until 2030, growing by 6-7% per year, according to ROSATOM's forecasts. Key growth drivers will include the implementation of the Healthcare National Project, a wider range of nuclear medicine procedures covered by mandatory health insurance and of high-technology healthcare services, as well as the development of healthcare infrastructure. In a number of Russian regions, new nuclear medicine centres are being built, and existing healthcare institutions are being provided with state-of-the-art nuclear medicine equipment for diagnostics and therapy.

ROSATOM sees considerable potential for the development of nuclear medicine services for the general public. 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.

ROSATOM is a major supplier of isotopes and radiopharmaceuticals for nuclear medicine in Russia. About 40% of the world's reactor units producing medical radioisotopes are located in Russia. The Corporation accounts for 25% to 40% of global radioisotope production (depending on the types of radioisotope products). ROSATOM's long-term goal is to rank third on the international market in terms of revenue.

In addition, the Corporation is a major player on the market for medical device sterilisation using radiation processing technologies.

ROSATOM also produces and actively upgrades medical equipment for diagnostics and therapy. By 2030, the Corporation plans to become a National Champion in a number of segments, including magnetic resonance imaging (MRI),

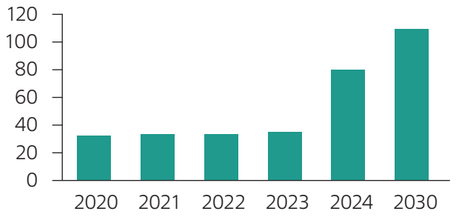
18 MeV linear particle accelerators, cyclotron and radiochemistry facilities, single-photon emission computed tomography (SPECT) scanners and brachytherapy equipment.

For details, see the section 'Business Diversification'.

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 32.9 million tonnes in 2020 to 80 million tonnes in 2024 and 110 million tonnes in 2030.

Projected cargo traffic along the NSR, million tonnes



Under the Northern Sea Route Development Federal Project.

Global cargo traffic can become a driver for further growth of cargo transportation along the NSR in the long term (after 2030). Cargo transportation along the Northern Sea Route 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 the section 'Development of the Northern Sea Route'.

GRI 103-2

Waste management market

ROSATOM is implementing a strategic programme for industrial and consumer waste management and is developing the relevant infrastructure. At the time of the launch of this programme, only 1.5% of all waste was treated and recycled in an environmentally safe manner by operators that have licences for the relevant operations and the required capacities.

A Federal Project titled 'Infrastructure for the Management of Hazard Class 1 and 2 Waste' has been developed and approved as part of the Ecology National Project, with ROSATOM appointed as contractor under the Project. The development of an integrated system for hazard class 1 and 2 waste management involves building a state information system for hazard class 1 and 2 waste management and the relevant waste processing infrastructure.

For details, see the sections 'Business Diversification' and 'Implementation of the Ecology National Project'.

1.5 International Cooperation

Key results in 2020:

- ROSATOM arranged employee rotation at its overseas sites amid the pandemic.
- Agreement was reached to accelerate work on the El Dabaa NPP construction project in Egypt.
- ROSATOM will be able to maintain its current presence on the US market until 2040 following the signing of an amendment to the Agreement Suspending the Antidumping Investigation on Uranium from the Russian Federation.
- 4 intergovernmental agreements and 12 major interdepartmental arrangements were concluded.
- Issues related to the purchase of the natural uranium component remaining in Russia following the completion of the Russia-US HEU-LEU Contract and compensation for the shortfall in uranium supply from Russian-Kazakh joint uranium mining enterprises were settled with Kazakhstan.
- The International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) run by the IAEA gained new impetus due to an increase in project funding.

GRI 103-1

ROSATOM's international activities are aimed at creating a favourable international legal and political environment to promote Russian nuclear technologies on the global market, strengthen the nuclear safety and non-proliferation regimes and actively engage with international organisations and specialised forums and platforms.

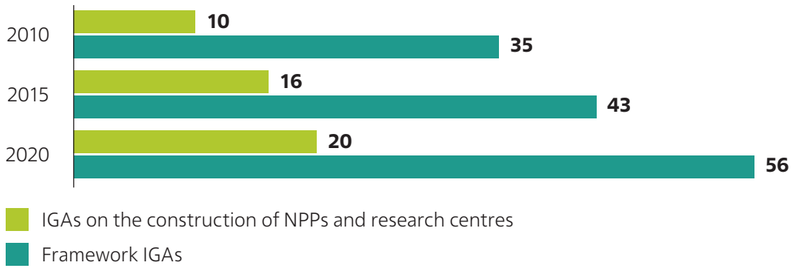
GRI 103-3

1.5.1. Strengthening the international legal framework for cooperation

In 2020, the Corporation continued to work to expand the international legal framework for cooperation in order to promote Russian nuclear energy technologies globally and enable the Russian nuclear industry to consolidate its position on global nuclear energy markets. 4 intergovernmental agreements (IGAs) and 12 major interdepartmental arrangements were signed.

As at 31 December 2020, IGAs on the construction of nuclear facilities were signed with 20 countries (a twofold increase compared to 2010), and framework IGAs providing the foundation for bilateral cooperation on nuclear projects were signed with 56 countries.

Number of countries with which IGAs have been signed



GRI 102-13

Cooperation with key partners in strengthening the international legal framework

Bangladesh	An intergovernmental protocol with Bangladesh concerning assistance in the operation of Rooppur NPP was signed and came into force. An intergovernmental legal framework was established for the participation of Russian specialised organisations in maintenance and repairs over the entire service life of the first NPP currently under construction in Bangladesh.
Republic of Belarus	A protocol was signed on amendments to the IGA on the construction of the Belarusian NPP to revise the schedule of commissioning of power units currently under construction.
Kazakhstan	A protocol was signed on amendments to the IGA on cooperation and mutual payments related to the disposal of nuclear warheads. It involves the payment of financial compensation for the share of unsold feedstock due to be delivered to the Republic of Kazakhstan and remaining in the Russian Federation following the completion of the Russia-US HEU-LEU Contract instead of transporting it to the Republic of Kazakhstan.
Syria	A memorandum of understanding was signed with the Atomic Energy Commission of Syria; it concerns cooperation in the peaceful use of nuclear technology for non-energy applications. The document outlines the key areas of cooperation: the use of radiation technologies in healthcare, agriculture and industry, nuclear and radiation safety, training of administrative, research and technical personnel, etc.
Thailand	A memorandum on personnel training was signed with Thailand. The document envisages the provision of training for Thai specialists in the peaceful use of nuclear technology for non-energy applications.
Republic of the Congo	Memoranda of cooperation on personnel training and on shaping a positive public opinion were signed with the Republic of the Congo. These documents are aimed at promoting cooperation in capacity building in the nuclear industry in the Republic of the Congo and at taking steps to shape a positive public opinion and raise public awareness about nuclear technologies.
AFCONE	A framework memorandum of understanding was signed with the African Commission on Nuclear Energy (AFCONE), which comprises 42 countries across the continent. The document is aimed at disseminating objective information on nuclear technologies, raising public awareness about their applications and promoting nuclear education and personnel training for the nuclear industry in African countries.
Serbia	A road map was signed for the implementation of the project to build a Russian-design Centre for Nuclear Science, Technology and Innovation; the document stipulates key project milestones for 2021.
US	An amendment to the Agreement Suspending the Antidumping Investigation on Uranium from the Russian Federation was signed, making it possible to maintain the share of Russian uranium products on the US market almost unchanged at 20% until 2040.
Canada	An Administrative Arrangement was signed with the Canadian Nuclear Safety Commission under the framework IGA on cooperation in the peaceful use of nuclear energy. The document establishes the procedure for accounting for and tracking nuclear materials with the Canadian obligation codes supplied to Russian nuclear organisations for processing and subsequent handover to third-party countries.

1.5.2. Support for long-term projects as part of infrastructure development for international cooperation

In 2020, the Corporation continued to provide support for the implementation of major overseas projects, particularly for the construction of NPPs and Nuclear Research and Technology Centres, which are central to ROSATOM's international activities.

Despite the COVID pandemic, ROSATOM fulfilled all its international commitments. Construction of nuclear power generation facilities abroad progressed steadily, without any disruptions. Arrangements were made for employee rotation at overseas NPP construction sites and for the entry of critical foreign specialists into Russia.

To do so, amendments to Orders of the Russian Government No. 635 dated 16 March 2020 and No. 763 dated 27 March 2020 were initiated and introduced under the established procedure; they enable ROSATOM to promptly deliver the personnel required for meeting production schedules to NPP construction sites in Belarus and Russia. These amendments enabled foreign partners to perform quality control of equipment manufactured at Russian plants for foreign projects within the time frame stipulated in contracts and to provide installation supervision, maintenance and adjustment of foreign equipment installed at NPPs and in other nuclear organisations in Russia.

In cooperation with the Office of the Government of the Russian Federation, the Russian Ministry of Foreign Affairs, the Border Service of the Federal Security Service of the Russian Federation and other agencies, starting from April 2020, about 22,000 people were moved across the Russian border and more than 40 flights were made under fly-in fly-out arrangements to countries where NPP construction projects are at an active stage.

To do so, about 40 separate resolutions were adopted at the request of ROSATOM by the Emergency Response Centre of the Russian Government for Preventing the Import and Spread of the Novel Coronavirus Infection in the Russian Federation.

As for specific overseas projects, the following steps were taken:

Belarusian NPP construction project

Support was provided for the Belarusian NPP construction project in cooperation with the key ministries and government agencies of the Republic of Belarus. Working consultations were regularly held on current issues, including in the context of cooperation with international organisations, such as the IAEA, the European Nuclear Safety Regulators Group (ENSREG), etc.

El Dabaa NPP construction project (Egypt)

Agreement was reached with the Egyptian party to accelerate work on the El Dabaa NPP construction project; it was endorsed by the President of Egypt Abdel Fattah el-Sisi during the meeting with ROSATOM's Director General Alexey Likhachev in December 2020. Jointly with the Egyptian customer, all technical specifications were adjusted and decisions required for proceeding with project implementation, including the waterproofing of NPP buildings, were made.

Cooperation with China

A visit of ROSATOM's Director General Alexey Likhachev to China was arranged in January 2020, including a visit to the Tianwan NPP site. During the visit, a final acceptance protocol for power unit No. 3 was signed in the presence of the Chairman of the China Atomic Energy Authority Zhang Kejian and a ceremony was held to mark the start of construction of power units No. 7 and 8.

Steps were taken to expand the existing agenda for bilateral cooperation. As agreed by nuclear industry policymakers of the two countries, steps were taken to agree a joint strategic document that will outline promising areas for future cooperation.

Kudankulam NPP construction project (India)

Despite the pandemic, regular dialogue was held at various levels, including between Russian and Indian nuclear industry policymakers, in order to address issues arising in the course of construction and operation of power units of Kudankulam NPP.

Rooppur NPP construction project (Bangladesh)

Systematic support was provided for the implementation of the main phase of construction of Rooppur NPP. A visit of ROSATOM's Director General Alexey Likhachev to Bangladesh was arranged in March 2020; during the visit, he met with Prime Minister Sheikh Hasina Wazed and the heads of the relevant ministries and government agencies and visited the NPP construction site.

NPP construction project in Uzbekistan

Support was provided for negotiations on the key Russia-Uzbekistan project focused on the preparation for the construction of the first nuclear power plant in Uzbekistan. Support was provided for negotiations on the terms and conditions of the general contract.

Nuclear Research and Technology Centre construction project in Vietnam

ROSATOM engaged with Vietnamese government agencies; as a result, the Government of Vietnam adopted a resolution on the allocation of funding for a feasibility study for the construction of a Nuclear Research and Technology Centre and on a 'special procedure' for contractor selection. This made it possible to proceed to the next stage of the project, namely the drafting of a contract with an authorised Russian organisation for conducting the feasibility study for the project.

Nuclear Research and Technology Centre construction project in Bolivia

Amid the pandemic, support was provided for engagement with the Bolivian party on the project to build a Nuclear Research and Technology Centre. A supplementary agreement was signed to the general contract for the construction of the Centre; it sets out a revised schedule for the completion of construction and the commissioning of the Centre.

Cooperation with Kazakhstan

ROSATOM helped to reach an agreement on amendments to mineral development contracts concluded by Russian-Kazakh joint uranium mining enterprises. These amendments are intended to reflect compensation for shortfalls in natural uranium supply to the Russian party between 2023 and 2033 for each enterprise.

In addition to ongoing projects involving the construction of nuclear facilities abroad, ROSATOM took steps to expand its presence on the global nuclear energy market.

Nuclear Research and Technology Centre construction project in Rwanda

Preparations continued for the start of practical work in Africa. A number of consultations were held with Rwandan partners. Key steps were outlined for the project to build a Nuclear Research and Technology Centre in Rwanda; an understanding was reached on the next steps in the implementation of nuclear energy projects, including the potential construction of small nuclear power plants in the future.

Project to build a Centre for Nuclear Science, Technology and Innovation in Serbia

Regular contact was maintained with the Serbian party to promote the project to build a Russian-design Centre for Nuclear Science, Technology and Innovation in Serbia.

Cooperation with Germany and France

Despite the pandemic, ROSATOM cooperated with its partners in France and Germany, including on promising projects.

ROSATOM took part in the Energy Dialogue at the Reichstag and provided German colleagues with information on Russian approaches to SNF management. Jointly with partners, ROSATOM selected five promising research projects in the sphere of SNF and RAW management and identified the sources of funding for these projects.

ROSATOM continued to cooperate with France. Agreement was reached on expanding the scope of cooperation, including joint projects involving the management of non-irradiated fuel and supplies of Russian enriched uranium for French research reactors.

For details, see the section 'International Business Development'.

1.5.3. Cooperation with international organisations

ROSATOM continued to actively participate in international organisations and forums in order to contribute to the formulation of international rules and standards on nuclear power.

In 2020, this work was influenced by the pandemic. ROSATOM maintained regular contact with the IAEA and the OECD NEA, including via video conferencing. ROSATOM's representatives took part in all specialised international conferences and meetings, with about 1,000 Russian experts participating in 340 events (including 820 Russian experts participating in 270 online events). 11 events were held under the auspices of the IAEA and the OECD NEA in the Russian Federation.

Due to COVID-related restrictions, some events to be held jointly with the Agencies were rescheduled for 2021.

Pursuant to orders of the Russian Government, international commitments to pay contributions to the OECD NEA and the IAEA were met in full.

As part of an industry-wide programme to train Russian personnel for international organisations, candidates were selected through a three-stage process; individual development programmes were implemented, and a practical workshop was held online for the members of the pool of experts with assistance from the Human Resources Division of the IAEA and the Human Resources Team of the OECD NEA. The Human Resources Department of the ITER Organisation participated in this event for the first time.

International Atomic Energy Agency (IAEA)

ROSATOM played a key role in the events of the 64th session of the IAEA General Conference and actively participated in the IAEA Ministerial Conference on Physical Nuclear Security. Resolutions adopted at these events, as well as resolutions approved by the policy-making bodies of the IAEA, reflect the Russian position and accommodate the interests of the Russian nuclear industry.

Financing and participation of Russian organisations in major projects continued as part of the Technical Cooperation Programme, the Nuclear Security Fund, the Russian Safeguards Support Programme and the Programme of Action for Cancer Therapy.

On the initiative of ROSATOM, the Government of the Russian Federation made a decision to increase contributions towards the implementation of the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) run by the IAEA in 2021 and 2022, which will enable the Russian Federation to retain its status as a major donor under the project and will give it greater influence on the relevant programme activities.

A number of interdepartmental documents aimed at expanding cooperation with the IAEA were signed. The IAEA, ROSATOM and the FMBA of Russia concluded an agreement on an extra-budgetary contribution towards the implementation of the Programme of Action for Cancer Therapy. ROSATOM's Technical Academy became the IAEA Collaborating Centre in the field of knowledge management and human resources development for nuclear sciences and applications.

Steps were taken to strengthen Russia's presence in specialised international organisations. In 2020, three Russian specialists from the pool of experts formed at ROSATOM were sent to work at the IAEA.

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

The OECD NEA conducted the first virtual mission to Russia, which involved aligning the entire agenda for bilateral cooperation. The event was attended by more than 40 Russian experts from ROSATOM, leading organisations in the industry, specialised universities, as well as representatives of Rostekhnadzor, NRC Kurchatov Institute and the Nuclear Safety Institute of the Russian Academy of Sciences (IBRAE RAN). The Agency was represented by key executives of its divisions engaged in cooperation.

The two-day event involved a discussion of matters related to human resource development, nuclear and radiation safety, work with the OECD NEA Data Bank, gender balance in the nuclear sector, nuclear science, radioactive waste management and decommissioning.

Support was provided for Russian participation in seven international projects and five programmes of the OECD NEA aimed at improving NPP safety and designing innovative new-generation nuclear reactors.

Implementation of the Russian project continued as part of the Nuclear Education, Skills and Technology (NEST) Framework launched by the OECD NEA.

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

As part of the work of the Commission of the CIS Member States on the Peaceful Use of Nuclear Energy, ROSATOM drafted the following documents and prepared them for signing at the meeting of the Council of Heads of the CIS Member States on 6 November 2020:

- A Framework Programme of Cooperation in the Peaceful Use of Nuclear Energy until 2030 and the relevant Implementation Plan until 2025. These documents are aimed at promoting the development of nuclear power in the CIS member states.
- An Agreement on Cross-Border Transportation of Radioactive Materials in the CIS Member States. The document will help to align requirements for transportation safety and security and approaches to decision-making on cross-border transportation between the CIS member states; it will also help to improve the permitting system and make cross-border transportation more effective.
- At the meeting on 15 September 2020, the CIS Economic Council approved an Action Plan for the Implementation of the Agreement on Cooperation between the CIS Member States to Ensure Preparedness in the Event of a Nuclear Accident or a Radiation Emergency and Mutual Assistance in Accident Response dated 2 November 2018. The Plan reflects the specifics of ensuring emergency preparedness: creating dedicated information resources, establishing communication channels, developing standardised operational report forms and underlying emergency response algorithms.

In order to accomplish the objectives of the ATOM – CIS COOPERATION Framework Programme for Cooperation between the CIS Member States in the Peaceful Use of Nuclear Energy until 2020, ROSATOM provided support for the work of the Basic Organisation for Personnel Training (NRNU MEPhI) and the Basic Organisation for the Safety of Nuclear Research Facilities (SSC RIAR).

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

449 draft contracts (arrangements, agreements) were reviewed in accordance with the Uniform Industry-Wide Procedure for Organising Export Control in ROSATOM. The findings of the review were sent to organisations in the industry.

Existing export control lists were reviewed. ROSATOM participated in the efforts initiated by the Federal Service for Technical and Export Control (FSTEC) of Russia to amend the List of Dual-Use Items and Technologies approved by Order No. 1661 of the President of the Russian Federation dated 17 December 2011.

ROSATOM provided support for the participation of the Russian delegation in the Nuclear Suppliers Group (NSG), including the review of proposals for amending the Group's control lists. The official website of the NSG was translated into Russian.

To optimise the nuclear export procedure in the course of NPP construction abroad, a Reference Book for the Identification of Equipment for NPPs with VVER Reactors was compiled. The reference book was approved by the FSTEC of Russia and sent out to nuclear organisations participating in overseas NPP construction projects as guidelines for identifying exported products. ROSATOM actively engaged with the Federal Customs Service of Russia on matters related to the potential use of the reference book during customs clearance.

The Russian-US programme to import highly enriched uranium fuel from Russian-design research reactors from third countries into Russia continued.

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

Support was provided for ROSATOM's overseas projects through ROSATOM's representatives in embassies and trade missions of the Russian Federation, as well as under the Permanent Mission of the Russian Federation to International Organisations in Vienna (Austria) and the Permanent Mission of the Russian Federation to the European Union in Brussels (Belgium).

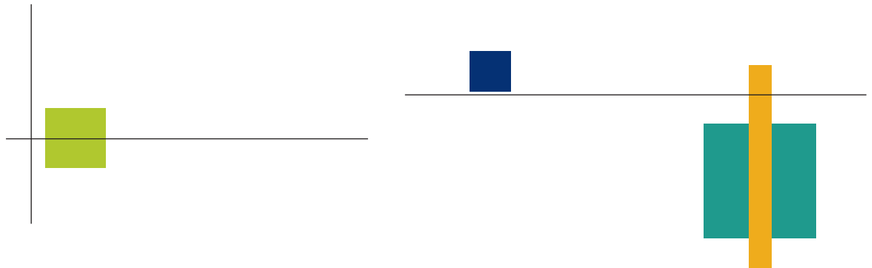
Special focus was given to the fulfilment of international commitments to build Russian-design nuclear facilities abroad amid the COVID pandemic.

ROSATOM currently has overseas representatives in 15 countries globally.

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

In 2020, ROSATOM worked to promote Russian nuclear energy technologies on the global markets in an international environment that had deteriorated considerably.

Efforts to create a favourable international environment for the development of the Russian nuclear power industry are made in close cooperation with the relevant ministries and agencies of the Russian Federation. ROSATOM helps to maintain the credibility of the Russian nuclear industry in the international arena through unconditional fulfilment of its obligations, including the supply of fuel, equipment and services, regardless of the current political situation.



1.5.7. Plans for 2021 and beyond

In 2021, ROSATOM will continue to cooperate with its long-standing partners and to expand the international legal framework for cooperation for the benefit of nuclear organisations, with a focus on small modular reactors and non-energy applications of nuclear technologies to promote the achievement of the Sustainable Development Goals adopted by the UN in 2015.

The Corporation will expand cooperation in personnel training for international organisations, with the Human Resources Department of WANO to be engaged in the initiative along with the IAEA, the OECD NEA and the ITER Organisation.

GRI 102-13

ROSATOM plans to intensify cooperation in making nuclear power more acceptable for society and fostering public demand for it.

To achieve its objectives, the Corporation will continue bilateral cooperation and work with specialised international organisations and institutions, as extensive international cooperation is a necessary prerequisite for the long-term, sustainable and safe development of nuclear power. ROSATOM intends to use various negotiation formats, including video conferencing, in a more flexible way.

Performance of Government Functions

Key results in 2020:

- Government orders were 100% fulfilled.
- ROSATOM participated in the consideration of more than 400 bills.
- The government programme of the Russian Federation 'Development of the Nuclear Power and Industry Complex' until 2027 was updated.
- Overall performance against the targets set in the government programme of the Russian Federation 'Development of the Nuclear Power and Industry Complex' in 2020 was assessed at 100.52%.
- The procedure for cooperation between ROSATOM's NWD organisations was approved; it stipulates financial obligations under contracts concluded as part of the state defence order carried out by ROSATOM.

1.6.1. Performance of the Nuclear Weapons Division

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

GRI 103-1
GRI 103-2

Cooperation of ROSATOM's Nuclear Weapons Division (NWD) with the Russian Ministry of Defence and the Russian nuclear forces is aimed at maintaining Russia's nuclear capabilities (in terms of both their scope and quality) at a level that ensures the implementation of Russia's nuclear deterrence policy.

The NWD operations are managed by ROSATOM's Nuclear Weapons Directorate.

ROSATOM and its NWD organisations fulfilled the state defence order for 2020 in full.

In the reporting year, consolidated revenue from other products of NWD organisations totalled RUB 78.2 billion.

Operations in the civilian sector

The Nuclear Weapons Directorate continued to take steps to increase the share of high-technology civilian products in the total product output.

Projects implemented by NWD organisations to diversify manufacturing operations and develop ROSATOM's new businesses are focused on prioritised sectors of the Russian economy and are implemented in those segments where NWD organisations have the relevant competences, technological capabilities and access to markets.

Organisations of the Nuclear Weapons Directorate manufacture high-technology civilian products, including as part of an industry-wide programme approved by ROSATOM to diversify manufacturing operations of ROSATOM's organisations included in the consolidated register of organisations forming part of Russia's military-industrial complex.

Improving the performance of NWD organisations

In 2020, the federal target programme aimed at developing Russia's nuclear weapons complex for the period from 2007 through 2020 was successfully completed. The programme enabled a major improvement in experimental and production capabilities of NWD organisations and provided a comprehensive solution for addressing issues that had arisen in the 1990s in terms of upgrading the relevant technological capabilities.

GRI 103-3

In order to establish uniform rules and procedures for cooperation between organisations of the Nuclear Weapons Directorate that carry out the state defence order, the procedure for cooperation between ROSATOM's NWD organisations was approved in the reporting year; it stipulates financial obligations under contracts concluded as part of the state defence order carried out by ROSATOM. The terms and conditions of government contracts concerning the rules for converting indicative prices into fixed prices and applying key economic targets were updated and standardised, and a procedure and conditions for revising prices (the base price) were established.

Measures were taken to ensure that organisations comply with the deadlines and procedures for providing a rationale for requests for budget funding of the state defence order for 2021 and for the 2022 and 2023 planning period. In order to optimise paperwork and the monitoring of completeness of documents submitted by NWD organisations, a key performance indicator, the Quality of Price Forecasting, was set for 2020 for executives in the Finance and Economics Unit, and requirements (rules) for the completeness and format of price offers were formulated.

R&D for military, special and dual-use applications

299 R&D results were recorded in the single national register of R&D results for military, special and dual-use applications. In 2020, 211 resolutions were adopted on legal protection of intellectual property (IP) generated as a result of R&D under government contracts, including: 146 inventions, 38 computer software programs, 16 utility models, 6 items of know-how, 3 integrated circuit layouts and 2 industrial designs. In 2020, intangible assets related to IP for military, special and dual-use applications contributed more than RUB 1,404 million to the capitalisation of the NWD.

Road Map for the Development of Technology for New Materials and Substances

Under a Letter of Intent between the Government of the Russian Federation and ROSATOM aimed at developing a high-technology area, Technology for New Materials and Substances, in Russia, the relevant road map was developed and approved.

In late 2020, five new product areas were launched under the road map: Functional Materials; Chemical Precursors and Products for Materials and Processes; High-Purity Substances and Materials for Various Functional Applications, Including Microelectronics and Photonics; Carbon-Based Materials; Structural Materials. Approval was also obtained for the development of a separate product area: the Technology, Materials and Structures Digital Platform.

Other highlights in NWD operations

- Heating units were produced for the ExoMars international project.
- The Division commenced mass production and subsequent servicing of TIANOX devices for inhaled nitric oxide therapy.

For information on ROSATOM's contribution to improving the regulatory framework for government regulation of prices for products supplied under the state defence order, see the section 'Law Drafting'.

1.6.2. Law drafting

GRI 103-2

In 2020, ROSATOM participated in law drafting in accordance with the Law Drafting Plan of ROSATOM for 2020 approved by Order No. 1/1511-P of ROSATOM dated 27 December 2019, which was implemented in full, and in accordance with instructions from the President of the Russian Federation and the Government of the Russian Federation.

As part of the exercise of its regulatory powers in the relevant sphere of operation, in the reporting year, ROSATOM reviewed more than 400 legislative initiatives, more than half of which directly or indirectly affected the interests of the Corporation and its employees.

GRI 103-1

ROSATOM's efficient participation in law drafting in 2020 enabled it not only to assess the legal implications of proposed amendments to laws in a timely manner but also to implement a number of initiatives designed to strengthen the position of the nuclear industry.

Amendments to Article 5.1 of the Merchant Shipping Code of the Russian Federation

Draft Federal Law No. 1062335-7 on Amending Article 5.1 of the Merchant Shipping Code of the Russian Federation (on Concluding Long-Term Contracts for the Provision of Services by the Nuclear-Powered Icebreaker Fleet) prepared by ROSATOM became an important milestone in the development of the Northern Sea Route as an international shipping route.

The draft law supports the implementation of the strategic objective set by Decree No. 204 of the President of the Russian Federation on National Goals and Strategic Objectives of the Russian Federation until 2024 dated 7 May 2018, which involves developing the Northern Sea Route and increasing cargo traffic along this route to 80 million tonnes by 2024.

New legal solutions provided by the draft law, which make it possible to introduce a mechanism for concluding long-term contracts whereby nuclear icebreakers will escort vessels along the Northern Sea Route on a regular basis, enable ROSATOM to raise loans in order to finance the construction of Project 22220 Arktika-class follow-on multi-purpose nuclear icebreakers (LK-60Ya).

In addition, the draft law is designed to formalise the legal status of existing legal regulation and promote the development of social and economic relations in the Arctic zone.

Changes in the sphere of supervision and control as part of the introduction of the 'regulatory guillotine'

In the reporting year, the Corporation continued to participate in the transformation of existing legislation on supervision and control as part of the 'regulatory guillotine' that is being introduced in the country.

Effective and well-coordinated efforts made it possible to fully accommodate the interests of ROSATOM and its organisations when drafting framework laws and at the same time to maintain existing mechanisms for setting and enforcing mandatory requirements governing the use of nuclear energy and measures to ensure nuclear and radiation safety, as well as mechanisms for supervising and controlling the use of nuclear energy (Federal Law No. 247-FZ on Mandatory Requirements in the Russian Federation dated 31 July 2020, Federal Law No. 248-FZ on Government Control (Supervision) and Municipal Control in the Russian Federation dated 31 July 2020).

The Corporation also participated in preparing draft Federal Law No. 1051647-7 on Amending Certain Laws of the Russian Federation due to the Adoption of the Federal Law on Government Control (Supervision) and Municipal Control in the Russian Federation.

ROSATOM's proposals concerning government control over safe and secure transportation of nuclear materials, radioactive substances and products made from them, licensing control of the operations of organisations that use nuclear energy for defence purposes, and enhancing the status of government supervision of construction and renovation of facilities of federal nuclear organisations were fully supported by the expert community and incorporated in the above bill drafted by the Russian Ministry of Economic Development.

The bill also stipulates ROSATOM's power to approve mandatory safety and security requirements for nuclear warheads and nuclear munitions at all stages of the life cycle of nuclear weapons, as well as for military nuclear power installations.

These changes not only became a major step towards developing a system for the safe use of nuclear energy but also expanded ROSATOM's capabilities related to government control (supervision) in the relevant sphere of operation.

Ensuring the uniformity of measurements

To support the introduction of the 'regulatory guillotine', Federal Law No. 348-FZ dated 27 October 2020 on Amending Article 5 of the Federal Law on Ensuring the Uniformity of Measurements was adopted. The Law abolishes departmental regulation by transferring the power to approve the list of measurements subject to government regulation aimed at ensuring the uniformity of measurements and to impose the relevant mandatory metrological requirements to the Government of the Russian Federation.

At the same time, this law makes special provisions in terms of imposing mandatory metrological requirements in the use of nuclear energy, stipulating the Corporation's power to determine measurements related to the use of nuclear energy that are subject to government regulation aimed at ensuring the uniformity of measurements.

Amendments to administrative laws

In addition to the reform in the sphere of supervision and control, ROSATOM also actively participated in initiatives aimed at improving administrative laws.

ROSATOM's representatives were included, along with representatives of government agencies and leading legal institutions, in working groups tasked with drafting a new version of the Code of the Russian Federation on Administrative Offences and the new Procedural Code of the Russian Federation.

Conceptual approaches proposed by ROSATOM with regard to elements of administrative offences and liability for offences related to operations in the nuclear energy sector, as well as with regard to maintaining procedural powers of ROSATOM's executives were incorporated in the new versions of the Code of the Russian Federation on Administrative Offences and the Procedural Code of the Russian Federation.

Amendments to laws on procurement

In 2020, ROSATOM submitted an initiative to the Russian Ministry of Finance to amend laws on the procurement of goods, work and services by certain types of legal entities amid the COVID pandemic in order to enable procurement, including all the necessary actions, on non-working days.

This resulted in the adoption of Federal Law No. 124-FZ on Amending Certain Laws of the Russian Federation to Ensure Sustainable Economic Development in the Context of a Deteriorating Situation due to the Spread of a New Coronavirus Disease dated 24 April 2020, which establishes a special procedure for calculating the time frame for procurement on non-working days.

In addition, in order to make sure that ROSATOM's interests are accommodated, the Corporation participated in drafting Decree No. 2013 of the Government of the Russian Federation on the Mandatory Minimum Share of Procurement of Russian Goods dated 3 December 2020.

Amendments to laws on physical protection and anti-terrorism security of facilities

In the reporting year, ROSATOM also continued to take steps to improve the regulatory framework of the Russian Federation pertaining to physical protection and anti-terrorism security of facilities. This included:

- Preparing a draft Decree of the Government of the Russian Federation on Approving the Regulations on a Security Area with a Special Legal Regime and submitting it to the Government of the Russian Federation within the prescribed time frame. Pursuant to a resolution of the Government of the Russian Federation, work on the draft decree continued in 2021;
- Preparing proposals for amendments to the Land Code of the Russian Federation and Article 31 of Federal Law No. 170-FZ on the Use of Nuclear Energy dated 21 November 1995 regarding the security area with a special legal regime and submitting them to the Federal Service for State Registration, Cadastre and Cartography (Rosreestr) within the prescribed time frame;
- Drafting and approving four orders of ROSATOM governing physical protection and security of nuclear facilities, with two orders registered by the Russian Ministry of Justice as statutory regulations.

Statutory and local regulations drafted by ROSATOM made it possible to harmonise Russian laws and establish a uniform industry-wide approach to physical protection and security (including anti-terrorism security) of nuclear facilities.

Amendments to the Regulations on Government Regulation of Prices for Products Supplied under the State Defence Order

In the reporting year, the Government took into account ROSATOM's proposals for amendments to the Regulations on Government Regulation of Prices for Products Supplied under the State Defence Order approved by Decree No. 1465 of the Government of the Russian Federation dated 2 December 2017. These included:

- Adding a clause to the Regulations to allow contractors (general contractors) to use actual profit in excess of the target set for contracts (government contracts);
- Setting a single minimum profit threshold for contractors and general contractors.

Other activities

In 2020, ROSATOM continued to draft and provide legal support for federal bills affecting its operations and the operations of its organisations in the following areas:

- Standardising the content of annual reports of state-owned corporations and state-owned companies (Federal Law No. 115-FZ on Amending Certain Laws of the Russian Federation to Standardise the Content of Annual Reports of State-Owned Corporations (Companies) and Public Companies and to Determine the Special Characteristics of Regulation of Corporate Relations in 2020 and on Suspending the Provisions of Certain Laws of the Russian Federation dated 7 April 2020);
- Improving legal relationships in the sphere of technical regulation, standardisation and ensuring the uniformity of measurements;
- Revising laws on the state defence order, the contractual system in the sphere of procurement for government and municipal needs and procurement by certain types of legal entities;
- Defining government support measures for business operations in the Russian Arctic and establishing the procedure for operating in the Russian Arctic;
- Improving legal regulation of security of facilities under the jurisdiction (within the scope of operations) of ROSATOM;
- Maintaining a mechanism for establishing joint intellectual property rights owned by the Russian Federation and the contractor under a government contract;
- Providing social support to employees of government and municipal institutions in closed administrative and territorial formations of the nuclear industry;
- Modernising approaches and updating the tariff regulation model in the sphere of hazard class 1 and 2 waste management;
- Updating the powers in the sphere of civil defence and protection of the population and areas against natural and man-made disasters;
- Partly lifting restrictions in radiation control areas and security areas with a special legal regime at the locations of nuclear facilities;
- Improving legal regulation of the design, construction and renovation of radiation facilities.

1.6.3. Government programme ‘Development of the Nuclear Power and Industry Complex’

In the reporting year, the government programme of the Russian Federation ‘Development of the Nuclear Power and Industry Complex’ was being implemented.

Overall performance under the government programme ‘Development of the Nuclear Power and Industry Complex’ was assessed at 100.52%. This assessment reflects progress on measures scheduled and the achievement of targets set for 2020, as well as the amount of budgetary and extra-budgetary financing used for implementing the measures stipulated in the government programme.

In the reporting year, the government programme was updated for the period until 2027[29]. Amendments to the programme incorporate the parameters of a comprehensive programme titled ‘Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024’ (hereinafter referred to as the Comprehensive Programme).

The Comprehensive Programme was approved in December 2020. Its implementation is aimed at supporting the achievement of national development goals set by the President of the Russian Federation for the coming decade; it is aligned with the principles and provisions applied to national projects.

1.6.4. Implementation of federal target programmes

In 2020, ROSATOM’s organisations implemented measures forming part of three federal target programmes (FTPs).

Funding allocated for the implementation of the FTPs (for the part of its scope on which information is publicly available) totalled RUB 39,338,883,590, including RUB 21,635,169,300 from the federal budget and RUB 17,703,714,290 from extra-budgetary sources.

[29] http://rosatom.ru/about-nuclear-industry/atomnaya-otrasl-rossii/.

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

Summary of property of ROSATOM, its organisations and enterprises under its jurisdiction

As at 31 December 2020, ROSATOM kept centralised records of the following assets and property:

- Property transferred to ROSATOM as asset contributions of the Russian Federation pursuant to resolutions of the President of the Russian Federation and the Government of the Russian Federation;
- 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;
- Assets of limited liability companies in whose authorised share capital ROSATOM has interests;
- Assets of ROSATOM's private institutions;
- Assets of federal state unitary enterprises with regard to which ROSATOM exercises ownership powers;
- Assets of 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 of ROSATOM (APMS).

As at 31 December 2020, centralised records of real property of nuclear organisations in the Automated Property Management System covered 356 organisations, which have 44 branches and are recorded in the APMS as individual architectural structures, including 15 federal state unitary enterprises with an authorised capital totalling RUB 220,766.4 million.

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 federal state unitary enterprises 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 federal state unitary enterprises (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 approved by Decree No. 693-24 of the Government of the Russian Federation dated 19 August 2011).

ROSATOM's property

ROSATOM's assets have certain special characteristics; more specifically, foreclosure of certain property of ROSATOM is prohibited[30].

ROSATOM is authorised to exercise ownership rights with regard to federal property on behalf of the Russian Federation. Federal property under the economic management of federal state unitary enterprises is recorded on their balance sheet. Federal property acquired as part of the exercise of the rights of a public contracting authority is recorded in ROSATOM's budgetary accounting records.

Property of enterprises under ROSATOM's jurisdiction

As at 31 December 2020, there were 15 federal state unitary enterprises under ROSATOM's jurisdiction.

In 2020, the enterprises were not reorganised.

To enable effective use of real property and protect the rights and legitimate interests of owners and holders of these rights, in 2020, ROSATOM monitored the registration of title to real property used by federal state unitary enterprises.

Performance of government functions related to state property management by ROSATOM in 2020 involved monitoring the registration of title to real property held by the Russian Federation by federal state unitary enterprises under ROSATOM's jurisdiction, as well as land regularisation.

In 2020, the Russian Federation registered its title to 29 out of 34 items of real property (buildings and structures) the title to which was required to be registered in the reporting year. The registration of title to items of real property that were not registered in 2020 is expected to be completed in 2021.

[30] In accordance with paragraph 9 of Article 3 of the Law on State Atomic Energy Corporation Rosatom (according to the list approved by Decree No. 346 of the Government of the Russian Federation dated 6 May 2008 on Measures for Implementing Order No. 369 of the President of the Russian Federation Dated 20 May 2008).

As at 31 December 2020, enterprises under ROSATOM's jurisdiction concluded a total of 260 agreements granting a lease of real property with a total floor space of 538,400 m².

According to reports of enterprises under ROSATOM's jurisdiction, as at 31 December 2020:

- A total of 12,930 items of real property was under the economic management of these enterprises;
- The floor space of the items of real property under the economic management of these enterprises totalled 33,028,800 m²;
- The initial book value of the items of real property under the economic management of the enterprises totalled RUB 250,471,352,730;
- The residual book value of the items of real property under the economic management of the enterprises totalled RUB 212,916,264,880;
- The number of land plots used by the enterprises totalled 2,212;
- The area of land plots used by the enterprises totalled 89,202.29 hectares;
- The cadastral value of the land plots totalled RUB 169,204,155,990;
- The authorised capital of the federal state unitary enterprises totalled RUB 220,766.4 million.

Property of ROSATOM's organisations

89 non-core assets owned by joint-stock companies in which ROSATOM has a shareholding exceeding 25% were restructured in 2020 (87 items of real property and shares (interests) in 2 non-core companies).

More specifically:

- 47 assets were sold;
- 40 assets were transferred free of charge to the government and municipalities;
- 2 assets were liquidated (written off).

Proceeds from the sale of these non-core assets totalled RUB 880.6 million.

380 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 2020 (378 items of real property and shares (interests) in 2 non-core companies).

More specifically:

- 93 assets were sold;
- 15 assets were transferred free of charge to the government and municipalities;
- 272 assets were liquidated (written off).

Proceeds from the sale totalled RUB 513.9 million.

As at 31 December 2020, ROSATOM's organisations concluded a total of 2,201 agreements granting a lease of real property with a total floor space of 1,833,680 m².

According to reports of ROSATOM's organisations, as at 31 December 2020:

- A total of 22,254 items of real property were owned by these organisations;
- The floor space of the items of real property on the balance sheet of the organisations totalled 48,059,160 m²;
- The initial book value of the items of real property totalled RUB 801,796,452,310;
- The residual book value of the items of real property RUB 645,107,326,190;
- The number of land plots used by the organisations totalled 3,644;
- The area of land plots used by the organisations totalled 115,420.89 hectares;
- The cadastral value of the land plots totalled RUB 142,327,922,930.

1.7 Development of the Northern Sea Route

Key results in 2020:

- The targets set for the Northern Sea Route Federal Project were met. Cargo traffic totalled about 33 million tonnes (against a target of 31 million tonnes).
- The flagship multipurpose nuclear icebreaker, *Arktika*, was accepted into service.
- Dredging work was performed, with more than 44 million m³ of material excavated.
- A seafloor topography survey was conducted along the Northern Sea Route totalling 46,500 adjusted kilometres.

GRI 103-1
GRI 103-2

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

ROSATOM has been assigned the 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 Corporation supervises the implementation of the Northern Sea Route Federal Project, which forms part of the Comprehensive Plan for Upgrading and Expanding Core Infrastructure until 2024[31].

ROSATOM has prepared and is implementing the NSR Infrastructure Development Plan until 2035 approved by the Russian Government. The Plan outlines a large scope of measures grouped into 11 sections, from the development of infrastructure for large-scale investment projects and preparations to enable transit navigation along the NSR to addressing healthcare issues and providing personnel for navigation in the Arctic.

Starting from 2020, navigation along the NSR is managed by the Marine Operations Headquarters of FSUE Atomflot, which provides icebreaker support and escorts vessels along the NSR in accordance with amendments to the Rules of Navigation along the NSR approved by a decree of the Government of the Russian Federation.

[31] Developed in accordance with Decree No. 204 of the President of the Russian Federation on National Goals and Strategic Objectives of the Russian Federation until 2024 dated 7 May 2018.

In the reporting year, Federal State Budgetary Institution NSR Administration became the organisation[32] that establishes the procedure for managing navigation along the NSR, including issuing navigation permits and licences for piloting and icebreaking services along the NSR, subject to approval by the Marine Operations Headquarters of FSUE Atomflot.

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

Russia owns the world's only nuclear-powered icebreaker fleet and has a long track record in the construction and operation of nuclear icebreakers. The nuclear-powered icebreaker fleet managed by ROSATOM participates in projects in the Arctic that are strategically important for Russia's economic development.

Icebreakers and onshore infrastructure are operated by FSUE Atomflot, an organisation of ROSATOM which has the status of a federal nuclear organisation.

As at 31 December 2020, the nuclear-powered icebreaker fleet included:

- Two nuclear icebreakers with 75,000 h.p. two-reactor nuclear propulsion units: *Yamal* and *50 Let Pobedy*;
- Two nuclear icebreakers with a 50,000 h.p. one-reactor nuclear propulsion unit: *Taymyr* and *Vaygach*;
- *Sevmorput*, a nuclear-powered LASH carrier with a 40,000 h.p. one-reactor nuclear propulsion unit;
- *Imandra* and *Lotta* floating maintenance bases;
- *Serebryanka*, a motor vessel intended for liquid RAW management and SNF transportation; *Rossita*, a motor vessel used for SNF and RAW transportation; and Rosta-1, a radiation monitoring vessel;
- The fleet providing port services to gas tankers in challenging ice conditions:
  - Two ice-class tugboats, *Pur* and *Tambey*;
  - Two icebreaking tugboats, *Yuribey* and *Nadym*;
  - A port icebreaker, *Ob*.

Under the Northern Sea Route Federal Project, cargo traffic along the NSR is projected to reach 80 million tonnes per year by 2024. By 2030, cargo traffic may increase to 110 million tonnes per year.

[32] In accordance with amendments to the Merchant Shipping Code of the Russian Federation.

In 2020, an additional target was set for the Federal Project, namely the total capacity of seaports situated along the NSR: by 2024, it should total 83 million tonnes per year, and by 2030 it is expected to reach 115 million tonnes per year.

GRI 103-3

In the reporting year, the targets set for the Federal Project were met ahead of schedule, with cargo traffic totalling 32.97 million tonnes (against a target of 31 million tonnes), including 25.2 million tonnes transported by vessels escorted by nuclear icebreakers.

In 2020, nuclear icebreakers escorted a total of 497 vessels with a total gross tonnage of 34,885,906 tonnes along the NSR. The total gross tonnage of escorted vessels increased by 15.2% year on year. This increase was driven by the ramp-up of the LNG plant in the port of Sabetta to full capacity and the commissioning of all 15 large-capacity Yamalmax gas tankers with a gross tonnage of 128,800 tonnes each that will transport liquefied natural gas from the port of Sabetta.

Maritime traffic along the NSR between 2017 and 2020

	2017	2018	2019	2020
Number of vessels, pcs.	493	331	510	497
Total gross tonnage, million tonnes	7.2	12.7	30.3	34.9

In the reporting year, *Arktika*, the flagship Project 22220 multipurpose nuclear icebreaker with a RITM-200 integral reactor unit whose power exceeds 80,000 h.p., was accepted into service.

In May 2020, two gas tankers, *Christophe de Margerie* and *Vladimir Voronin*, were escorted eastwards; this was the first time that vessels were escorted along the NSR so early in the season. This demonstrated that the icebreaker fleet was ready for an extension of the navigation season to 9 or 10 months per year and a transition to year-round navigation in the future.

1.7.3. Construction of new icebreakers

To handle the growing cargo traffic along the Northern Sea Route, ROSATOM is upgrading its icebreaker fleet on a large scale. By year-end 2020, four Project 22220 multipurpose nuclear icebreakers, *Sibir*, *Ural*, *Chukotka* and *Yakutia*, were under construction, with the latter two laid down in 2020; they are scheduled to be commissioned in 2021, 2022, 2024 and 2026 respectively.

In 2020, a contract was signed and the construction of a unique Project 10510 icebreaker, Rossiya, with propulsion power totalling 120 MW (more than 160,000 h.p.) was commenced. This icebreaker will enable year-round operation in the High Arctic, mainly in its eastern sector, which is characterised by the most challenging ice conditions.

Extending the service life of icebreakers

In 2020, the core of the reactor units of the *50 Let Pobedy* and *Taymyr* nuclear icebreakers was reloaded. The scheduled reloading will enable the nuclear icebreakers to run on the loaded fuel during the next four to five years.

To enable the uninterrupted operation of existing nuclear icebreakers and navigation in the Arctic, ROSATOM is taking steps to extend the service life of their reactor units to 235,000 hours and to extend their operational life to 36 years, with a potential for further extension to 260,000 hours and 40 years respectively. Work is currently underway to extend the service life of the *Taymyr* and *Vaygach* nuclear icebreakers to 235,000 hours and extend their operational life to 36 years. The service life of the nuclear propulsion units of the *Imandra* and *Lotta* floating maintenance bases and the special systems of the *Serebryanka* motor vessel were extended until the end of 2025.

GRI 103-1

Nuclear and radiation safety

In the course of operation of its icebreaker fleet, ROSATOM attaches great importance to environmental safety and preserving marine and coastal ecosystems. Accordingly, in 2020, ROSATOM continued to take steps in order to put the fundamental principles of the Uniform Industry-Wide Environmental Policy into practice and accomplish specific environmental objectives related to minimising the environmental footprint, including addressing ‘nuclear legacy’ issues.

In the reporting year, the cutting out and unloading of spent nuclear fuel from the storage tanks of the *Lepse* floating maintenance base was completed. This involved removing 398 casks containing spent fuel assemblies, loading them into 21 TUK-18 transportation packages on the Serebryanka motor vessel, transporting and placing the transportation packages in a storage area. 24 spent nuclear fuel shipping casks from the Lepse floating maintenance base (12 transportation packages containing SNF unloaded and delivered to FSUE Atomflot in 2019) were transported to FSUE Mayak Production Association.

The last batch of SNF from the storage tanks of the *Lepse* floating maintenance base (9 transportation packages) is scheduled to be sent for processing in Q1 2021. A total of more than 20 of ROSATOM's organisations in the Murmansk, Arkhangelsk and Leningrad Regions participated in the project to dismantle the Lepse floating maintenance base with financial support from international organisations.

Lepse was built as a dry cargo ship in 1934 and converted into a floating maintenance base in 1961. Until 1981, the floating maintenance base was used to reload the reactors of nuclear icebreakers with nuclear fuel. Starting from 1981, the Lepse floating maintenance base was used only for storing spent nuclear fuel and radioactive waste. It was decommissioned in 1988 and was converted into a permanently docked vessel in 1990. Preparations for its dismantling were commenced in 1991.

In addition, FSUE Atomflot continued to coordinate the transportation of spent nuclear fuel from nuclear submarines of the Russian Navy stored at former onshore maintenance bases in Andreev Bay and the village of Gremikha on Kola Peninsula and SNF delivery for processing. In 2020, 46 shipping containers with SNF from the Navy submarines were removed.

As part of the Federal Target Programme on Nuclear and Radiation Safety for the Period from 2016 through 2020 and for the Period until 2030, radioactive waste continued to be conditioned, removed and handed over by FSUE Atomflot to FSUE National Operator for Radioactive Waste Management (an organisation of ROSATOM).

In 2020, 47.22 m3 of waste was conditioned, and 51 containers with radioactive waste were removed from the premises of FSUE Atomflot and handed over to FSUE National Operator for Radioactive Waste Management.

Systematic implementation of the environmental policy enables ROSATOM to monitor activities in the sphere of environmental protection and environmental safety, focus on environmental issues and implement timely corrective measures to address them in order to ensure compliance with environmental laws.

1.7.4. Activities of FSUE Hydrographic Enterprise

GRI 103-2

Navigational and hydrographic support of navigation along the Northern Sea Route

In 2020, navigational and hydrographic support of navigation along the NSR was provided under the Northern Sea Route Federal Project in accordance with the Plan of Navigational and Hydrographic Support of Navigation along the Northern Sea Route, in Seaports Located along the Northern Sea Route and in Port Approaches for 2020 approved by ROSATOM.

This task was assigned to FSUE Hydrographic Enterprise, which had been transferred to ROSATOM from the Ministry of Transport of Russia pursuant to an Order of the President of the Russian Federation in 2019.

FSUE Hydrographic Enterprise comprises:

- Seven hydrographic bases;
- An integrated Arctic hydrographic expedition;
- A cartographic unit;
- An integrated Arctic radio navigation unit;
- An Arctic service of aids to navigation;
- An information centre for safety at sea;
- An Arctic pilot service;
- A port infrastructure construction and operation department.

In 2020, hydrographic surveys (seafloor topography mapping) conducted by FSUE Hydrographic Enterprise covered a total of 46,572 adjusted kilometres along the NSR and in bottleneck areas in the Yenisei Gulf and on the Yenisei and Kolyma Rivers. Thus, the Enterprise set a new record, as previously the scope of the surveys had not exceeded 35,000 adjusted kilometres.

In 2020, FSUE Hydrographic Enterprise maintained 369 aids to navigation along the NSR, in seaports situated along the NSR and in port approaches in the stated mode of operation; this included the maintenance and operation of the NAVTEX Coast Station in the port of Tiksi.

The Enterprise also maintained, operated and developed the infrastructure of seven stations of the GLONASS/GPS global navigation satellite system (GNSS) situated on the coast and on islands along the NSR, including six GLONASS/GPS monitoring and correction stations on Oleny Island, Cape Sterlegov, Andrey Island, Stolbovoy Island, Kamenka Island and in the estuary of the Indigirka River, as well as the control station in Dikson.

Construction of two Ice 3 class Project E35.G hydrographic survey boats and two Ice 3 class Project BLV03 buoy tenders[33] was continued in the reporting year. These vessels are designed to operate in ports situated along the NSR, enable safe navigation and develop port infrastructure, as well as to position, service and deliver navigation and radio equipment and specialists to onshore facilities. The vessels are scheduled to be commissioned in 2021.

Construction and management of infrastructure facilities of the Northern Sea Route

FSUE Hydrographic Enterprise continued to support the construction of the Uternniy terminal for liquefied natural gas and stable gas condensate, the renovation of a sea canal (an approach canal in the Gulf of Ob, Kara Sea), as well as maintenance dredging in the approach canal and in the seaport of Sabetta.

[33] A vessel that installs, removes and maintains navigation marks on waterways.

As part of dredging work in the approach canal and in the basin of the Utrenniy terminal, a total of 11,057,011 m³ of material was excavated. The approach canal of the Utrenniy terminal is 5.5 kilometres long and 225 metres wide, with a bottom elevation of minus 15.0 metres.

Four sea buoys were purchased in the reporting year; two of them were installed and tested at sea, with the other two buoys serving as a backup. Light beacons No. 1 and No. 2 were installed at the end of the berths. Pipe piles of the front wall, a row of barrier piles and battered piles were sunk at the sites of the Northern and Southern Ice Protection Structures (a total of more than 450 piles).

As part of the renovation of the sea canal (the approach canal in the Gulf of Ob, Kara Sea), dredging work will be performed in two stages between 2020 and 2022 and will involve excavating a total of 59,812,235 m3 of material. The renovation of the sea canal will enable safe navigation amid a staged increase in the number of gas tankers transiting the canal, including in adverse weather conditions during seasonal ice drift in the navigation area in winter.

The first stage of renovation in 2020 and 2021 involves performing dredging work to widen the sea canal to 475 metres and build the second bend of the canal. Following the completion of the second stage of dredging work (in 2022), the sea canal will be 573 metres wide and 51.6 kilometres long, with a bottom elevation of minus 15.1 metres (16.5 metres in the foundation pits for a gravity-based structure and 15.5 metres along the turn).

As a result of dredging work performed in the sea canal during the summer navigation season in 2020, 32,488,898 m³ of material was excavated and moved to underwater dumping sites. This is a national record for the scale of dredging work.

Maintenance dredging was performed as part of the operation of the approach canal and the seaport of Sabetta, with 708,040 m³ of material excavated. The work was planned at the end of the summer navigation season and performed in October, providing a safe depth throughout the ice navigation season.

In 2020, the Enterprise also completed remediation measures aimed at replenishing aquatic wildlife in order to repair environmental damage from construction work performed in the reporting year. In July and August 2020, 1,140,967 juvenile Siberian sturgeon and 3,116,578 juvenile whitefish (muksun) were released into water bodies forming part of the Ob and Irtysh basin. Construction work at the sites was accompanied by industrial environmental monitoring and the tracking of changes in all components of the ecosystem.

For details on ROSATOM's impact on biodiversity, see the section 'Impact on Local Flora and Fauna' in the chapter 'Safety Report'.

1.7.5. New products

Digitisation of operations

In 2020, the digitisation programme of ROSATOM's Northern Sea Route Directorate was updated as regards the migration of ROSATOM's digital infrastructure to Russian software.

In addition, in the reporting year, the Automated Control System for the Marine Operations Headquarters of FSUE Atomflot became fully operational. The system currently supports decision-making on the management of the icebreaker fleet and icebreaker support, the collection and visualisation of data on navigation and ice conditions and the hydrometeorological situation, satellite imaging, as well as analytics covering specific indicators. A situation centre was launched at the Marine Operations Headquarters. During the summer and autumn navigation season in 2020, the Headquarters piloted 11 vessels along the Northern Sea Route without icebreaker support.

Digitisation in FSUE Hydrographic Enterprise

In 2020, a digitisation programme was developed for FSUE Hydrographic Enterprise. The programme is aimed at integrating all information systems, adopting information systems used in ROSATOM and ensuring information security.

The Enterprise has been provided with modern automated hydrographic systems based on multibeam echosounders, which are used for seafloor topography mapping along the NSR. To collect and process seafloor topography data and prepare reports, the Enterprise uses state-of-the-art licensed software: QPS Qinsy, QPS Qimera 2 and Civil 3D. This equipment and software enable the Enterprise to conduct hydrographic surveys along the NSR, process the relevant data and prepare reports in accordance with the requirements of Publication S-44 of the International Hydrographic Organisation (IHO), *Standards for Hydrographic Surveys.*

Innovative activities of the Enterprise include creating and updating departmental electronic navigational charts (ENCs) and digital reference datasets (DRDSs) covering the NSR that are compliant with applicable IHO standards; this is done using state-of-the-art software, dKart Editor. FSUE Hydrographic Enterprise has been registered with the International Hydrographic Organisation and has been assigned its own ENC producer code, R1.

In 2020, 259 ENCs covering the entire NSR were updated; 58 new DRDSs were created, and all of the Enterprise's DRDSs comprising a total of 253 cells were kept up-to-date.

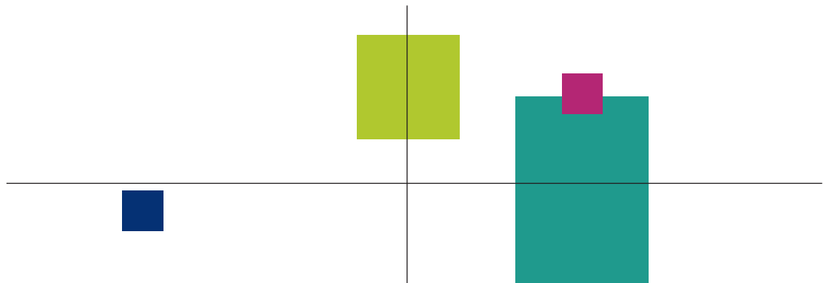
The ENCs and DRDSs created by the Enterprise are provided to mariners and updated in accordance with the requirements of IHO Publication S-57, *IHO Transfer Standard for Digital Hydrographic Data.* All ENCs and DRDSs provided by the Enterprise are protected against unauthorised access, copying and distribution in accordance with the requirements of IHO Publication S-63, *IHO Data Protection Scheme.*

FSUE Hydrographic Enterprise is the only organisation in the Russian Federation that creates DRDSs covering seaport areas and approaches to them with a controlling depth and provides these DRDSs to mariners, in accordance with Annex A to IHO Publication S-65, High Density ENCs, adopted by the IHO in 2020.

By the end of the reporting year, 38 organisations were provided with 1,293 DRDSs and ENCs compliant with IHO Publication S-57 under existing contracts, with 259 ENCs provided under a contract with FSUE Atomflot to support the activities of the Marine Operations Headquarters. All large-capacity vessels sailing along the NSR, primarily LNG tankers and nuclear icebreakers of FSUE Atomflot, are provided with DRDSs created by the Enterprise.

1.7.6. Plans for 2021 and for the medium term

- To meet the targets set under the Northern Sea Route Federal Project for cargo traffic and the total capacity of seaports situated along the NSR.
- To continue the construction of Project 22220 multipurpose nuclear icebreakers and the Project 10510 nuclear icebreaker.
- To accept the first follow-on Project 22220 icebreaker, Sibir, into service.
- To extend the service life of the reactor units of the *Taymyr* and *Vaygach* nuclear icebreakers.
- To commission two Ice 3 class hydrographic survey vessels and two Ice 3 class buoy tenders.
- To commence the construction of a large Arc7 ice-class hydrographic survey vessel.
- To develop and implement automated vessel routing algorithms as part of development of the Automated Control System for the Marine Operations Headquarters.



- To develop a concept of an Integrated NSR Digital Service Platform.
- To organise seafloor topography surveys along the NSR, in the Yenisei Gulf and the Yenisei and Kolyma Rivers.
- To organise maintenance, operation and infrastructure development of GLONASS/GPS monitoring and correction stations in the Arctic.
- To organise the construction of facilities forming part of the Global Maritime Distress and Safety System.
- To develop the NSR port infrastructure, including the construction of the Utrenniy liquefied natural gas and gas condensate terminal in the seaport of Sabetta.

1.8 Implementation of the Ecology National Project

The Ecology National Project is one of the national projects of the Russian Federation scheduled for implementation between 2019 and 2024; it is aimed at improving the environment in the country.

The National Project includes nine federal projects and is focused on five areas: waste, water, air, biodiversity and technology. It is scheduled to be completed by the end of 2024.

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

ROSATOM has been authorised to create an integrated system for the management of hazard class 1 and 2 waste[34] in Russia. This initiative has been launched under the Infrastructure for the Management of Hazard Class 1 and 2 Waste Federal Project, which forms part of the Ecology National Project.

[34] 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-vapor lamps and mercury thermometers, as well as mercury-containing industrial waste); effluents from industrial enterprises, organic waste, mixed and composite organic and inorganic waste.

FSUE Federal Environmental Operator (an organisation of ROSATOM), which has been appointed as federal operator responsible for the management of hazard class 1 and 2 waste in the Russian Federation, has been authorised to create a secure integrated system covering the entire hazard class 1 and 2 waste management process chain, from waste generation to waste processing into recycled products.

In the reporting year, a national information system for the management of hazard class 1 and 2 waste was piloted; it has enabled manufacturing enterprises and operators to start entering data on their operations to facilitate compliance with requirements for the management of these types of waste. By mid-2021, the system was adopted in approximately 60 regions.

At the end of the reporting year, a federal road map for the management of hazard class 1 and 2 waste was approved pursuant to an order of the Government of the Russian Federation.

As part of the Federal Project, ROSATOM is also working to create infrastructure for the management of hazard class 1 and 2 waste, namely a network of environmental technology parks, which will be equipped with world-class state-of-the-art technological solutions. The first four environmental technology parks will be created by 2024 in the Saratov, Kirov and Kurgan Regions and in the Udmurt Republic. ROSATOM plans to build a total of seven environmental technology parks.

In the reporting year, design documents were developed for waste processing facilities, and public discussions were held. Regional experts and representatives of the scientific community were engaged in the development of design documents. All designs were approved by the State Environmental Expert Review Board.

1.8.2. Implementation of the Clean Country Federal Project

As part of the Clean Country Federal Project, ROSATOM is working to mitigate environmental risks posed by legacy sites in the Irkutsk, Chelyabinsk and Leningrad Regions.

Municipal landfill reclamation in Chelyabinsk

The Chelyabinsk municipal landfill with an area of approximately 74.1 hectares is situated near the centre of Chelyabinsk; it was put into operation in 1949. A total of 17.5 million m³ of solid household waste is stored at the landfill. Since 2018, waste is no longer accepted for disposal at the landfill.

In 2020, the reclamation of the Chelyabinsk municipal landfill was largely completed. The following work was performed:

- The reshaping of the landfill body was 100% completed (measures were taken to ensure that the landfill site has a regular geometric shape and that its sides slope at 20 degrees, as required by regulations);
- The construction of a reinforced earth embankment was 100% completed (this involved building a structure preventing landslides in the western part of the landfill site);
- Landfill capping was 90% completed (this involved covering the reshaped landfill body with a drainage mat, a 40-centimetre layer of sandy clay, a bentonite mat, a geomembrane, a 40-centimetre layer of loam, a second drainage mat and topsoil);
- Construction of a leachate collection and removal system was 100% completed (this involved building a rockfill drain (a rock drainage ditch) for leachate collection around the perimeter of the landfill site, a 1.6-kilometre-long sheet pile retaining wall and a 2,500 m³ leachate collection tank);
- Construction of a storm water runoff collection system was 85% completed;
- Construction of a landfill gas collection and recovery system was 69% completed (this involved installing vertical drains (plastic drainage panels wrapped in geosynthetic material), building horizontal drains and installing gas collection wells and manifolds).

Work completed in 2020 significantly reduced the negative environmental impact of the landfill and helped to improve the visual appearance of the remediated site.

This project is intended to serve as a benchmark, as the entire range of world-class reference solutions for environmental remediation was applied for the first time ever at the site. The project will help to reduce emissions within the city boundaries by 30%. Reclamation work involved adopting world-class state-of-the-art technological solutions for emission and leachate treatment.

The project is scheduled to be completed in 2021.

Krasny Bor landfill remediation

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 Leningrad (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. The land plot situated 6 kilometres away from the city of Kolpino had been selected due to favourable geological conditions, namely the presence of a thick layer of Cambrian clay (80 to 110 metres thick) preventing toxic substances from seeping downwards and contaminating groundwater.

Hazard class 1 waste is stored in hermetically sealed steel containers buried in a layer of blue clay at a depth of 7 metres; hazard class 2 to 4 waste is stored in landfill cells grouped by waste type (acid, alkaline, organic waste).

During the operation of the landfill, 70 landfill cells were built by 2014; they contain 1.7 million tonnes of highly toxic waste. 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.).

In 2020, ROSATOM initiated the development of a project to remediate the landfill site. Following the collection, systematisation and analysis of input data for the project, the following list of stages of development of design documentation was compiled:

Stage 1. Construction of a multilayer cut-off wall surrounding the Krasny Bor landfill site; it is designed for groundwater diversion and will prevent the seepage of contaminants to adjacent areas. The structure will be equipped with an automated control system.

The multilayer cut-off wall is a wall with a depth of 5 to 9.9 metres and a width of more than 5 metres. It is equipped with a multilayer safety system, which comprises a system of barriers (cut-off walls), a monitoring system, an injection control system and a leachate collection system.

If there is a breach in the cut-off wall, the injection control system will be activated automatically and will immediately seal the crack.

Based on the findings of an environmental impact assessment, it was determined that the installation of the multilayer cut-off wall will significantly reduce the risk of contamination beyond the boundaries of the landfill site and will thus minimise its environmental impact.

Stage 2. Construction of infrastructure for the treatment (processing) of waste stored in open landfill cells and remediation of the Krasny Bor landfill site.

In the reporting year, engineering surveys were completed, and a concept was developed for repairing historical environmental damage; selected technological solutions were approved by institutes of the Russian Academy of Sciences, and design documentation was prepared.

Industrial site rehabilitation in Usolye-Sibirskoye

As at 2020, the sites of chemical enterprises in the town of Usolye-Sibirskoye were an environmental disaster area. The region hosts 565 industrial properties with a total footprint of 610 hectares; the area of land contaminated with harmful chemicals totals about 20 km^2.

Mercury leaks from the industrial site contaminate the Angara River. Starting from 1992, the Institute of Geochemistry of the Siberian Branch of the Russian Academy of Sciences has been monitoring and assessing the level of mercury contamination in the Angara River and the Bratsk Reservoir, with high levels of mercury contamination detected in bottom sediments, water and fish in the Bratsk Reservoir. In 2018 and 2019, emissions of hazardous chemicals were detected; they were caused by leaks from storage tanks (silicon tetrachloride) and wells used for industrial waste disposal (epichlorohydrin). In addition, residual concentration of mercury contamination in fish continues to exceed permitted limits across an area extending to the upper portion of the Bratsk Reservoir.

FSUE Federal Environmental Operator (an organisation of ROSATOM) has been authorised to implement a set of urgent measures to ensure the safety of facilities situated in Usolye-Sibirskoye and an action plan to prevent environmental contamination and clean up the industrial site.

In 2020, high-priority work forming part of the industrial site rehabilitation project was completed ahead of schedule:

- Measures were taken to ensure the safety of 17 tanks containing toxic substances, which were in a dilapidated condition;
- 2 out of 12 shafts were decommissioned at a brine field;
- An underground waterproofing system was installed, which helped to prevent 14,500 m3 of oil-contaminated soil from being washed into the Angara River;
- The dismantling and clean-up of the superstructure of the mercury cell electrolysis shop, which had been the main source of contamination at the site, were completed.

1.8.3. Implementation of the Preservation of Lake Baikal Federal Project

Remediation of the site of the Baykalsk Pulp and Paper Mill

ROSATOM is implementing a project aimed at environmental improvement of Lake Baikal, which involves reducing the area of land with a high and extremely high level of environmental contamination.

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. 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 million tonnes of industrial waste, mainly lignin sludge[35], were accumulated in 13 landfill cells. In addition, the captive CHPP of the enterprise produced a large amount of ash as a result of coal combustion. Solid household waste and construction waste was also dumped into the landfill cells.

A major environmental hazard is posed by black liquor[36], which is stored mainly at BPPM's wastewater treatment facilities. Preliminary estimates suggest that the volume of alkaline liquor stored at the site may exceed 250,000 m^3.

In late 2020, FSUE Federal Environmental Operator was appointed as the sole contractor responsible for preparing and implementing a project to repair environmental damage caused over the years by the operations of OJSC Baykalsk PPM.

The project will involve a clean-up of the Solzansky and Babkhinsky landfills and the wastewater treatment facilities where alkaline liquor is stored. Given that landfill cells contain a heterogeneous mixture of waste of different nature generated as a result of cellulose production, the operation of the CHPP and other production operations, there are no universal technological solutions for managing this waste. Individual solutions are being developed for each group of waste; it is suggested that they should be reviewed as a single set.

Plans for 2021 include conducting studies, collecting proposals concerning technological solutions for the BPPM site remediation and developing the relevant design documentation, which will be reviewed during public discussions and environmental reviews required by law.

[35] Insoluble solid fibre residue from the pulping process.
[36] Spent solution produced as a result of the pulping process; it is a compound of organic and inorganic substances.

1.9 Digital Transformation

Key results in 2020:

- ROSATOM is responsible for two road maps for developing high-technology areas.
- About 70 IT projects focused on internal digitisation were implemented.
- Six new digital products were launched.

1.9.1. Uniform Digital Strategy

ROSATOM is implementing a Uniform Digital Strategy (UDS), which is focused on supporting the digitisation of the Russian economy, developing ROSATOM's own digital products and launching them on the market, and improving internal business processes.

The UDS covers three areas:

1. Participation in digitisation in Russia;
2. Digital products;
3. Internal digitisation.

The UDS is updated on an annual basis taking into account the results achieved by ROSATOM and market changes.

The UDS implementation relies on four main pillars:

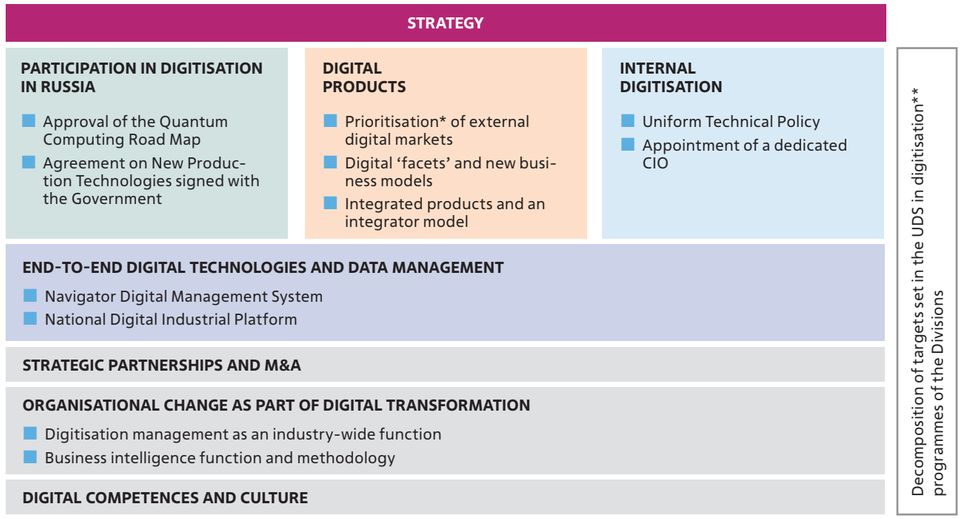
- End-to-end digital technologies and data management;
- Strategic partnerships, mergers and acquisitions;
- Organisational change;
- Digital competences and a digital culture.

The launch and implementation of digitisation programmes in the Divisions is another key driver for the effective implementation of the Strategy.

ROSATOM is responsible for two road maps for developing high-technology areas:

- Quantum Computing (approved and currently being implemented);
- New Production Technologies (developed and prepared to be submitted for approval).

Vision of Uniform Digital Strategy 4.0



* Prioritisation is a tool that makes it possible to rank a diverse set of tasks in order of importance.

** Digitisation means the use of digital and computer technologies in order to redesign a business to make sure that business decision-making is fully based on data.

1.9.2. Participation in digitisation in Russia

Pursuant to Decree No. 234 of the Government of the Russian Federation dated 2 March 2019, ROSATOM has been granted the status of a competence centre and an active participant of the Digital Technology Federal Project, which forms part of the Digital Economy National Programme. In 2020, ROSATOM recorded a number of major achievements related to the performance of these functions.

ROSATOM assisted in updating the framework of government support for the development of digital technologies and products as part of the Digital Technology Federal Project.

Systematic organisational, methodological and expert support provided to ROSATOM's Divisions and nuclear organisations, as well as improved local regulations governing investment procedures have enabled an exponential increase in the amount of government co-funding secured by nuclear organisations for digital projects.

Budget funds raised by nuclear organisations, RUB billion

2018	2019	2020
0.4	1.32	6.2

In July 2020, the Presidium of the Government Commission on Digital Development and the Use of Information Technology to Improve the Quality of Life and the Business Environment approved a road map for developing the Quantum Computing high-technology area; ROSATOM was assigned responsibility for its implementation. A total of RUB 23.6 billion will be allocated for activities under the Quantum Computing Road Map between 2020 and 2024, with RUB 13.2 billion to be allocated from the budget.

A science and technology consortium (the National Quantum Laboratory) was established in order to implement the Road Map and to build and develop the relevant science and technology infrastructure.

In addition, in 2020:

- 10 research projects focused on technologies for the development of a quantum processor were reviewed by 14 leading international researchers from nine countries;
- The Moscow Institute of Physics and Technology (MIPT), the Moscow Engineering Physics Institute (MEPhI) and Moscow State University were actively developing specialised educational programmes;
- High-technology research equipment required for R&D activities was delivered to ROSATOM's quantum laboratories;
- ROSATOM established a Research and Development Committee on Quantum Technologies.

The project to develop quantum computing is a major national strategic task. Findings of research conducted over the past few decades show that quantum computers can be many times more efficient that conventional computers.

ROSATOM is implementing a road map for developing quantum computing approved in 2020. The road map had been developed under letters of intent for the development of individual high-technology areas signed in July 2019 by the Government of the Russian Federation and state-owned companies. The document is focused on addressing research, engineering and infrastructure tasks related to quantum computing.

The project will result in the development of a full stack of quantum computing technologies (from hardware platforms to software products and algorithms), including the development of a universal multi-qubit quantum processor.

1.9.3. Digital products

In 2020, six new digital products were officially launched on the open market.

In June 2020, JSC Rosenergoatom unveiled the ***Infrastructure Platform for the Hosting of Modular and Containerised Data Centres***; it is a service provided by the Kalinin Data Centre. A specially equipped two-hectare site is designed to host 30 containerised customer data centres with a unit capacity of up to 1 MW.

In October 2020, JSC TVEL unveiled a new digital service, ***Atombot. Procurement***. This is a procurement automation system enabling much more efficient processing of procurement documents. The service is based on solutions for smart business process automation; it has been successfully tested in nuclear organisations.

In December 2020, four more digital products were unveiled:

- The ***Multi-D Unified Time Schedule***, a software tool for schedule management and the centralised monitoring of risks associated with complex engineering projects. This analytical solution forming part of the Multi-D technology suite does not rely on imported technology. The product has been developed and successfully adopted in the Engineering Division, where it is applied in NPP construction projects in Russia and abroad;
- ***Logos Strength***, a new component of the Logos system, which is a continually evolving computer-aided engineering (CAE) software suite. The launch of the Logos Strength module on the market marked the completion of the Corporation's three-year efforts to develop the key components of an engineering simulation system which does not rely on imported technology. This system also includes the Logos Aero-Hydro and Logos Thermo modules, which had been unveiled earlier. Logos provides an integrated interface for solving multiphysics problems, including calculations in the field of fluid dynamics, heat and mass transfer, static and dynamic strength and vibration resistance. Logos can fully meet the needs for physical process simulation in various industries;
- The ***Mobile Data Centre*** is a mobile data collection, processing, storage and transmission facility enabling the rapid deployment of digital infrastructure. The Mobile Data Centre is designed for use in projects requiring a rapid setup of a data reception, processing and transmission point in hard-to-reach areas. It can be used in the mining industry, including mineral exploration; in the fuel and energy sector; in construction and transportation; in the defence industry and at Russian military facilities; in the emergency prevention and response system and in the sphere of environmental protection;
- A commercial version of the ***Pilot Access Control System*** for monitoring and managing access to public event venues and secure facilities. The system is designed to ensure the security of crowded public spaces, including not only sports venues but also the underground, airports and train stations, large office buildings, museums and exhibition halls, municipal parks and recreation areas. Its distinguishing feature is that the system makes it possible to integrate equipment at geographically dispersed facilities into a single access control system and is capable of supporting about a million users in real time. The system has been developed by NIKIRET.

In 2020, ROSATOM's register of digital products included more than 100 products developed by 30 nuclear organisations. To facilitate the development of successful market solutions based on digital products, in 2020, a Digital Product Development Club was launched in the industry.

1.9.4. Internal digitisation

As part of internal digitisation programmes, in 2020, ROSATOM implemented about 70 IT projects of different scale and level of complexity.

The Corporation is developing an integrated digital platform; in the future, this platform will combine the ecosystems of ROSATOM's organisations, suppliers of goods and services both within and outside the industry, Russian government agencies and international organisations. In addition, industry-specific processes are being increasingly integrated into the public service infrastructure: individual functions are performed within the Corporation, and communication with government agencies is maintained to obtain information needed by both employees and the employer.

A deteriorating epidemiological situation posed a major challenge for ROSATOM's IT function in 2020. To enable uninterrupted remote work and efficient communication between employees, remote access to corporate resources was provided for more than 40,000 workstations. A corporate communication platform was launched in the industry; it comprises a messaging service and a platform for online events. By year end, the number of its users reached 14,000 people, and the project was recognised as the best mobile communication solution according to Global CIO.

In the reporting year, the IT landscape was being developed ahead of schedule. A Private LTE network was tested simultaneously at three production sites; it enables nuclear organisations to introduce state-of-the-art digital services fully compliant with all security requirements.

Projects in the sphere of electronic document management were also a breakthrough. About 10,500 employees were given access to a cloud service system for managing legally valid documents. A data mart for tax monitoring launched jointly with the Federal Tax Service enabled nuclear organisations to shift to a new format of operation.

Corporate import substitution processes in the sphere of IT are entering a new phase: in 2020, ROSATOM started to take practical steps to transition its employees to workstations that do not rely on imported technology. A project was launched to migrate the integrated industry-wide electronic document management system (IIDMS) to a domestically developed platform. A competitive tendering process was announced for the procurement of a domestically developed operation system and office software. The pilot scope of the corporate cloud was migrated to Russian software; the Corporation also piloted the migration of data backup tools to domestically developed solutions. In terms of methodological guidelines, ROSATOM developed three corporate action plans for import substitution and is currently testing Russian software. Nine of ROSATOM's import substitution initiatives are being reviewed at the federal level.

As part of the programme to digitise NPP construction processes, ROSATOM developed design solutions for multi-platform computer-aided design systems. The design and procurement functions were integrated within JSC ASE EC (this was piloted at Kursk NPP-2); the Corporation also piloted an integrated database on the cost of resources for NPP construction.

ROSATOM piloted product releases of document management modules forming part of the Multi-D suite: Electronic Technical Document Management and Executive Documentation, as well as an integrated network scheduling system. The TCM NC system became fully operational at the construction sites of Paks II, Rooppur and El Dabaa NPPs. Draft standards and other regulations in the sphere of information modelling were prepared and submitted to the technical committees of the Russian Ministry of Construction, Housing and Utilities for approval.

1.9.5. Research and development in the sphere of digital technologies

End-to-end digital technologies and data management

The end-to-end digital technology development and data management (EDT & DM) programme is central to ROSATOM's Uniform Digital Strategy, as it provides a basis for further efforts in other prioritised areas, including the digitisation of the Russian economy, development of new digital products and internal digitisation in the industry.

In 2020, the scale of development in the sphere of EDT & DM grew at a record pace. The total number of projects, prototypes and initiatives in this area reached 56. Pilot projects to introduce end-to-end digital technologies were implemented in seven of ROSATOM's organisations. At least three business hypotheses concerning major economic benefits provided by the adoption of end-to-end digital technologies in the industry were confirmed.

As part of the EDT & DM programme, in 2020:

- New projects were launched in the industry to test business hypotheses;
- Projects in the sphere of end-to-end digital technologies and data management were aligned both across the industry and at the level of the Divisions;
- Internal competence centres focused on prioritised digital technologies were established;
- Standards governing the adoption of digital solutions in the industry were developed;
- Requirements for wireless connectivity were approved;
- A data management architecture and policy were approved;
- Projects were launched to develop the Navigator Digital Management System for the Nuclear Industry and the Digital Industrial Platform;
- Working groups on artificial intelligence, virtual and augmented reality (VR/AR) technologies were established and are actively working.

One of the key prerequisites for successful development and adoption of end-to-end digital technologies is to develop a network of laboratories in cooperation with partners.

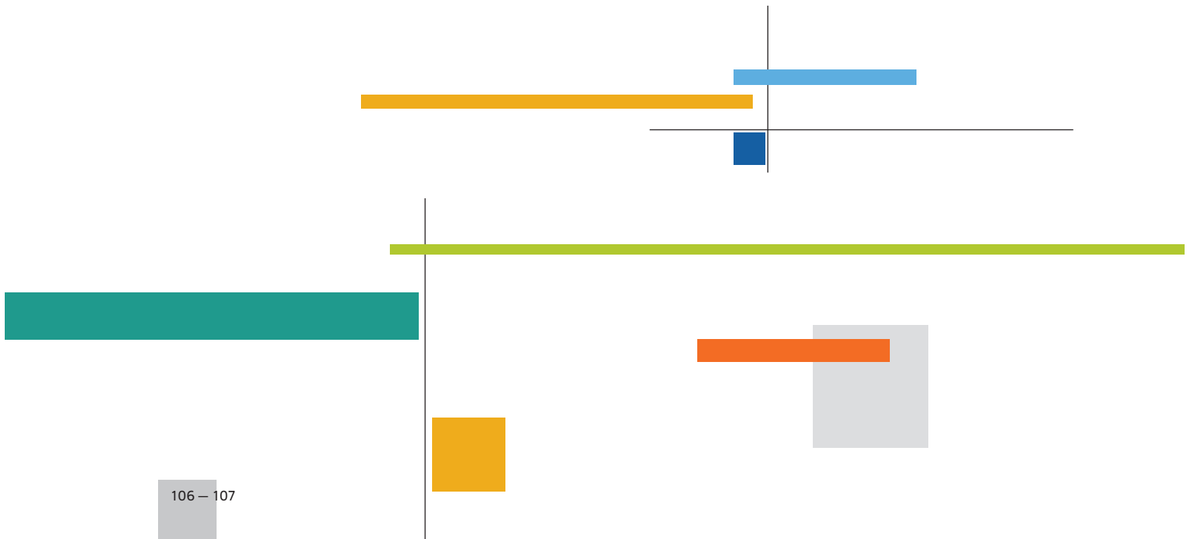
In 2020, ROSATOM implemented joint projects with a number of research and educational institutions:

- An agreement was concluded with the Russian Quantum Centre on the establishment of Russia's first laboratory that will study and develop machine learning and artificial intelligence methods based on quantum computing and will specialise in the application of these technologies in the nuclear industry;
- The International Research Centre for Advanced Nuclear Technologies was established jointly with Far Eastern Federal University on Russky Island (Primorsky Territory);
- A joint laboratory was launched at Obninsk Institute for Nuclear Power Engineering; it focuses on problems related to artificial intelligence and the Industrial Internet of Things.

For details on communication projects in the sphere of digitisation, see the section 'Strategic Communications'.

1.9.6. Plans for 2021 and beyond

- To develop digital products aligned with global best practices to meet the needs of the industry.
- To form product teams that will be responsible for digital product development and help them to further develop their professional competences.
- To productise the best digital projects and initiate their roll-out in the industry.
- To effectively fulfil ROSATOM's obligations as a competence centre/participant of the Digital Technology Federal Project forming part of the Digital Economy National Programme; to contribute to the development and implementation of digital transformation strategies for various sectors of the Russian economy.
- To secure government co-funding for digital projects to be implemented by nuclear organisations, including quantum computing (over RUB 5 billion).
- To implement all measures scheduled for 2021 under the road map for developing the Quantum Computing high-technology area, pursuant to Decree No. 1875 of the Government of the Russian Federation dated 18 November 2020.
- To approve a road map for developing the New Production Technologies high-technology area; to establish a Competence Centre responsible for developing New Production Technologies and initiate the implementation of the road map.



1.10 Research and Innovations

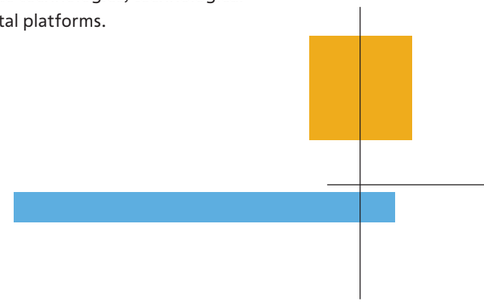
Key results in 2020:

- A comprehensive programme titled 'Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024' was approved.
- ROSATOM updated the Innovative Development and Technological Modernisation Programme.
- 44 technological projects were underway.
- Over 100 conceptual designs were produced and funded, covering all strategic areas of R&D and technology development in the industry.
- More than 140 projects were being implemented in 2020 as part of ROSATOM's Consolidated Industry-Wide Plan of R&D Topics.
- The number of international applications filed and patents obtained in the reporting year totalled 784.

Despite the COVID-19 pandemic, in 2020, the Corporation promoted new technologies and products.

On the one hand, the events of the spring of 2020, namely the COVID-19 pandemic and its impacts, such as large-scale self-isolation and the use of new formats of communication, posed new challenges for the implementation of ROSATOM's research and innovative projects. On the other hand, remote work entailed a shift in the focus of external communication towards digital channels (a variety of effective remote communication channels were set up); it also helped to speed up business processes and digitisation, make relations with partners more personal and expand cooperation.

Nuclear organisations achieved impressive results in the sphere of large- and small-scale nuclear power generation, designed new icebreakers and technologies of the future, expanded the range of non-nuclear products that are in demand in various industrial sectors, developed and introduced medical and composite technologies, technological solutions for the mining of rare-earth metals and industrial waste processing and digital platforms.



Map of innovative projects

Name of the integrated project	Key outcomes in 2020	Impact of the project	Contribution to the development of the Russian economy
Strategic areas of R&D and technological development of national importance			
Development of technologies for a two-component nuclear power industry based on a closed nuclear fuel cycle	■ The concept of a digital twin of automated and robotised production facilities forming part of the closed nuclear fuel cycle was developed; it is based on an information model being developed for the pilot and demonstration energy facility (PDEF) and the industrial energy facility. ■ The design feasibility study was completed to confirm the competitiveness of the BN-1200M power unit. A preliminary design of the core of the BR-1200 reactor unit was developed. ■ Irradiation of an experimental fuel assembly, ETVS-11, with BREST-OD-300 fuel elements was completed. A maximum burnup of 9.0% h.a. was reached with a damaging dose of 107.6 dpa. ■ A comprehensive test of a refining technology using an extraction and crystallisation process was completed as part of the HYDRO project. The mode of dissolution of oxidised spent MNUP fuel was confirmed for a sample with a burnup of about 7% h.a.	■ Laying the foundation for a new nuclear power system of the future that is based on technologies that are safer and more environmentally friendly, enabling expanded replenishment of resources of the nuclear power industry and providing an affordable source of energy for households and industrial enterprises. ■ Developing modern infrastructure for scientific research. ■ Developing an NFC product offer that helps to address the SNF accumulation problem by enabling efficient SNF processing involving multiple recycling of fissionable materials and removal of long-lived isotopes from RAW. ■ Reducing the total NFC cost (given the projected rise in uranium prices in the future).	■ Accelerated technological advancement in the Russian Federation due to the development of new-generation industrial nuclear energy technologies. ■ Long-term competitiveness of Russia's civilian nuclear cluster on global markets. Prevention of accidents that would necessitate the evacuation of local residents. ■ Growing public acceptance of nuclear power.
Development of controlled thermonuclear fusion technologies and innovative plasma technologies	■ Advanced structures and technological solutions for the first wall and the divertor were designed and tested. ■ Two irradiation devices with simulators of structural and new functional materials for a hybrid reactor blanket were designed and produced. ■ Detailed designs were prepared, and a laboratory prototype of a plasma accelerator for a magnetised plasma generator was manufactured, assembled and tested. ■ Technology was developed for rolling substrate strips with a low mass per unit area (less than 400 g/m2) for high-temperature superconductors (HTS) for plasma propulsion engines.	■ Developing thermonuclear and plasma technologies that will serve as a basis for inexhaustible sources of clean energy, sources of particles and radiation for various applications, powerful engines for spacecraft, innovative equipment for healthcare, mechanical engineering, microelectronics and other knowledge-intensive sectors of the economy. ■ Developing research capabilities in the field of controlled thermonuclear fusion. ■ Developing experimental facilities for joint research, including in cooperation with foreign organisations.	■ Russia's leadership in the sphere of controlled thermonuclear fusion. Development of new competitive products.
Participation in the project to create the International Thermonuclear Experimental Reactor (ITER)	■ The final stage of assembly of the PF-1 superconducting coil and its preparation for delivery to the reactor site were commenced. ■ The ITER Divertor Test Facility (IDTF) was prepared for high heat flux tests of serial plasma-facing components of the central divertor assembly. ■ Gyrotron unit No. 4 (produced in 2019) to be delivered for ITER was tested. Gyrotron unit No. 5 to be delivered for ITER was assembled and tested.	■ International cooperation between enterprises involved in the design and production of ITER systems provides a blueprint for the thermonuclear industry of the future.	■ Development of a technological platform for the thermonuclear power industry of the future. Fulfilment of Russia's commitments to build ITER. ■ Participation of the Russian Federation in an international 'mega science' project.
Development of new materials and technologies for advanced energy systems	■ Technology was developed for the production of high-strength carbon fibre from imported PAN precursor. A research programme and methods were developed to study the ageing of NPP structures, systems and components resulting from prolonged exposure to thermal, force and corrosion impacts. The feasibility of various processes for additive manufacturing of piezoelectric ceramic components was examined. ■ A mock-up of a hardware and software platform was developed and produced.	■ Developing new materials with unique properties and a wide range of innovative technologies that will make the new-generation power industry and high-technology sectors of the economy more competitive.	■ A wider range of high value-added products supporting economic growth at a rate above the global average and enabling an increase in production of non-resource non-energy goods, as well as new energy products and technologies.

Name of the integrated project	Key outcomes in 2020	Impact of the project	Contribution to the development of the Russian economy
Prioritised R&D and technological development project areas			
Projects to develop the modern nuclear power industry based on VVER technology	■ The concept of a non-reactor supercritical pressure loop and the relevant programme of experiments. ■ Computer codes for thermal hydraulics, thermal physics and neutron physics of a VVER-SKD reactor unit.	■ Reducing the cost of electricity through reduced CAPEX (a reduced scope of construction, a longer service life of main equipment, optimised configurations, etc.); a shorter duration of construction; lower unit operating and maintenance costs (improved performance and fuel consumption, optimisation of human resources, a shorter duration of repairs, etc.).	■ Development of a product offer of the Russian Federation in the sphere of NPP construction with a lower cost of electricity.
Projects focused on small nuclear power plants	■ Conceptual design of a small NPP power unit based on a standardised Shelf-M reactor unit.	■ Developing a new product that will be in demand both in Russia and abroad. ■ Providing consumers in the Russian Arctic with reliable, high-quality and economically viable sources of energy designed for operation in a harsh natural and climatic environment.	■ Development of a commercial product solution for the construction of small NPPs in Russia and abroad that will make a direct social and economic impact, as well as a number of associated systemic impacts. An increase in the added value of the product as a contribution to Russia's economy. ■ Development of energy infrastructure in Russia as a prerequisite for fulfilling the ambitions and safeguarding national interests in the Arctic and the Arctic Region. ■ Development of a new global nuclear power market.
Projects focused on SNF processing and multiple recycling of nuclear materials	■ Technical specifications were drafted for input powder for REMIX uranium/plutonium fuel. ■ Equipment was designed and manufactured for a uranium/plutonium powder production facility using the peroxide precipitation process. ■ Laboratory facilities were launched to prove the feasibility of processing and disposal of irradiated graphite from NPPs.	■ Providing a basis for ROSATOM's new global business: a high-technology process designed to minimise radiation hazards associated with SNF, dispose of unused components, recover and reuse useful materials.	■ Large-scale development of the global nuclear power industry addressing an increase in SNF accumulation around the world.
Projects focused on laser technologies	■ Preliminary designs were prepared, and an experimental laboratory prototype of a laser emitter was produced and tested. ■ Laboratory samples of liquid active laser media with optimal characteristics for powerful diode-pumped lasers were produced.	■ Business development driven by new products based on laser technologies that are in demand in various industries, including scientific research.	■ Manufacture of equipment and products for various industries in Russia to replace imports. ■ Improved standard of living due to the use of laser technologies in healthcare, environmental protection and agriculture, as well as for food quality control.
Projects in the sphere of materials and technologies	■ A laboratory technology was developed for the production of piezoelectric sensors, conductive suspensions and heat-dissipating polymer composite materials. The laboratory technology for the production of a carbon scaffold was improved. A technology was developed for the production of a biocompatible modified material based on carbon foam with a potential for injecting bioactive substances and autologous stem cell colonisation.	■ Upgrading technical capabilities in the nuclear industry by introducing advanced materials and state-of-the-art technologies, including the production of polymer composite materials based on carbon fibre (an organic material with carbon content ranging between 92% and 99.99%).	■ Development of domestically manufactured materials that will be in demand in the aerospace, nuclear, automotive, electricity and construction industries, shipbuilding, bridge building, pipeline transportation and the manufacture of consumer goods.

Name of the integrated project	Key outcomes in 2020	Impact of the project	Contribution to the development of the Russian economy
Projects in the sphere of nuclear medicine	■ The 177Lu isotope was produced in the IR-8 reactor; the design and technology for synthesising and purifying methotrexate conjugates using various chelating agents were developed. ■ A process flow diagram was developed for the production of lutetium oxyorthosilicate-based crystals (the laboratory stage).	■ Establishing new businesses focused on the production of radiopharmaceuticals, medical equipment and devices.	■ Maintaining Russia's position as a key player on the global market for industrial and medical radioisotopes. ■ Launching the production of equipment and devices for nuclear medicine in Russia (import substitution), including medical laser equipment. ■ Provision of radiological departments of Russian hospitals with modern medical equipment. ■ Domestic production of radiopharmaceuticals.
Projects in the sphere of superconductivity	■ Production technology was piloted, and a pilot batch of VTSP-2Sh high-temperature superconductors was tested. Engineering designs were developed, and a hybrid superconducting fault current limiter was produced. Pilot batches of precursor powders were produced; technology for the production of targets with a BaSnO3 doping additive was developed.	■ Increasing superconductor production. ■ Securing additional orders for superconductors from Russian and foreign companies.	■ Consolidation of Russia's position in the sphere of superconductor production, including for the construction of the Future Circular Collider (FCC).
Prioritised projects and activities aimed at upgrading existing technologies			
Fuel for water-cooled power reactors	■ A pilot batch of full-scale cladding made from the E110 alloy with Cr coating was produced. ■ Engineering designs of TVS-K-ATF fuel elements (42KhNM Cr-Ni alloy + UO_2) were developed.	■ Reducing the cost of fuel as a component of the cost of electricity, improving technical and economic performance of NPPs by extending their service life and the fuel cycle.	■ Development of a fuel that has a number of competitive advantages, including special design solutions and a potential for extended operation, while guaranteeing safe and reliable operation.
R&D to validate the VVER-TOI design	■ A safety case was prepared for the VVER-TOI design; a new type of steel was produced for VVER-TOI reactor internals.	■ Enabling serial construction of innovative reference NPP power units that will be in demand on both the domestic and global markets for nuclear energy technologies.	■ Maintaining and increasing electricity output, ensuring energy security, reducing the unit cost of energy production and consumption through timely replacement of decommissioned power units.
R&D focused on innovations in the design, construction and operation of nuclear facilities	■ A rationale was prepared for the transition of power unit No. 1 of Novovoronezh NPP-2 to an extended fuel cycle (up to 18 months).	■ Reducing the cost of design, construction, operation, servicing and decommissioning of power units. ■ Increasing the NPP capacity factor.	■ Improved standard of living due to the provision of consumers with electricity generated by Russian nuclear power plants. ■ Maintaining a leading position on the Russian power generation market.
R&D aimed at extending the fuel cycle of sodium-cooled fast reactors	■ Post-irradiation examination of spent fuel assemblies from the BN-600 and BN-800 reactors was carried out to provide a rationale for extending the fuel cycle.	■ Increasing electricity generation and supplies. ■ Multiple recycling of plutonium and reprocessed uranium recovered from SNF.	■ Reduction in the amount of accumulated RAW due to an increase in RAW processing.
Fine-tuning of process parameters for the processing of spent nuclear fuel from VVER-1000 reactor units	■ The first stage of comprehensive testing of the start-up arrangement of the second start-up facility was conducted in a research hot chamber of the Pilot Demonstration Centre (RHC PDC).	■ Reducing the cost of processes, increasing the efficiency of separation of SNF components and reducing RAW generation.	■ Prevention of liquid RAW dumping into the environment (for the first time in the world). Significant reduction in the burial of intermediate- and high-level RAW.

GRI 103-2

1.10.1. Implementation of the Innovative Development and Technological Modernisation Programme

In 2020, ROSATOM updated the Innovative Development and Technological Modernisation Programme until 2030 (the IDP). The IDP includes the most significant integrated innovative projects selected based on their scale and contribution to the achievement of the IDP goals and KPI targets.

The main IDP activities scheduled for 2020 were completed. Key performance targets of the IDP were achieved. In the reporting year, performance against the target for the integrated innovation KPI stood at 112%.

In 2020, ROSATOM was implementing 44 integrated technological projects supporting R&D and technological development in strategic areas of national importance, prioritised industry-specific areas, digitisation of the economy and modernisation of existing technologies.

22 'process' projects ensured effective management of R&D, technology and innovation activities, including promoting cooperation with third-party organisations and facilitating the development of innovations in the form of infrastructure projects and programmes, as well as educational events.

Implementation of the Innovative Development and Technological Modernisation Programme of ROSATOM was focused on the following project areas:

- Strategic areas of R&D and technological development of national importance;
- Prioritised R&D and technological development project areas;
- Prioritised projects and activities aimed at upgrading existing technologies;
- Prioritised innovative projects and activities in the sphere of digital transformation;
- Developing an innovation management system and innovation infrastructure, cooperating with third-party organisations.

Outcomes in the first three project areas are presented on the Map of Innovative Projects provided in this section.

The main objective of prioritised innovative projects and activities in the sphere of digital transformation is to support the achievement of ROSATOM's strategic goals in the sphere of digital transformation and promote the development of the national programme titled 'Digital Economy of the Russian Federation'. Outcomes achieved in this area in 2020 included the following:

- The Smart City platform became fully operational in 17 nuclear towns and cities[37];
- ROSATOM unveiled a new digital module, Logos Strength, which is designed for solving strength engineering problems related to the design and construction of aircraft and other vehicles. Logos Strength is the third module forming part of the computer-aided engineering (CAE) software suite for engineering analysis and supercomputer simulation;
- The administration of Yuzhno-Sakhalinsk signed an agreement with JSC RIR on comprehensive preparation of the municipality for digital transformation;
- JSC RASU launched two projects to develop 'end-to-end' digital technologies: Trusted Sensor Systems and Development of an Experimental Hardware and Software Prototype for Ion-Based Quantum Computing Technology;
- A pilot project, Digital Simulation of the Northern Sea Transit Corridor Logistics Service, was launched in cooperation with Peter the Great St. Petersburg Polytechnic University, the Faculty of Economics of Lomonosov Moscow State University, as well as the Phystech.Digit and Phystech.Arctic centres of the Moscow Institute of Physics and Technology (MIPT).

The main objective of initiatives focused on developing an innovation management system and innovation infrastructure and cooperating with third-party organisations is to enable the development of innovations through infrastructure projects and programmes and educational events. As part of these initiatives, in 2020, ROSATOM launched the Digital Science project, which will involve developing a set of digital services that will help to automate the management of R&D programmes and projects, as well as creating elements of an innovation ecosystem: the management of scientific and technical expertise, research and technical capabilities, intellectual property and knowledge management.

For more details on this area, see the subsection 'Plan of R&D Topics of ROSATOM'.

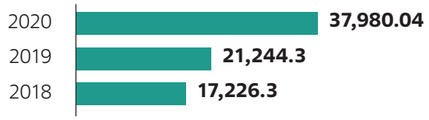
[37] *For details on the Smart City platform, see the section 'Contribution to the Economy' of the chapter 'Report on the Development of Nuclear Towns and Cities'.*

GRI 103-3

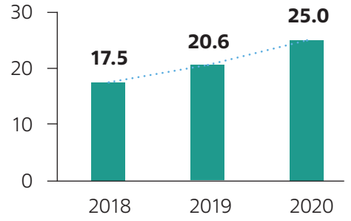
Performance indicators in the sphere of innovation between 2018 and 2020

Indicator, unit of measurement	2018 (actual)	2019 (actual)	2020 (target)	2020 (actual)
Share of innovative products and services in the total sales of products and services across the industry, %	17.54	20.6	18.0	25.01
Number of items of intellectual property: 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), pcs.	1,339	1,778	2,360	2,562
Research and development costs as a percentage of the output of innovative products and services, %[38]	-	-	20.0	13.25
Funding of R&D projects carried out by research institutions at the request of ROSATOM, RUB billion	3.5	4.25	4.1	5.98
Funding of R&D projects carried out by universities at the request of nuclear organisations, RUB billion	0.82	1.36	1.25	1.68

R&D costs under the IDP between 2018 and 2020, RUB million



Share of innovative products and services in total sales in the nuclear industry between 2018 and 2020, %



[38] Annual decrease due to the growth of output of innovative products.

Key performance indicators under the IDP for the period from 2021 through 2023

Indicator, unit of measurement	2021	2022	2023
Share of innovative products and services in the total sales of products and services across the industry, %	21.0	21.5	22.0
Number of items of intellectual property: 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), pcs.	2,520	2,645	2,800
Research and development costs as a percentage of the output of innovative products and services, %[39]	14.6	13.5	13.3
Funding of R&D projects carried out by research institutions at the request of ROSATOM, RUB billion	4.25	4.4	4.45
Funding of R&D projects carried out by universities at the request of ROSATOM and its organisations, RUB billion	1.35	1.4	1.4

1.10.2. Comprehensive programme ‘Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024’

In December 2020, the Presidium of the Presidential Council for Strategic Development and National Projects approved a comprehensive programme titled ‘Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024’[40] (CP DTTS), which will be launched in 2021.

[39] Annual decrease due to the growth of output of innovative products.

[40] Minutes No. 15 of the meeting of the Presidium of the Presidential Council for Strategic Development and National Projects dated 24 December 2020. The programme has been developed and approved pursuant to Order No. 270 of the President of the Russian Federation dated 16 April 2020.

The CP DTTS includes five federal projects:

- Development of Technologies for a Two-Component Nuclear Power Industry Based on a Closed Nuclear Fuel Cycle ('Two-Component Nuclear Power Industry');
- Development of Modern Experimental Test Facilities for the Development of Technologies for a Two-Component Nuclear Power Industry Based on a Closed Nuclear Fuel Cycle ('Experimental Test Facilities');
- Development of Controlled Thermonuclear Fusion Technologies and Innovative Plasma Technologies ('Thermonuclear and Plasma Technologies');
- Development of New Materials and Technologies for Advanced Energy Systems ('New Materials and Technologies');
- Design and Construction of Reference Power Units of Nuclear Power Plants, including Small Nuclear Power Plants.

These projects involve:

- Laying the foundation for a new nuclear power system of the future that is based on technologies that are safer and more environmentally friendly, enabling expanded replenishment of resources of the nuclear power industry and providing an affordable source of energy for households and industrial enterprises;
- Developing thermonuclear and plasma technologies that will serve as a basis for virtually inexhaustible sources of clean energy, sources of particles and radiation for various applications, powerful plasma propulsion engines for spacecraft, innovative equipment for healthcare, mechanical engineering, microelectronics and other knowledge-intensive sectors of the economy;
- Developing new materials with unique properties and a wide range of innovative technologies that will make high-technology sectors of the economy more competitive and will help to expand the range of the relevant products, including in order to replace imports and increase non-resource exports.

This large-scale programme is vital for Russia. It will help to accelerate the development of our country, show its potential as a global leader in high-technology industries and enhance Russia's credibility in the international arena.

1.10.3. Proryv (Breakthrough) Project aimed at closing the nuclear fuel cycle

The Proryv (Breakthrough) Project is aimed at developing fast neutron reactors and closing the nuclear fuel cycle. This project will result in the development of technologies that will help to solve the problem of radioactive waste accumulation and make nuclear power plants more cost-effective.

In 2020:

- The concept of a digital twin of automated and robotised production facilities forming part of the closed nuclear fuel cycle was developed; it is based on an information model being developed for the pilot and demonstration energy facility (PDEF) and the industrial energy facility;
- The development of the engineering design of a test bench for acceptance tests of the main circulation pumping unit of the BREST-OD-300 reactor unit was completed;
- Performance specifications of the core of the BN-1200M reactor unit were determined for a gradual increase in the burnup of MNUP and MOX fuel. The design feasibility study was completed to confirm the competitiveness of the BN-1200M power unit. A preliminary design of the core of the BR-1200 reactor unit was developed;
- The programme to test MNUP fuel in the core of the BN-600 reactor is underway. In the autumn of 2020, irradiation of an experimental fuel assembly, ETVS-11, with BREST-OD-300 fuel elements was completed. A maximum burnup of 9% h.a. was reached with a damaging dose of 107.6 dpa;
- Development of SNF reprocessing technology continued. A comprehensive test of a refining technology using an extraction and crystallisation process was completed as part of the HYDRO project. The mode of dissolution of oxidised spent MNUP fuel was confirmed for a sample with a burnup of about 7% h.a.;
- Stage 1 construction and installation work continued at the PDEF site in Seversk; this included the construction of a fuel assembly production module for the BREST reactor unit and the necessary infrastructure. Preparations were initiated for stage 2 construction of a power unit with a BREST-OD-300 reactor.

1.10.4. International projects

In 2020, ROSATOM continued to participate in the development of unique Megascience research facilities: the International Thermonuclear Experimental Reactor (ITER) in France and the Facility for Antiproton and Ion Research in Europe (FAIR) in Germany.

ITER (International Thermonuclear Experimental Reactor) project

The implementation of the project involves conducting research and developing technologies that will provide the groundwork for thermonuclear energy generation, which provides fuel resources that are virtually inexhaustible and is characterised by a high degree of safety and environmental friendliness.

In 2020, equipment and reactor systems were designed, manufactured and delivered to the construction site in accordance with the ITER construction schedule as part of Russia's commitments under the ITER project.

The following equipment manufactured as part of Russia's commitments was delivered as an in-kind contribution under the supply agreements concluded with the ITER Organisation:

- Aluminium DC busbars for poloidal coils and the central solenoid; sections of resistors and steel supports for the busbars (a total of 20 trailers) were supplied to the ITER Organisation;
- Two upper central ports were supplied to the ITER Agency of South Korea, and six upper lateral ports were supplied to the ITER Organisation;
- The first batch of bimetallic pedestals for the connectors of blanket modules was supplied to the ITER Organisation.

At year-end 2020, a total offset was received amounting to 41.2% of Russia's total in-kind commitments, and in-cash commitments to the ITER Organisation were fully met.

In the reporting year, Russian representatives took part in all events held by the ITER Organisation: the meetings of the ITER Council (IC-26 and IC-27), the Management Advisory Committee (MAC), the Science and Technology Advisory Committee (STAC) and the Financial Audit Board.

Plans for 2021 and for the medium term

To fulfil all of Russia's commitments in accordance with the ITER construction schedule, including the following:

- To prepare the PF-1 poloidal field coil for delivery to the ITER Organisation;
- To start serial production of port stub extensions for the ITER vacuum vessel;
- To complete the development of experimental technologies in order to start manufacturing the components of the central assemblies of the divertor and to manufacture a full-scale prototype of the first wall panel.

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

RUB 895,824,500 (EUR 10,884,100) was contributed to FAIR, which corresponds to the budgetary commitments for 2020.

By the end of 2020, the Russian Federation met 56.4% of its commitments on cash contributions for the construction of the Facility for Antiproton and Ion Research in Europe (as part of allocated budget funding).

In the reporting year, ROSATOM's representatives participated in all meetings of FAIR working groups. Russian organisations continued to supply equipment for the FAIR accelerator complex and detectors. To date, contracts worth a total of EUR 91.9 million have been concluded; taking into account related contracts, the amount has reached EUR 122.5 million. The contracts are being successfully performed.

Generation IV International Forum (GIF)

To date, the GIF Charter has been signed by Australia, Argentina, Brazil, the United Kingdom, Canada, China, the Republic of Korea, the USA, France, Switzerland, South Africa, Japan, the European Union and the Russian Federation. Furthermore, Australia, the United Kingdom, the European Union, Canada, China, the Republic of Korea, the USA, France, Switzerland, South Africa, Japan and the Russian Federation have signed the Framework Agreement of the Generation IV International Forum for International Collaboration on Research and Development of Generation IV Nuclear Energy Systems and are full members of the GIF Project.

The development of Generation IV reactor systems remains a topic of interest worldwide. The UK signed the Framework Agreement in 2019; in the same year, China joined the Memorandum of Understanding (MOU) to develop lead-cooled/lead-bismuth-cooled fast reactors. Turkey has declared its intention to join the GIF and has requested the consent of all GIF members to join it.

Within the framework of the GIF, six promising reactor technologies are under development, with ROSATOM participating in the development of four of these technologies.

In 2020, a report titled 'Analysis of Compliance of the BN-1200 Design with the Generation IV SFR Safety Design Criteria' was prepared and published. Based on the benchmarking results, it was concluded that the BN-1200 design complied with the design safety criteria for Generation IV fast reactors, which is of great importance for consolidating Russia's position as the global leader in the development of fast reactors.

Due the COVID-19 pandemic, events and meetings covering all areas of GIF activities were held online; Russian specialists and experts successfully participated in these events.

In 2020, a project agreement was signed for fast reactor equipment and conversion module design.

Russia's contribution to the GIF Secretariat was paid in full.

Plans for 2021

- To arrange the participation of Russian experts in the GIF Policy and Expert Groups, in scientific, R&D and interface meetings held by various working groups and task forces within the GIF structure.
- To prepare the documents necessary for entering the System Agreement on Molten Salt Reactors.
- To prepare the documents necessary for joining the Project Agreement on Supercritical Water-Cooled Reactor (SCWR) Thermal Hydraulics and Safety.

1.10.5. Plan of R&D Topics of ROSATOM

The implementation of the Consolidated Industry-Wide Plan of R&D Topics (CIPT) is aimed at promoting scientific and technological development in areas prioritised by ROSATOM, including VVER technology, small-scale reactors, new materials, hydrogen energy, thermonuclear fusion, superconductivity, nuclear medicine, etc. The R&D Plan is prepared according to a number of criteria, such as ensuring that the product/technology being developed by ROSATOM outperforms existing analogues in terms of their main technical characteristics, as well as the export potential and national security. It also takes into account the findings of benchmarking, patent search and technology readiness assessment conducted by ROSATOM and the commitment to accelerating research and development.

In 2020, 144 CIPT projects worth a total of more than RUB 9 billion were implemented.

In 2020, more than 70% of CIPT projects successfully progressed to the next technology readiness level (TRL).

In addition, more than 100 conceptual designs were produced and funded in 2020, covering all strategic areas of R&D and technology development in the industry. Conceptual designs provide a robust rationale for future R&D and help to reduce the likelihood of expenditure on costly work with low implementation potential, as well as the cost and the amount of time required to develop a new product or technology.

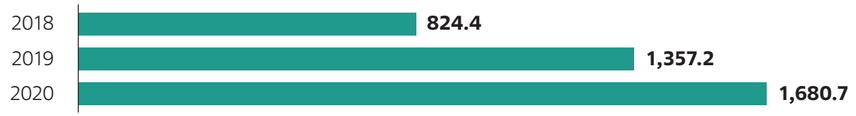
1.10.6. Cooperation on scientific research with research institutions and universities

In order to expand communication as part of R&D projects, in 2020, ROSATOM actively engaged with its core partners: universities, organisations of the Russian Academy of Sciences, research institutions, small and medium-sized businesses.

Representatives of universities and third-party research institutions not only participated in innovative projects focused on prioritised research topics, but also provided research supervision for a number of projects. In addition, they participated in innovation management as members of the R&D Board and the Science Committee, contributed to scientific workshops and conferences on key topics and helped to shape educational programmes in order to train specialists for new businesses.

In the reporting year, more than 25 universities and 50 third-party research organisations, including 25 organisations of the Russian Academy of Sciences, were involved in innovative projects. The volume of orders for R&D performed by universities totalled RUB 1.68 billion (up by 23% year on year). Projects were implemented primarily by core universities, including National Research Nuclear University MEPhI, Nizhny Novgorod State Technical University, Bauman Moscow Technical University, Lomonosov Moscow State University, the Ural Federal University, National University of Science and Technology MISIS, Moscow Power Engineering Institute, Tomsk Polytechnic University and Peter the Great St. Petersburg Polytechnic University.

Funding of R&D projects carried out by universities at the request of ROSATOM and its organisations between 2018 and 2020, RUB million



In 2020, nuclear organisations actively cooperated with universities, primarily on national projects and programmes, such as Science, Education and Digital Economy. This cooperation took various forms: research and educational centres, competence centres under the National Technology Initiative, joint laboratories, leading research centres, contributions to endowment funds of specialised universities, etc.

Funding of R&D projects carried out by research institutions at the request of ROSATOM between 2018 and 2020, RUB million

The volume of orders for R&D performed by research institutions outside the industry is growing year by year. In 2020, the relevant expenditure totalled RUB 4.3 billion. Research and development projects were implemented primarily by the National Research Centre Kurchatov Institute, the Central Research Institute of Structural Materials Prometey, the Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences, the Nuclear Safety Institute of the Russian Academy of Sciences (IBRAE RAN), 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 Ioffe Institute of the Russian Academy of Sciences and the Institute of Applied Physics of the Russian Academy of Sciences.

1.10.7. Science competitions

The 2020 Innovative Leader of the Nuclear Industry competition[41] was held. Employees of ROSATOM's organisations aged under 35 participating in the development and implementation of innovative projects were invited to participate in this event. A total of 116 applications were submitted for the competition by 59 organisations in the industry in 2020. Participants of the competition received 20 main prizes and 15 honourable mentions.

Under a cooperation agreement between ROSATOM and the Russian Foundation for Basic Research (RFBR), co-funding was provided for research projects selected through a joint competition for the best interdisciplinary basic research projects on the interaction of electromagnetic radiation with matter as a basis for new techniques for material modification and development of materials operating under extreme conditions. This competition also seeks to integrate science and industry.

[41] http://innov-rosatom.ru/network/molodezhnyy-konkurs-innovatsionnyy-lider-atomnoy-otrasli/.

1.10.8. Knowledge management system

In 2020, ROSATOM continued to develop the industry-wide knowledge management system (KMS) and accomplished the following objectives:

- As part of a programme titled 'Integrated Digital Platform for the Nuclear Industry', an industry-wide project, Development of the Digital Science Set of Digital Services, was approved; the project is underpinned by ROSATOM's knowledge management methodology;
- An automated R&D database was created in the Corporate Social Network Management (CSNM) information system in order to pilot R&D planning and accounting processes in multi-user mode; it was linked to research and technical information collections on the Research and Technical Information Portal (in its publicly available section);
- An Expert Database IT system was created in the CSNM information system; it contains data on experts and scientific and technical expert reviews that have been conducted;
- An information system software product, ROSATOM's Online Platform for Cooperation with Universities, Research Institutions and SMEs, was developed and piloted: research and technical capabilities of more than 50 Russian universities in the areas prioritised by JSC Proryv and JSC RASU were mapped;
- General requirements for the common information space of the CP DTTS were formulated;
- The Corporation continued to take steps to preserve critical knowledge and continue to develop the corporate knowledge management culture.

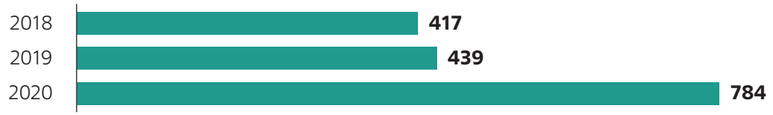
Plans for 2021

- To implement the common information space of the CP DTTS.
- To update the regulatory framework governing ROSATOM's knowledge management system taking into account ROSATOM's prioritised tasks in the sphere of scientific and technological advancement.
- To develop ROSATOM's Online Platform for Cooperation with Universities, Research Institutions and SMEs: to engage new specialised universities and business customers in the mapping of capabilities on the online platform and expand the range of its functions by including cooperation with SMEs.

1.10.9. Intellectual property management

In 2020, 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 2020 totalled 784 (against a target of 582).

Number of foreign patents and international applications between 2018 and 2020, pcs.



Patent activity

Indicator	2018	2019	2020
Number of patents obtained for inventions, utility models and industrial designs, certificates for computer software and databases and items of know-how registered in the Russian Federation, pcs.	535	735 (10,411)[42]	666 (10,682)
Number of applications filed for inventions, utility models and industrial designs, certificates for computer software and databases in the Russian Federation, pcs.	315	371	412
Number of 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 intellectual property in the nuclear industry, pcs.	417	439	784

[42] Figures in brackets show the number of items of intellectual property as a cumulative total taking into account their legal protection status as at 31 December 2020.

In 2020:

- A project was launched to systematise intellectual property accumulated by ROSATOM under a portfolio-based approach with a link to products and technologies;
- A Technology Readiness Assessment (TRA) system was established for forming intellectual property portfolios as part of R&D efforts;
- The procedure was developed for patent and technical examination of intellectual property notifications; 79 reviews of intellectual property materials were conducted in Q4 2020 within the industry network of patent experts;
- A thematic session titled 'Intellectual Property Rights Management Issues' was held; it was focused on the assignment of intellectual property rights to a business customer as part of the implementation of projects included in the CIPT;
- Nine lectures on intellectual property were held to support the implementation of projects included in the CIPT and the comprehensive programme 'Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024';
- A process was launched for the use of patent research findings when drafting statements of work for R&D.

Plans for 2021

- To submit 160 foreign patent applications and obtain foreign patents.
- To form intellectual property portfolios covering five technologies.
- To improve the mechanism for the use of patent research findings when initiating government contracts.
- To continue to develop the industry network of patent experts to ensure optimal allocation of resources for prioritised tasks.
- To organise and hold three workshops on intellectual property.

1.10.10. Long-term priorities in the sphere of scientific development

- To transition to a new technological platform for the development of the nuclear power industry by building on a two-component structure based on fast and thermal-neutron reactors and a closed nuclear fuel cycle (CNFC).
- To design and develop modern experimental test facilities for developing technologies for the two-component nuclear power industry based on the CNFC.
- To conduct research and development focused on controlled thermonuclear fusion technologies, innovative plasma technologies, new materials and technologies for advanced energy systems.

- To build infrastructure for hydrogen-based nuclear technologies for environmentally friendly hydrogen production in order to enable its widespread use as a product, as a source of energy, an energy storage medium and a component of industrial technology.
- To develop a system for managing unique technological capabilities of ROSATOM's organisations and expanding their links with the capabilities of Russian research and educational institutions.
- To perform a market and technology analysis and competitive analysis in order to identify promising areas for the innovative development of the nuclear industry.
- To upgrade existing technologies, including in order to increase the output of innovative products and reduce their cost and the lead time.
- To participate in building state-of-the-art research and development and innovation infrastructure, including participation in the formation and development of a network of unique 'mega science' research facilities and establishment of world-class research and educational centres.
- To form a competitive digital company with a strong presence on the Russian and global markets.
- To participate in the Science National Project, including expanding cooperation with universities and research institutions on R&D and the manufacture of innovative products using unique test facilities.
- To develop personnel training and professional development mechanisms in ROSATOM's organisations; to expand a motivation system for encouraging innovation and the study and sharing of best practices.
- To develop leadership skills and managerial competences, including for career planning and executive succession planning purposes.

Performance of Divisions

1.11.1. Mining Division

Key results in 2020:

- Uranium resources totalled 509,400 tonnes.
- 2,846 tonnes of uranium were produced (the production programme was 103% completed).
- The Scandium project (JSC Dalur) began commercial operation: 366 kilograms of scandium oxide were sold; development of the Pavlovskoye lead and zinc mining project in the Arctic continues.

The Mining Division (its holding company is JSC Atomredmetzoloto) is one of the world's largest natural uranium producers. The Division has unique uranium mining capabilities; its organisations perform a full range of operations, from geological exploration, design and pilot operation to the decommissioning of production facilities and land rehabilitation. In addition to uranium mining, the Division is also actively developing non-uranium businesses: scandium mining (as a by-product), brown coal mining, gold mining projects (JSC Elkon MMP), etc.

The Division manages Russian uranium mining assets in the Zabaykalsky Territory (PJSC PIMCU), the Republic of Buryatia (JSC Khiagda) and the Kurgan Region (JSC Dalur).

Operating results

Enterprises of the Mining Division produced 2,846 tonnes of uranium in 2020, which is 3% above the target.

Mineral resource base and uranium production

	2018	2019	2020
Mineral resource base, '000 tonnes	520.7	512.7	**509.4**
Uranium production, tonnes, including:	2,904	2,911	**2,846**
PJSC PIMCU	1,456	1,300	**1,240**
JSC Dalur	590	595	**585**
JSC Khiagda	858	1,016	**1,021**

The development of uranium assets in 2020 was accompanied by further development of new uranium deposits:

- At JSC Khiagda, construction was completed and units at the Vershinnoye deposit were prepared for the start of operation;
- At JSC Dalur, geological exploration at the Dobrovolnoye deposit was completed, and construction was started at a pilot drillhole in-situ leaching site;
- PJSC PIMCU fully implemented the infrastructure construction programme for Mine No. 6.

The Division is actively adopting the most efficient uranium mining technique: drillhole in-situ leaching. In 2020, the share of uranium mined through in-situ leaching in JSC Khiagda and JSC Dalur increased to 56% of the total output.

GRI 103-1
GRI 103-2
GRI 103-3

Sustainable development results

Key aspects of the operations of JSC Atomredmetzoloto are underpinned by responsibility and sustainability principles. Consistent integration of these principles into key decision-making processes enables the company to improve the safety of its operations and enhance its environmental stewardship, corporate social responsibility and stakeholder engagement practices; it also provides a basis for sustainable business development and drives economic growth in nuclear towns and cities.

Key projects in 2020

- **Programme to provide support (grants) through a contest of social and charity initiatives** in the town of Krasnokamensk (Zabaykalsky Territory) aimed at creating employment and improving the standard of living. In 2020, the contest was dedicated to the 75th anniversary of the nuclear industry. Financial support was provided to 39 important social projects.
- **Project to preserve the biodiversity of Lake Baikal**
  In 2020, JSC Khiagda implemented a project to preserve the biodiversity of Lake Baikal, which contributed to the implementation of the Preservation of Lake Baikal Federal Project forming part of the Ecology National Project. Baikal sturgeon (which is an endangered species) and grayling were raised from eggs to fingerlings in special incubators at the Selenginsky experimental fish farm and the Barguzinsky fish farm and were subsequently released into the basin of Lake Baikal.
  The release of fish helps to restore the lake's endemic fish fauna, aquatic biotic communities in the Ina River and Lake Baikal and the related aquatic food web.
- **Project to localise the production and servicing of self-propelled mining machines**
  The project that is being implemented by LLC ARMZ Mining Machinery is aimed at upgrading technological infrastructure by equipping industrial enterprises with innovative battery-powered mining machines and at making the mining production chain more sustainable.
  The aim of the project is to start mass production of modern self-propelled mining machines to replace imports, sell them on foreign markets and develop a network of branded after-sales service centres.

Plans and development prospects

In 2021, the Division intends to continue the planned development of uranium and non-uranium businesses:

- To complete the construction of above-ground infrastructure and begin pumping mine water from PJSC PIMCU's Mine No. 6;
- To complete the construction of supporting infrastructure facilities at the Khokhlovskoye deposit and begin the construction of facilities at the Dobrovolnoye deposit to enable pilot operations;
- To continue the development of mineral deposits forming part of the Khiagda ore field;
- To implement digital technologies as part of the pilot operation of the Smart Mine and Smart Hard Hats;
- To continue scandium production at JSC Dalur and produce mining equipment in Krasnokamensk.

For details, see the Appendix 'Performance of the Mining Division in 2020'.

1.11.2. Fuel Division

Key results in 2020:

- The Division fulfilled all commitments related to the supply of nuclear fuel to Russian and foreign customers.
- VVER-1200 fuel started to be used abroad.
- The first batch of MOX fuel for the full reloading of the reactor was manufactured and delivered to the plant.
- Investment projects to upgrade an experimental production site for nuclear fuel fabrication at JSC Siberian Chemical Plant (JSC SCP) and to develop the core of the RITM-200 reactor unit for a small nuclear power plant were launched.
- 88 international, regional and national patent applications for inventions were filed.

The Fuel Division (its holding company is JSC TVEL) is a leading player on the global nuclear fuel cycle front-end market and the only supplier of nuclear fuel for Russian NPPs and the nuclear-powered icebreaker fleet.

The Division comprises nuclear fuel fabrication, uranium conversion and enrichment, and gas centrifuge production enterprises, as well as research and design organisations.

The Division also supplies the Russian and global markets with a wide range of non-nuclear products and services for a variety of applications, including the metals, chemical and mechanical engineering sectors, additive manufacturing and energy storage.

Operating results

- The Division met all the targets of the 2020 production programme and made the scheduled deliveries of nuclear fuel to all Russian and foreign customers (more specifically, fuel was supplied to nuclear power plants in Hungary, the Czech Republic, Slovakia, Bulgaria and Finland).
- A new version of VVER-440 nuclear fuel with an optimised water/uranium ratio was developed for Paks NPP (Hungary), and its production was commenced. The first 18 fuel bundles with the new version of fuel were delivered to the customer and loaded into the reactor of power unit No. 3 of Paks NPP.
- Fuel assemblies were loaded into new Generation 3+ nuclear power units with VVER-1200 reactors at Leningrad NPP-2 and the Belarusian NPP.
- Pilot operation of TVS-Kvadrat fuel assemblies was completed at power unit No. 3 of Ringhals NPP (Sweden). Components of irradiated fuel assemblies were handed over to a specialised laboratory for post-irradiation examination.
- On the research reactor market, contracts were signed for the supply of nuclear fuel and its components to research facilities in the Czech Republic (the LVR-15 research reactor at the Research Centre Řež) and Egypt (ETRR-2 at the Nuclear Research Centre in Inshas). Despite COVID-related restrictions, the scheduled deliveries of nuclear fuel for research reactors in Hungary and the Czech Republic were made in full.
- The Division approved a programme of prioritised activities for 2020 and 2021 focused on developing uranium/plutonium fuel for thermal-neutron reactors and fabrication of fuel containing minor actinides for foreign customers to support the Balanced Nuclear Fuel Cycle product area, which combines SNF reprocessing services and fabrication of fuel containing reprocessed products.

GRI 103-1
GRI 103-2
GRI 103-3

Sustainable development results

- The Fuel Division manages its production operations in such a way as to support comprehensive economic, social and environmental development of its organisations and the regions where they are located.
- The company is aware of its responsibility towards local communities in its regions of operation and, accordingly, pursues a socially oriented policy that meets the fundamental needs of the residents in its home towns and cities without compromising the interests of future generations.

Key projects in 2020

- A **project titled 'TVEL's Zero Carbon Footprint'** is aimed at achieving carbon neutrality in the Division's organisations in order to contribute to global climate action. This involves adopting microgrids based on renewable energy sources, switching to electric vehicles and using energy storage systems to improve energy efficiency. Project activities include assessing the Division's carbon footprint, setting targets for its reduction and developing a road map for achieving these targets. The project is expected to result in the Division being assigned an international climate rating.
- In the towns of Glazov and Zelenogorsk, an **educational project titled 'Children's Foresight'** is being implemented under an agreement with the Agency for Strategic Initiatives. As part of the project, children are provided with training in social entrepreneurship.
- As part of the Agreement on Development of Children's Science Parks between JSC TVEL and NRC Kurchatov Institute, a model and a plan for cooperation in organising the **Element of the Future festival of children's technologies** were developed. About 100 schoolchildren from Novouralsk, Glazov, Seversk, Zelenogorsk and Elektrostal took part in online camps hosted by the Kurchatov Institute Technology Park. Following practical training, the best students will go to Artek (when COVID-related restrictions are lifted) and later will attend the finale of the festival in Novouralsk.

Plans and development prospects

- To participate in competitive tendering for nuclear fuel supplies to nuclear power plants in Europe.
- To develop cooperation with foreign power companies and industrial partners in order to promote TVS-Kvadrat fuel.
- To conclude new and carry out current foreign engineering contracts (to develop new versions of VVER fuel and provide engineering services related to the nuclear fuel cycle).
- To expand the range of fuel and components for foreign-design research reactors and the relevant sales footprint.
- To perform R&D as part of the development of accident tolerant fuel meeting new-generation safety standards in Russia.
- To conclude contracts for the supply of nuclear fuel components for foreign-design research reactors.
- To optimise and modernise calcium production by electrolysis; to improve the calcium wire pressing technology and the technology for calcium treatment of steel.
- To expand the geography of the nuclear decommissioning business and launch new educational programmes focused on the decommissioning of facilities posing nuclear and radiation hazards.

For details, see the Appendix 'Performance of the Fuel Division in 2020'.

1.11.3. Mechanical Engineering Division

Key results in 2020:

- Mechanical engineering products were delivered on time to 19 nuclear power plants in Russia and abroad.
- A contract was signed to develop engineering designs and mock-ups for the Proryv Project.
- A contract was signed for the package supply of a nuclear propulsion unit and large-size hull castings for the Lider multipurpose nuclear icebreaker.

The Mechanical Engineering Division (its holding company is JSC Atomenergomash) is one of the leading groups of mechanical engineering enterprises in Russia and the key supplier of main and auxiliary equipment for Russian-design NPPs under construction.

The Division is successfully developing adjacent business areas at an accelerating pace. JSC Atomenergomash offers a range of solutions for the manufacture and supply of equipment for the nuclear and thermal power industry, shipbuilding, the oil and gas industry, and the special steel market. Extensive production and technological capabilities of the Division's organisations and control over the entire production chain enable the Division to supply its customers with high-quality reliable equipment.

Operating results

- In the reporting year, mechanical engineering products were delivered on time to 19 NPPs, including 9 NPPs in Russia and 10 NPPs abroad.
- Production and shipment of key equipment for Rooppur and Akkuyu NPPs were completed.
- Equipment for fuel collection, prototypes of control and safety system actuators and tanks of the second main circulation pump for research and industrial reactors were supplied.
- The Division underwent product certification as a supplier and secured orders for the delivery of blanks for the rotors of low-pressure, high-pressure and intermediate-pressure cylinders of the steam turbine for Akkuyu NPP.
- The shipment of all boiler equipment for the first waste-to-energy plant was completed, and the shipment of equipment for the second waste-to-energy plant was started.
- Equipment was delivered to the Riverside waste-to-energy plant in the United Kingdom.
- Tests of the first Russian large-capacity LNG pump for one of the leading oil and gas producers were successfully completed. The equipment was handed over to the customer.
- Deliveries of blanks for follow-on multipurpose nuclear icebreaker No. 3 were completed.
- A conceptual design for an optimised floating power unit was developed, and funding was obtained to develop the engineering design.
- In 2020, the Division signed a contract for the development of engineering designs and mock-ups for the Proryv Project, as well as a contract for the package supply of a nuclear propulsion unit and large-size hull castings for the Lider multipurpose nuclear icebreaker.

Sustainable development results

GRI 103-1
GRI 103-2
GRI 103-3

The Mechanical Engineering Division supports the globally recognised initiative of the UN to achieve the Sustainable Development Goals; it seeks to contribute to the implementation of the global sustainable development agenda. JSC Atomenergomash assists the global community in achieving those Sustainable Development Goals that are relevant to its operations by promoting social and economic development in its regions of operation. This involves not only contributing to budget revenues on the regional and local level but also implementing a wide range of social and charitable programmes and protecting the environment.

The Division manages its production operations in such a way as to support comprehensive economic, social and environmental development of its organisations and the regions where they are located.

Key projects in 2020

In 2020, JSC Atomenergomash took part in the Federal Programme titled 'Creating a Comfortable Urban Environment': funds were allocated for the landscaping of a pedestrian boulevard and for building a splash fountain in Druzhba Square in Volgodonsk.

JSC RPA CNIITMASH became one of the venues of the company's first Industry-Wide Blood Donor Week, with more than 150 people participating in the campaign. The project reached the finals of the Volunteer of Russia 2020 National Contest of the Best Volunteer Initiatives. In the reporting year, two blood donation campaigns were held in the organisation.

Priorities in the sphere of environmental protection included emission reduction, recycling and energy conservation. Organisations are adopting state-of-the-art resource-saving production technologies and implementing environmental measures. Every year, quality management, occupational health and safety management and environmental management systems of all organisations of JSC Atomenergomash are recognised as effective by external auditors, such as TÜV Thüringen, DQS GmbH, IQNet, etc. In the reporting year, JSC ZIO-Podolsk and Ganz EEG successfully confirmed their compliance with international standards.

Plans and development prospects

- To ensure the supply of key equipment and perform work as part of the company's NPP construction projects.
- To increase revenue from new products and sales on foreign markets.
- To carry out existing contracts and develop cooperation with foreign companies and industrial partners.
- To consolidate the Division's position on target markets.
- To expand the range of equipment supplied by the Division and its sales footprint.
- To develop NPP servicing and thermal power businesses abroad.
- To implement plans for integration into global supply chains of licensors, OEMs and EPC contractors.
- To produce and complete the deliveries of reactor unit equipment (RITM-200), hull castings and propellers for follow-on multipurpose nuclear icebreakers No. 3 and No. 4.
- To initiate[43] the engineering design of the Optimised Floating Power Unit.
- To produce sets of equipment for four waste-to-energy plants under construction.
- To complete the construction of Russia's first LNG test bench and put it into operation.
- To commence the pilot operation of the first Russian large-capacity LNG pump.
- To participate in competitive tendering for the supply of equipment for leading national oil, gas and petrochemical producers.
- To proceed with qualification processes for the supply of special steel products and expand the overseas business footprint.

For details, see the Appendix 'Performance of the Mechanical Engineering Division in 2020'.

1.11.4. Engineering Division

Key results in 2020:

- Power unit No. 1 at the Belarusian NPP was put into operation.
- Power start-up was completed at power unit No. 2 of Leningrad NPP-2.

The Engineering Division (its holding company is JSC ASE[44]) designs and builds large NPPs in Russia and abroad. The Division has well-developed capabilities for managing the construction of complex engineering facilities.

The Engineering Division operates in Russia, Europe, the Middle East and North Africa, as well as the Asia-Pacific Region.

In 2020, the reorganisation of the Engineering Division continued along two main dimensions: formation of the joint design institute at JSC Atomenergoproekt and formation of the Division's holding company at JSC ASE.

Operating results

- *Russia*. In October 2020, concreting of the floor slabs of the main circulation pump (MCP) began at power unit No. 1 of Kursk NPP-2; in May 2020, the cantilever truss (the second part of the core catcher) of power unit No. 2 was moved into final position.
  In October 2020, power start-up was completed at power unit No. 2 of Leningrad NPP-2.
- *Republic of Belarus*. Power unit No. 1 was connected to the national power grid. Testing was performed as part of the power start-up programme in order to commence pilot operation. The testing of safety systems with an open reactor was started at power unit No. 2 and was successfully completed in January 2021.
- *Hungary*. The construction of the first two buildings forming part of construction and installation facilities was completed in December at Paks II NPP. The set of licensing documents for the construction of two new power units was submitted by the customer to the Hungarian supervisory authority.
- *Egypt*. Grading and levelling was completed at three sites of construction and installation facilities of El Dabaa NPP. Non-nuclear permits were obtained for facilities forming part of the pioneer base. The development of engineering designs, a preliminary safety analysis report and detailed designs continued.
- *India*. The Division was actively supplying equipment to the construction site of the second stage of Kudankulam NPP: since the launch of the project, 23 shiploads of equipment were delivered by December 2020.
- *Bangladesh*. Concreting of the fourth layer of the internal containment vessel was completed at power unit No. 1 of Rooppur NPP. The support truss at power unit No. 2 was moved into final position. The reactor vessel and one steam generator were delivered to the construction site of power unit No. 1.
- *China*. The conditions for the final acceptance of the nuclear island of power unit No. 3 of Tianwan NPP were met. Equipment was delivered to start the concreting at power unit No. 7 on schedule. A preliminary safety analysis report and detailed designs of the foundation slab of the reactor building were prepared and handed over to the customer. In December, Jiangsu Nuclear Power Corporation (JNPC), the customer for the construction of Tianwan NPP, signed a final acceptance protocol for the nuclear island of power unit No. 4 after a two-year period of warranty operation.

Detailed designs of the pit and a preliminary safety analysis report for Xudabao NPP were prepared and handed over to the customer.

[43] The schedule may be revised.
[44] On 1 July 2021, JSC ASE EC was merged with JSC ASE.

GRI 103-1
GRI 103-2
GRI 103-3

Sustainable development results

The Engineering Division defines sustainable business development as an activity that is not only beneficial from the economic and environmental perspective but also promotes the social interests of society and governments. As it is tasked with designing and building NPP power units, the Division seeks to ensure the safety and reliability of nuclear facilities in all countries where it operates.

The efforts of the Engineering Division in the sphere of sustainable development involve implementing the corporate social responsibility policy, personnel management, developing a supply chain management system and implementing environmental projects. The Division also attaches great importance to participation in initiatives undertaken by ROSATOM's Sustainability Department.

Key projects in 2020

- The **Sustainable Supplies project** launched at the NPP construction site in Egypt involves formulating a code setting out the Division's additional requirements for suppliers' compliance with high ethical standards, the principles of fair and open business conduct and fundamental principles of sustainable development. In 2020, employees of the Engineering Division jointly with the ROSATOM's Project Office for Sustainable Development Programmes formulated the key principles of 'sustainable supplies' and drafted a preliminary version of the Supplier Code of Conduct. The Division plans to incorporate the provisions of the Code into procurement documents and contracts and to develop mechanisms for monitoring compliance with the Code.
- A **joint special project with the TASS News Agency titled 'Useful Atom'** is an educational communication project focusing on atomic energy, the history of its discovery, its application in everyday life and unique Russian developments in the peaceful use of nuclear energy.
  Within a month after its launch, the audience of the project numbered more than 43,000 users.
- An **exhibition entitled 'Atomic Age. 75 Years of Service to the People'** was held in the central squares of three cities in Hungary. It was visited by more than 10,000 people, including local residents, employees working at the Paks II NPP construction site and journalists. The ceremony was broadcast on YouTube; the broadcast was publicly available. In addition, thematic tours were organised for the company's employees and for Russian and Hungarian schoolchildren.

Plans and development prospects

The strategic goals of the Engineering Division are informed by ROSATOM's strategic development priorities defined in the company's 2020 strategy. The pursuit of each of these goals makes a significant contribution to the development of the nuclear industry:

- Carrying out contracts for the construction of large nuclear power plants;
- Reducing the duration and cost of NPP construction;
- Developing advanced technologies.

In 2021, the Engineering Division plans to continue to implement its target organisational model under the previously approved plans, including the legal merger of JSC ASE EC with JSC ASE, as well as the merger of JSC ATOMPROEKT and JSC Saint Petersburg Research and Survey Institute (JSC Energy Surveys) with JSC Atomenergoproekt, subject to the fulfilment of all licensing and other obligations guaranteeing the performance of contracts of the Engineering Division on time and on budget.

For details, see the Appendix 'Performance of the Engineering Division in 2020'.

1.11.5. Power Engineering Division

Key results in 2020:

- Electricity output at Russian NPPs reached a new all-time high of 215.7 billion kWh, or 20.3% of Russia's energy mix.
- Power start-up was completed at power unit No. 2 of Leningrad NPP-2 equipped with a VVER-1200 reactor.
- The floating thermal nuclear power plant in Pevek was put into operation.
- The capacity of NPPs in Russia totalled 29.3 GW.
- The NPP capacity factor stood at 81.07%.

The Power Engineering Division (its holding company is JSC Rosenergoatom) is the only NPP operator in Russia and a major player on the Russian electricity market.

The Division's main business areas include power and heat generation at NPPs and acting as the operator of nuclear facilities (nuclear power plants), radiation sources and facilities storing nuclear materials and radioactive substances in accordance with Russian legislation.

The Division includes operating nuclear power plants, directorates of NPPs under construction, the Capital Projects Implementation Branch Office, the Technology Branch Office, Pilot and Demonstration Engineering Centres (PDEC) for Decommissioning of VVER and RBMK Reactors and the Akkuyu Engineering Centre.

Operating results

- In 2020, electricity output at 35 power units of operating NPPs and the floating thermal nuclear power plant totalled 215.7 billion kWh, reaching a new all-time high in the history of the Russian nuclear power industry and totalling 103.9% of the balance target set by the Federal Antimonopoly Service (FAS) of Russia and 103.3% of the actual electricity output for 2019.
- The NPP capacity factor stood at 81.07% in 2020 (80.4% in 2019). The share of nuclear power generation in electricity output in Russia totalled 20.3% (19% in 2019).
- A floating thermal nuclear power plant (FTNPP, Pevek) started commercial operation, with heat supplied to the town's heating network.
- Power start-up was completed at power unit No. 2 of Leningrad NPP-2 equipped with a VVER-1200 reactor (commissioned in 2021). The RBMK-1000 reactor (power unit No. 2, Leningrad NPP) was permanently shut down for decommissioning after 45 years of safe operation.
- A Data Centre was opened in the Republic of Tatarstan.

GRI 103-1
GRI 103-2
GRI 103-3

Sustainable development results

As one of the largest electric power companies and the sole operator of NPPs in Russia, the Division makes a significant impact on the social and economic well-being of local communities and on the environment in its regions of operation and the locations of the nuclear power plants, as well as globally.

The Division is fully aware of its economic, social and environmental responsibility towards society and is strongly committed to the UN Sustainable Development Goals (SDGs).

Key projects in 2020

Nuclear power fully meets the targets for CO_2 emission reduction and zero-carbon power. Russian NPPs help to prevent emissions exceeding 100 million tonnes of CO_2 equivalent per year. In 2020, Russian NPPs prevented emissions totalling 108.3 million tonnes of CO_2 equivalent, which is almost 4 million tonnes of CO_2 equivalent more than in 2019[45].

GRI 103-1
GRI 103-2
GRI 103-3

To ensure environmental safety, the Division implemented measures scheduled for 2020 under the Comprehensive Plan for the Implementation of the Uniform Industry-Wide Environmental Policy of ROSATOM and Its Organisations for the Period from 2019 through 2021 and the Industry-Wide Plan of Prioritised Measures for Reducing the Negative Environmental Impact of ROSATOM's Organisations until 2020 (within the scope relevant to the Division).

Social projects implemented by the Division included the beautification of a former military burial ground in Obninsk. 50 employees of the Division and students of MEPhI put up an installation titled 'Cranes' and conducted a clean-up day. In addition, the municipal government provided assistance in planting trees, bushes and flowers in one of the central streets of Obninsk. As part of a campaign titled 'Thank You to Doctors', volunteers delivered 150 kilograms of pies for employees of FMBA hospitals; in addition, a coffee machine and food products were purchased for the emergency department of one of the hospitals, where the staff are on duty 24 hours a day.

Plans and development prospects

The FAS of Russia has set the balance target for electricity generation at nuclear power plants in 2021 at 217.674 billion kWh.

In 2021, the Division planned to complete pre-commissioning at the ramp-up stage and to demonstrate the readiness of power unit No. 2 at Leningrad NPP-2 (equipped with a VVER-1200 reactor) for commercial operation to the commission of Rostekhnadzor. The power unit became operational in March 2021.

For details, see the Appendix 'Performance of the Power Engineering Division in 2020'.

[45] Alternative emissions of CO_2 equivalent have been calculated based on an assumption that 100% of nuclear power generation is replaced with other electricity sources in proportion to their shares in the global power generation structure, with emissions of CO_2 equivalent reassessed accordingly under ROSATOM's methodology available on the web portal at http://report.rosatom.ru.

1.12 Resource Management

1.12.1. Corporate governance

GRI 103-1
GRI 103-2

Corporate governance system

Principles of corporate governance:

- 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 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 business incubators and functional industry organisations whose holding companies own/manage various organisations in the nuclear industry, depending on their areas of business.

ROSATOM directly or indirectly (including through its subsidiary, JSC Atomenergoprom) performs corporate governance functions and exercises the powers of an asset owner or a shareholder/member with regard to nuclear organisations, as stipulated by applicable legislation of the Russian Federation.

GRI 102-18
GRI 102-23

Governing bodies

Supervisory Board

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.

The Supervisory Board members and chairman are appointed by the President of the Russian Federation.

The powers and functions of the Supervisory Board are stipulated in the Federal Law on State Atomic Energy Corporation Rosatom. GRI 102-26

The Supervisory Board members, except for ROSATOM's Director General, are not executives of ROSATOM.

The Supervisory Board members receive no remuneration for their participation in the work of the Supervisory Board. GRI 102-35

There are no collective advisory bodies under 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).

Composition of ROSATOM's Supervisory Board as at 31 December 2020

Name	Position
Sergey Kirienko	First Deputy Chief of the Presidential Executive Office, Chairman of the Supervisory Board
Igor Borovkov	Acting Chief of Staff of the Military Industrial Commission under the Government of the Russian Federation, Deputy Chief of Staff of the Russian Government
Larissa Brychyova	Assistant to the President of the Russian Federation, Head of the Legal Department of the Presidential Administration
Alexey Likhachev	Director General of State Atomic Energy Corporation Rosatom, member of the Supervisory Board by virtue of his position
Andrey Klepach	Chief Economist of the State Development Corporation
Sergey Korolev	Head of the Economic Security Service of the Federal Security Service of Russia
Alexander Novak	Deputy Chairman of the Government of the Russian Federation
Yury Trutnev	Deputy Chairman of the Government of the Russian Federation, Plenipotentiary Representative of the President of the Russian Federation in the Far Eastern Federal District
Yury Ushakov	Assistant to the President of the Russian Federation

In 2020, there were no changes in the composition of ROSATOM's Supervisory Board.

In the reporting year, the Supervisory Board held 14 meetings, including one face-to-face meeting, and considered 39 issues.

GRI 103-3

The Supervisory Board approved the following:

- ROSATOM's Business Strategy until 2030 (minutes No. 128 dated 28 April 2020);
- The report on the achievement of key performance targets by ROSATOM in 2019 (minutes No. 128 dated 28 April 2020);
- ROSATOM's key performance targets for 2020 (minutes No. 126 dated 26 February 2020);
- Key performance targets of federal nuclear organisations for 2020 (minutes No. 128 dated 28 April 2020);
- ROSATOM's annual report for 2019 (minutes No. 131 dated 30 June 2020).

GRI 103-3

Compliance with instructions from the Supervisory Board and its Chairman is monitored by the Director General of ROSATOM.

ROSATOM's Director General

The functions and powers of the Director General are stipulated in the Federal Law on State Atomic Energy Corporation Rosatom. 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). Information on the background of the Director General is available on ROSATOM's website[46].

ROSATOM's Management Board

The Management Board is ROSATOM's collective executive body. The 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 Director General manages the work of ROSATOM's Management Board.

GRI 102-26

The powers of the Management Board are stipulated in the Federal Law on State Atomic Energy Corporation Rosatom. Information on the background of the Board members is available on ROSATOM's website[47].

[46] http://rosatom.ru/about/management/director.
[47] http://rosatom.ru/about/management/board.

Members of ROSATOM's Management Board are appointed and dismissed under the resolution of ROSATOM's Supervisory Board on the recommendation of the Director General. The Board members work full-time for ROSATOM or are employees of ROSATOM's organisations, joint-stock companies and their subsidiaries, as well as organisations under ROSATOM's jurisdiction.

Members of the Management Board receive no remuneration for their participation in the work of the Management Board. GRI 102-35

Information about income, expenses, property and liabilities of the Management Board members and their relatives is available on ROSATOM's website[48].

The Management Board comprises 15 persons; there are no women on the Board.

Composition of the Management Board as at 31 December 2020

Name	Position
Alexey Likhachev	ROSATOM's Director General, Chairman of the Management Board
Ivan Kamenskikh	First Deputy Director General
Alexander Lokshin	First Deputy Director General for Operations Management
Kirill Komarov	First Deputy Director General for Corporate Development and International Business
Konstantin Denisov	Deputy Director General for Security
Oleg Kryukov	Director for Public Policy on Radioactive Waste, Spent Nuclear Fuel and Nuclear Decommissioning
Sergey Novikov	State Secretary, Deputy Director General for Execution of State Powers and Budgeting
Yury Olenin	Deputy Director General for Science and Strategy
Nikolay Spasskiy	Deputy Director General for International Relations
Yury Yakovlev	Deputy Director General for the State Safety Policy in the Defence Uses of Atomic Energy
Vyacheslav Ruksha	Deputy Director General, Director for the Northern Sea Route Directorate
Ilya Rebrov	Deputy Director General for Economy and Finance
Andrey Nikipelov	Chief Executive Officer of JSC Atomenergomash
Sergey Obozov	Director for Development of the ROSATOM Production System
Andrey Petrov	Director General of JSC Rosenergoatom

[48] https://rosatom.ru/about/protivodeystvie-korruptsii/svedeniya-o-doxodax-rabotnicov.

In 2020, there were no changes in the composition of ROSATOM's Management Board.

In 2020, the Management Board held 38 meetings (all by absentee voting). The Board considered 320 issues, including the following key issues:

- The achievement of key performance targets by ROSATOM in 2019;
- Approval of ROSATOM's key performance targets for 2020;
- ROSATOM's business strategy until 2030;
- ROSATOM's long-term operational programme (for the period from 2020 through 2024).

Auditing Commission

ROSATOM's Auditing Commission monitors ROSATOM's financial and business operations.

Composition of the Auditing Commission as at 31 December 2020

Name	Position
Roman Artyukhin	Head of the Federal Treasury, Chairman of the Auditing Commission
Olga Allilueva	Administrative Aide in the Presidential Domestic Policy Directorate of the Presidential Executive Office
Alexey Lipaev	Deputy Department Director, Head of the Office for Budgetary Policy in the Sphere of the State Defence Order and Material Reserves of the Department for Budgetary Policy in the Sphere of State Military and Law Enforcement Services and the State Defence Order of the Ministry of Finance of the Russian Federation
Andrey Pogodin	Chief Engineer of the 12th Main Department of the Ministry of Defence of the Russian Federation
Vasily Utkin	Office Head of the Department for the Defence Industry of the Government of the Russian Federation

Commissions, boards and committees under the governing bodies

In 2020, ROSATOM had about 30 permanent committees, boards and commissions under the governing bodies.

Key collective and advisory bodies as at 31 December 2020

Committee/Board/Commission	Chairman
Strategic Council	Sergey Kirienko, Chairman of the Supervisory Board of ROSATOM
Operations Committee	Alexey Likhachev, Director General of ROSATOM
Staff and Incentives Committee	
Steering Board of the Proryv (Breakthrough) Project	
Executive Committee on the Development of the Technology for New Materials and Substances High-Technology Area in the Russian Federation	
Unified Commission for the Procurement of Goods, Work and Services for Government Needs under a Closed Procedure	Ivan Kamenskikh, First Deputy Director General
Investment Committee	Alexander Lokshin, First Deputy Director General for Operations Management
Ethics Board	
Committee on the Standardisation of Technical Specifications	
Steering Committee on Overseas NPP Personnel Training	
Committee on the Restructuring of Non-Core Assets, Real Property and Equity	Kirill Komarov, First Deputy Director General for Corporate Development and International Business
Committee on Cost within International Sales	
Committee on Strategic Partnerships, Mergers and Acquisitions	
Committee on Venture Capital Financing	
Charity Committee	
Committee on Contracting within International Sales of ROSATOM	
Risk Committee	Sergey Novikov, State Secretary, Deputy Director General for Execution of State Powers and Budgeting
Science Committee	Yury Olenin, Deputy Director General for Science and Strategy
Technical Committee of the Proryv Project	Evgeny Adamov, Scientific Leader of the Proryv Project

Committee/Board/Commission	Chairman
Central Procurement Commission	Roman Zimonas, Director for Procurement, Logistics and Quality Management
Committee on Procurement Strategies	
Central Arbitration Committee (in procurement)	Herman Gonso, Chairman of the Central Arbitration Committee
Committee on Pricing in the Construction of Nuclear Facilities	Gennady Sakharov, Director for Capital Investments, State Construction Supervision and Government Expert Review

Improvement of the corporate governance system

The Corporation continued to adopt new regulations governing cooperation between ROSATOM and the holding companies of its Divisions, business incubators and functional industry organisations.

The industry-wide mechanism for the conclusion of corporate integration and cooperation deals by ROSATOM and its organisations was improved.

GRI 102-10

Key changes in the corporate structure in 2020

- As part of the development of its regional network, ROSATOM created a subsidiary of Rusatom International Network in Hungary (Rosatom Hungary Kft), which performs the functions of ROSATOM's regional centre in Eastern Europe.
- As part of its commitment to sustainable development goals, ROSATOM joined the UN Global Compact Network.
- In order to develop a new business in the sphere of industrial and consumer waste management, ROSATOM completed the transformation of LLC Rusatom Greenway into a joint-stock company.
- A joint venture was formed in order to establish a certification centre that will be responsible for verifying product compliance with fire safety requirements.
- In order to consolidate ROSATOM's position and promote long-term development on the Hungarian market, JSC Rusatom Service and MVM Hungarian Electricity Plc. concluded a deal to establish a joint venture in Hungary, European Power Services Zrt.
- In order to develop the capabilities of JSC Rusatom Service in the sphere of design and production of full-scale simulators and analytical packages, ROSATOM acquired a 100% shareholding in JSC ETC GET.
- In order to implement a joint project, JSC Rusatom Healthcare established LLC Radiological Medical Technologies, a joint venture providing external beam radiation therapy services.
- In order to implement an ash and slag processing project, JSC Rusatom Infrastructure Solutions established a wholly owned subsidiary, LLC Tefra (Seversk).
- JSC RPC Khimpromengineering acquired a 100% shareholding in LLC Porcher Advanced Materials (a manufacturer of high-technology textile based on carbon fibre).
- The entire shareholding in JSC Isotope (100%) previously owned by ROSATOM was transferred to JSC Rusatom Healthcare.
- Shares of eight joint-stock companies under federal ownership were transferred to ROSATOM pursuant to Order No. 1299-r of the Russian Government dated 16 May 2020 as an asset contribution of the Russian Federation.
- Shares in PJSC MSZ were bought back from minority shareholders.

Non-arm's length transactions

In accordance with Federal Law No. 317-FZ of 1 December 2007, the Supervisory Board approves non-arm's length transactions. In 2020, ROSATOM's Supervisory Board approved four non-arm's length transactions, including with the following organisations:

- Autonomous Non-Profit Organisation Digital Economy (Digital Economy NPO);
- NRC Kurchatov Institute;
- PJSC Inter RAO.

Plans for 2021 and for the medium term

- To transfer shares of eight joint-stock companies under federal ownership to ROSATOM as an asset contribution of the Russian Federation pursuant to orders of the Government of the Russian Federation.
- To complete the corporatisation of FSUE SRI SIA LUCH through transformation into a joint-stock company.
- To complete the reorganisation of JSC ASE EC through merger with JSC ASE.

1.12.2. Risk management

Risk management system

GRI 103-1
GRI 103-2

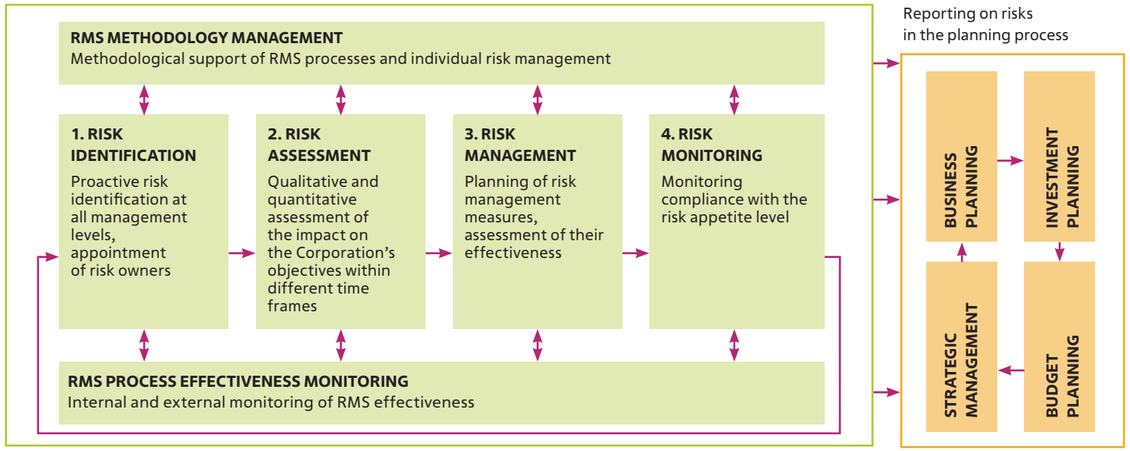
The industry-wide risk management system (RMS) is integrated into the Corporation's planning and management processes. The RMS is based on a continuous cyclical process of identifying, assessing and managing the risks that can affect ROSATOM's short- and long-term performance and the implementation of its strategy.

The RMS is being developed in accordance with the approved Risk Management Development Programme for the period from 2019 through 2024.

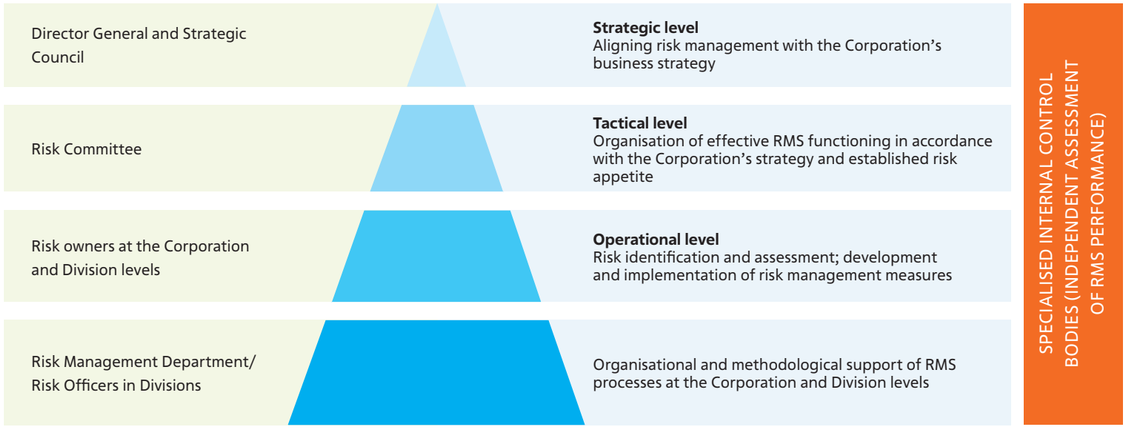
In 2020:

- Approaches to risk monitoring and the prevention of risk recurrence were developed: a database of the relevant indicative external and internal case studies and NPP construction benchmarks (systemic risks) was created; an expert assessment of the impact of systemic risks on project cost, time frame and likelihood of abandonment was carried out;
- A risk reporting format was developed for the Corporation's Analytical Centre; data on changes in key indicators reflecting the level of critical risks, including those posed by the COVID-19 pandemic, are updated on a quarterly basis;
- An expert assessment of key risk indicators was carried out, and data on changes in their levels were collected; a list of key risk indicators was compiled, including a description, sources of information, the calculation algorithm and frequency, and thresholds (warning and response thresholds);
- Performance of the risk management system for federal (national) projects was assessed as part of budget performance assessment;
- ROSATOM started to develop and implement an industry-wide IT system for risk management (ISRM): functional specifications were drafted setting out requirements for the scope of work and deliverables in terms of developing and implementing the IT system; the technical architecture and the sequence of implementation of the relevant subsystems were determined.

Risk management process at ROSATOM



Organisational model of the risk management system

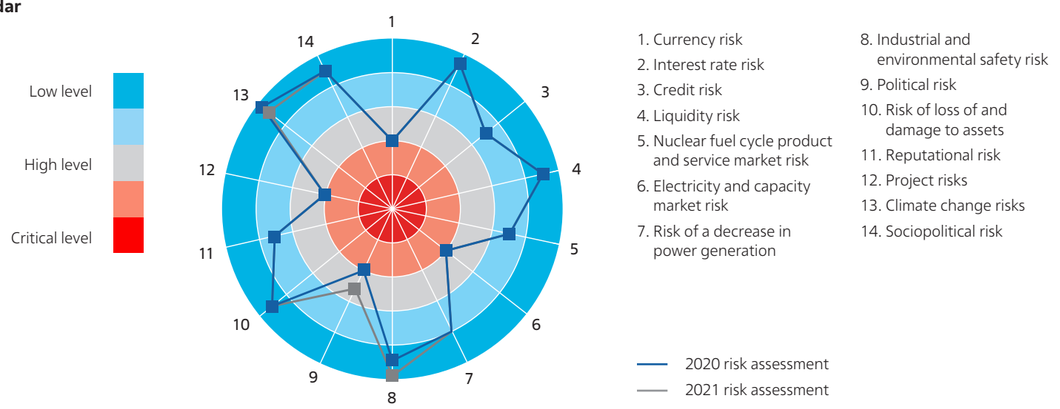


GRI 102-15

Key business risks[49]

As part of the functioning of the RMS, a list of critical risks was compiled; risk owners were appointed; risks were assessed, and risk management measures were developed and implemented.

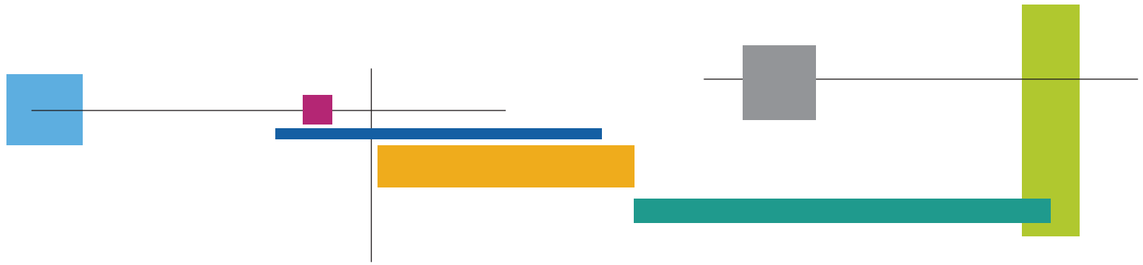
Risk radar



1. Currency risk
2. Interest rate risk
3. Credit risk
4. Liquidity risk
5. Nuclear fuel cycle product and service market risk
6. Electricity and capacity market risk
7. Risk of a decrease in power generation
8. Industrial and environmental safety risk
9. Political risk
10. Risk of loss of and damage to assets
11. Reputational risk
12. Project risks
13. Climate change risks
14. Sociopolitical risk

2020 risk assessment
2021 risk assessment

Comprehensive risk management measures largely offset the negative impact of external factors on the implementation of ROSATOM's strategy.



[49] 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 2020

GRI 103-3

Change in estimated risk levels for 2021:

↗ increase ↘ decrease ○ no significant changes

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

Risks and changes in risk levels (risk owners)	Risk description	Risk management practices	Connection with strategic goals
Financial risks			
1. Currency risk ○ (Executives of ROSATOM's Divisions)	Adverse changes in exchange rates	**Management approaches:** ■ 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); ■ Use of financial hedging instruments. **Results:** 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. An optimal ratio of assets and liabilities denominated in the same currency was maintained. **Changes:** There were no significant changes.	1 2 3

Risks and changes in risk levels (risk owners)	Risk description	Risk management practices	Connection with strategic goals
2. Interest rate risk ○ (ROSATOM's Treasury Department)	Adverse changes in interest rates, different timing of interest income and interest expenses	**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. All things being equal, the Corporation prefers long-term fixed-rate loans with the option of penalty-free early repayment; ■ Floating-rate loans on which interest rates may be increased are refinanced using the intra-group liquidity pool. **Results:** ROSATOM maintains a stable long-term credit portfolio. The average interest rate on the total debt portfolio was reduced to below 4.8% per annum, partly due to the refinancing of both the rouble-denominated and foreign-currency-denominated portions of the credit portfolio. The risk level decreased in 2020 due to the effective use of the risk management approaches described above, subsidies, as well as a decrease in the key rate of the Bank of Russia and lower volatility on the Russian credit market. **Changes:** The likelihood of an increase in the risk level due to an interest rate hike is assessed as low. *For details, see the section 'Financial Management'.*	1 2 3
3. Credit risk ○ (ROSATOM's Treasury Department for banks; executives of ROSATOM's organisations for other counterparties)	Failure by counterparties to fulfil their obligations in full and on time	**Management approaches:** ■ Setting and monitoring limits for counterparty banks; ■ Using suretyship, guarantees, restrictions on advance payments in favour of external counterparties; ■ Improving the legal framework for the wholesale electricity and capacity market (including increasing fines and improving the system of financial guarantees); ■ Monitoring the status of accounts receivable and the financial position of counterparties; ■ An internal counterparty solvency rating system. **Results:** Losses through the fault of counterparties were minimised.	1 2
4. Liquidity risk ○ (ROSATOM's Treasury Department / Heads of Divisions)	Lack of funds for the fulfilment of obligations by ROSATOM and its organisations	**Management approaches:** ■ Centralised cash management (cash pooling); ■ Rolling liquidity forecasts and cash flow budget; ■ Maintaining required amounts of open lines of credit with 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 with Russian federal executive authorities; ■ Active use of project financing instruments as part of implementation of projects and programmes by ROSATOM and its organisations; ■ Maintaining credit ratings assigned to ROSATOM by the 'Big Three' international rating agencies (S&P, Moody's and Fitch), JSC Expert RA and the Analytical Credit Rating Agency (ACRA) at the level of Russia's sovereign credit rating.	1 3

Risks and changes in risk levels (risk owners)	Risk description	Risk management practices	Connection with strategic goals
		Results: ROSATOM maintained sufficient liquidity to repay liabilities on time, preventing unacceptable losses and reputational risk. *For details, see the section 'Financial Management'.*	
Commercial risks			
5. Nuclear fuel cycle (NFC) product and service market risk ○ (Executives of the relevant Divisions of ROSATOM)	Adverse change in the pricing environment and demand on markets for natural uranium and uranium conversion and enrichment services	**Management approaches:** ■ Maintaining an optimal balance between market-focused and escalation pricing mechanisms (based on benchmark price inflation) in contracts; ■ Aligning pricing mechanisms used for procurement and those used in contracts with a high level of commodity risk; ■ Discussing the volume of future orders with customers in advance; ■ Embedding quantitative flexibility and options in contracts with suppliers to align purchase and sales volumes; ■ Providing supply guarantee mechanisms; ■ Improving the technical and economic characteristics of nuclear fuel; developing new types of fuel; ■ Promoting products in new market segments. **Results:** A transition to the fixed selling price for uranium in the Corporation enabled it to concentrate the risk of changes in uranium prices in processing enterprises. The risk level remains unchanged. *For details, see the section 'International Business Development'.*	1 2 4
6. Electricity and capacity market risks ○ (Director General of JSC Rosenergoatom)	Adverse changes in electricity and capacity prices	**Management approaches:** The risk depends exclusively on external factors. The risk cannot be hedged using financial instruments due to the low liquidity of the market. To reduce the risk, power supply divisions of JSC Rosenergoatom are negotiating with PJSC FGC UES and JSC SO UEC in order to align the schedule of power grid equipment maintenance. **Results**: In 2020, like in previous periods, key drivers included electricity consumption in the first pricing zone, indexation of gas prices (with gas being the main type of fuel used by thermal power plants in the first pricing zone) and competition between power generation companies. Due to a significant fall in consumption as a result of restrictions imposed in response to the new coronavirus disease, in 2020, the impact of these factors on electricity and capacity prices was much more pronounced than in 2019. Indeed, in 2020, electricity consumption in the first pricing zone decreased by 5% year on year.	1

GRI 103-3

Risks and changes in risk levels (risk owners)	Risk description	Risk management practices	Connection with strategic goals
Operational risks			
7. Risk of a decrease in power generation ○ (Director General of JSC Rosenergoatom)	Decrease in power generation due to equipment shutdowns and unavailability	**Management approaches:** ■ Scheduled preventive maintenance and repairs at NPPs; ■ Implementation of the NPP life extension programme and equipment upgrades to increase installed capacity and power generation at operating power units; ■ To minimise the impact of restrictions imposed by the system operator on nuclear power generation in 2020 amid the lockdown aimed at preventing the spread of COVID-19, daily regulation was introduced at Kola, Novovoronezh, Balakovo, Rostov and Kalinin NPPs. **Results:** All incidents and equipment failures have been properly investigated. Corrective and preventive measures have been developed in order to address the root causes of the incidents and prevent their recurrence. **Changes:** Implementation of a set of risk management measures and the use of tools forming part of the ROSATOM Production System has made it possible to offset the impact of negative factors. *For details, see the appendix to the Report of ROSATOM on the performance of the Power Engineering Division in 2020.*	1
8. Health, safety and environmental (HSE) risks ↘ (Executives of ROSATOM's Divisions)	Major accidents/ incidents in nuclear organisations	**Management approaches:** ■ Comprehensive inspections in manufacturing enterprises, followed by the development and implementation of risk mitigation plans; ■ Measures to improve HSE performance in ROSATOM's organisations, including measures to enhance occupational safety, reduce the impact of ROSATOM's operations on the health of the local population and prevent irreversible changes in the natural environment in the regions of operation; ■ Measures to upgrade process equipment and improve production processes in the organisations; ■ Monitoring of compliance of operations with statutory limits on environmental and health impacts; ■ Monitoring of individual radiation risk exposure of employees and measures to reduce it; ■ Monitoring of the radiation level and the environmental situation in ROSATOM's regions of operation; ■ Constant readiness of emergency response teams and equipment; ■ Special reserve funds formed by ROSATOM to ensure safety at all stages of the life cycle of its production facilities; ■ Arranging civil liability insurance against damage resulting from accidents for organisations that own hazardous industrial facilities; ■ Calculation and monitoring of indicators used for assessing the probability of potential negative implications of industrial safety violations at hazard class 1 and 2 industrial facilities; ■ Timely updates to internal regulations of the organisations, as required by the legislation and federal rules and standards; ■ Safe operation of hazardous industrial facilities of ROSATOM's organisations; ■ Maintaining a high level of professionalism, accountability and safety culture among employees; ■ Continuous monitoring of the use of personal protective equipment (including equipment designed to prevent the spread of COVID-19) by employees in the workplace. **Results:** Safe operation of ROSATOM's organisations, including hazardous industrial facilities. The risk level decreased. *For details, see the chapters 'Safety Report' and 'Social Report'.*	4
9. Political risk ↗ (International Cooperation Department of ROSATOM)	Changes in the regulatory and political climate in foreign countries imposing restrictions on the operations of ROSATOM and its organisations	**Management approaches:** ■ Coordination with the Russian Ministry of Foreign Affairs and other authorities; using the relevant intergovernmental mechanisms; ■ Providing political support for global operations of nuclear organisations; ■ Using the platform of specialised international organisations for communication and awareness campaigns; ■ Establishing partnerships with local and foreign regional companies and searching for alternative partners; ■ Examining alternative options for the supply of equipment that has been produced by the Corporation or is in production; ■ Developing and implementing an action plan in response to sanctions, as well as responding to the tightening of existing and imposition of new trade restrictions on target end markets; ■ Obtaining general export licences; ■ Taking into account political interests of governments in the Corporation's end markets. **Results:** The Corporation concluded 4 intergovernmental agreements and 12 major interdepartmental agreements, which is a positive trend. **Changes:** The risk tends to increase, as persisting sanctions pressure on Russian individuals and legal entities generally increases uncertainty over the possibility of implementation of specific economic projects. ROSATOM plans to mitigate the negative impact of this risk by expanding its footprint on those target markets where there are no restrictions, implementing the import substitution programme, holding consultations and negotiations under intergovernmental agreements and securing the required diplomatic support. *For details, see the sections 'International Cooperation' and 'International Business Development'.*	1 2 3

Risks and changes in risk levels (risk owners)	Risk description	Risk management practices	Connection with strategic goals
10. 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	**Management approaches:** An integrated industry-wide system for the prevention of corruption and other offences is in place in the Russian nuclear industry. **Results:** In accordance with ROSATOM's Anti-Corruption Plan for the period from 2018 through 2020, the Corporation implemented anti-corruption measures stipulated in the National Anti-Corruption Plan for the relevant period approved pursuant to Decree No. 378 of the President of the Russian Federation dated 29 June 2018. ROSATOM continued to develop the legal and organisational anti-corruption framework and to ensure compliance with anti-corruption laws and managerial decisions. Systematic measures were taken to prevent and resolve conflicts of interest. Executives of new businesses established in the nuclear industry were informed about prioritised anti-corruption measures, including the industry-wide anti-corruption regulations to be implemented in the organisations.	1 2
11. Reputational risk ○ (Communications Department of ROSATOM and Heads of Divisions)	Changes in stakeholder perception of the trustworthiness and appeal of ROSATOM and its organisations	**Management approaches:** ■ Measures are taken to shape a positive public opinion on the development of ROSATOM's technologies (both nuclear and non-nuclear) through improved information transparency and open stakeholder engagement (including the functioning of an industry-wide public reporting system); ■ ROSATOM works continuously to improve the recognition and appeal of its HR brand (both in the industry and among prospective employees and within the expert community); ■ ROSATOM continuously monitors public opinion on NPP construction and information on the decisions of government and regulatory bodies on curtailment of nuclear power generation in the countries where the Corporation is implementing projects. It continuously monitors and analyses news reports in the national and international media and information obtained during business meetings, industry conferences and workshops. Industry executives are promptly informed about key developments in the media space in Russia and abroad; ■ Technical tours and media tours of Russian nuclear facilities are arranged for foreign media representatives; ■ ROSATOM maintains a presence on social media; ■ ROSATOM's representatives participate in international industry exhibitions as speakers/delegates; ■ ROSATOM publishes printed materials (brochures, leaflets) to raise public awareness about the nuclear power industry.	1 3

Risks and changes in risk levels (risk owners)	Risk description	Risk management practices	Connection with strategic goals
		Results: Overseas projects are supported by government bodies. In 2020, the Corporation successfully held a number of events marking the 75th anniversary of the Russian nuclear industry; these events served to enhance the credibility of nuclear technologies and ROSATOM's projects among the general public in Russia and abroad. According to the findings of opinion polls, in 2020, 75.2% of the Russian population supported the use of nuclear power. Over the past few years, this figure remains persistently high. According to data in the Medialogia automated media monitoring and analysis system, in 2020, 95.98% of publications about the Russian nuclear industry were positive or neutral. The Corporation received a number of prizes and awards in the sphere of personnel management. In 2020, ROSATOM topped the Ranking of the Best Russian Employers compiled by the HeadHunter online recruitment platform (the ranking comprised 500 organisations). A high level of openness and transparency in ROSATOM is confirmed by the appreciation of quality of its public annual reports. In the annual competition held by the RAEX-Analytics agency, ROSATOM's Report for 2019 won in the Best Annual Report (Non-Financial Sector) category and was awarded 5 stars (the highest score) in the ranking of reports. The transition of ROSATOM's organisations to a single brand made an important contribution to enhancing ROSATOM's reputation. Russian nuclear organisations retained their historical names and identity; at the same time, they were given standardised logos based on ROSATOM's trademark (the 'Möbius strip'). Umbrella branding in the nuclear industry enables consistent positioning of ROSATOM's organisations on the Russian and international markets, which, in turn, will help Russian nuclear organisations and their projects gain greater recognition from partners and customers. **Changes:** There was no significant increase in the level of reputational risk in 2020. Strong correlation with political risk, which tended to increase, was largely offset by successful communication campaigns centred around the programme of events marking the 75th anniversary of the Russian nuclear industry, as well as the coverage of ROSATOM's major achievements in Russia and abroad. *For details, see the section 'Strategic Communications' and the chapter 'Social Report'.*	

Risks and changes in risk levels (risk owners)	Risk description	Risk management practices	Connection with strategic goals
12. Project risk ○ (Executives of ROSATOM's Divisions)	Changes in the macroeconomic indicators of countries participating in the projects; contractors' failure to fulfil their commitments with regard to the schedule and quality of work to be performed	**Management approaches:** ■ Improving project management practices; ■ Developing action plans for the interaction with foreign customers; ■ Concluding long-term contracts stipulating fixed electricity prices; ■ Developing standardised design solutions; ■ Implementing measures forming part of the industry-wide approach to managing risks associated with NPP construction projects; ■ Reallocating available credit resources between projects, when possible; ■ Developing additive manufacturing, including a system of printing services and infrastructure for new digital production facilities. **Results:** ROSATOM continuously improves the system for managing all stages of NPP construction, from front-end engineering design to the commissioning of power units. The Corporation carries out quantitative risk assessment for NPP construction projects (using the Monte Carlo method). A standardised approach to risk identification and assessment was developed and piloted. Risk assessment was carried out using the CAPEX@RISK model. Risk identification and assessment tools tested as part of a project run by JSC TVEL were piloted. Project risk management templates were developed. Risks were identified, systematised and assessed as part of a pilot project (jointly with JSC TVEL).	1 3 4
13.Climate risk ↘ (Executives of ROSATOM's Divisions)	Adverse climate change/impacts of natural disasters on the operations of ROSATOM and its organisations	**Management approaches:** ■ At the stage of NPP design, ROSATOM carries out a comprehensive assessment of risks associated with the climatic characteristics of the region where the proposed NPP construction site is situated; ■ Calculations performed as part of an assessment of external impacts take into account the climatic characteristics of the customer country and form part of a probabilistic safety assessment; ■ Industrial environmental control is performed to ensure that the operations of organisations that make an impact on the environment comply with statutory limits and applicable environmental laws and regulations; ■ Measures are developed and implemented in order to reduce greenhouse gas emissions from production operations;	1 4

GRI 102-15

Risks and changes in risk levels (risk owners)	Risk description	Risk management practices	Connection with strategic goals
		■ ROSATOM is developing wind power generation in order to increase the share of zero-carbon energy in the country's energy mix; ■ The environmental impact of NPPs is monitored at each stage of their life cycle (design, construction, operation and decommissioning). Special comprehensive measures forming part of a Comprehensive Plan for the Implementation of the Environmental Policy of ROSATOM and Its Organisations, which is updated on an annual basis, are implemented at NPPs. These measures help to predict and prevent emissions, accidents and their development and to minimise their impact. **Results:** Following the completion of engineering surveys, appropriate design solutions are adopted for each NPP construction project taking into account the climatic characteristics of the region where the NPP will be built. ROSATOM makes sure that all its operations are environmentally safe; nuclear power generation facilities produce virtually no CO or CO_2 emissions, helping to maintain the natural ecological balance and reduce the likelihood of adverse climate changes or natural anomalies. In 2020, the first wind farm was put into operation in the south of Russia; it comprises the 150 MW Adygea WPP and the 210 MW Kochubeyevskaya WPP situated in the Stavropol Territory and operated by JSC NovaWind (an organisation of ROSATOM).	
14. Sociopolitical risk in the regions of operation, including the risk of a deterioration in the epidemiological situation ○ (ROSATOM and executives of its Divisions)	Loss of public approval for the location of infrastructure facilities. Deteriorating epidemiological situation.	**Management approaches:** The Corporation operates in a socially important sector of the economy. The Government of the Russian Federation makes a direct impact on ROSATOM's operations by financing individual federal projects and federal target programmes. As a result, ROSATOM and its organisations are characterised by a high level of financial resilience sufficient to withstand the negative economic consequences of social and regional risks. ROSATOM implements a set of measures (public consultations, engagement with non-governmental organisations and the media) to inform the general public that its operations do not pose environmental risks. Simultaneously, the Corporation conducts environmental upgrades in the back-end segment, introducing new RAW and SNF processing technologies and reducing the volume and radioactivity of waste.	

Risks and changes in risk levels (risk owners)	Risk description	Risk management practices	Connection with strategic goals
		To prevent a deterioration in the epidemiological situation, ROSATOM fully complies with all requirements for public sanitation and disease prevention amid the spread of the new coronavirus disease (COVID-19) and recommendations by the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor); in addition, the following measures were implemented: ■ A Crisis Centre was established to prevent the spread of COVID-19; ■ During non-working days, teams were formed in organisations in Moscow to ensure the continuity of core processes in the workplace with a minimal risk to employees; manufacturing enterprises in the regions continued to operate, but measures were taken to protect employees against COVID-19; ■ Employees working remotely were provided with computers; ■ Physical contact among employees in the workplace was minimised; ■ Temperature checks were arranged at the entrance to the premises of the organisations; ■ COVID and antibody testing of employees was arranged; ■ Employees were provided with means of protection (face masks, gloves, hand sanitisers). **Results:** The set of measures implemented by ROSATOM to prevent the spread of COVID-19 helped to minimise the number of infected employees. Despite a challenging epidemiological situation, the atmosphere in ROSATOM's host towns and cities remained calm, and the Corporation successfully ensured operational continuity in its organisations. **Forecast changes:** The risk level is not expected to increase in 2021. The risk level is expected to remain low, including due to measures preventing the spread of the virus.	

Other risks

Licensing risks. ROSATOM currently has all necessary licences. Where necessary, the Corporation can promptly obtain licences for new businesses and renew existing licences.

Logistical risks. Regions in which the core operations of ROSATOM and its organisations are situated have well-developed infrastructure and transport links. ROSATOM's organisations implement preventive measures to ensure reliable supplies: they maintain emergency stocks of materials and equipment, organise exercises for emergency response and recovery teams and implement other measures to ensure the continuity of production and logistical processes.

Risk of additional taxes on the use of hydrocarbons in the production of goods (carbon tax). ROSATOM is developing approaches to raising ESG financing and issuing 'green' financial products. Another option is to raise ESG loans, whereby the interest rate on a loan is reduced if the borrower fulfils a number of environmental obligations in the course of NPP construction.

Risk insurance

GRI 103-2

Risk insurance is one of the main risk management approaches used by ROSATOM. To improve the reliability of insurance coverage, in 2020, the Corporation continued to cooperate with the insurance community on the reinsurance of Russian operators against property risks. A significant share of liability of Russian NPPs for potential nuclear damage was transferred for reinsurance to the international pooling system[50]. This proves that the international nuclear insurance community acknowledges the safety and reliability of Russian NPPs to be adequate.

In 2021, the Corporation plans to continue to engage experts from the Russian Nuclear Insurance Pool and the international pooling system to audit key organisations in the industry for insurance purposes.

Objectives for 2021 and for the medium term

ROSATOM has developed an action plan for 2021 covering the key areas of the Risk Management Development Programme for the period from 2019 through 2024. This plan takes into account both external factors related to the requirements of foreign customers (NPP construction on time and on budget) and Russian government bodies and internal factors (the need to build an efficient risk management system aligned with global best practices).

[50] The international pooling system comprised of International Nuclear Insurance Pools is an unincorporated organisation representing the interests of nuclear insurance pools from 27 countries.

The plan sets three key objectives for the development of risk management in the Russian nuclear industry:

- To develop an automated risk assessment and management system, which will, among other things, enable ROSATOM to maintain and update a knowledge base of typical risks and risk management measures;
- To develop the risk management expert community in the industry;
- To adopt procedures (including initial assessment) for managing risks associated with projects and programmes in the sphere of new business development.

Plans for 2021 include implementing the first stage of the ISRM project pursuant to instructions from ROSATOM and starting the pilot operation of the system.

1.12.3. Internal control system

Key results in 2020:

- The quality of organisation and performance of internal financial audit in ROSATOM was rated highly by external organisations: the Corporation topped the ranking of 94 chief federal budget administrators compiled by the Russian Ministry of Finance as part of quarterly monitoring of financial management quality.
- Inspections conducted in the Corporation and its organisations by Russian government bodies did not reveal any major violations that had not been detected by the Internal Control and Audit Function.
- A Road Map for Comprehensive Development of Specialised Internal Control Bodies (SICBs) in 2020 and 2021 and a Road Map for Professional Development of SICB Specialists were approved.

GRI 103-2

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 the Internal Control and Audit Function (ICAF).

Results in 2020

The specialised internal control bodies (SICBs) of ROSATOM's Divisions assumed greater responsibility by adopting a leadership model:

- The SICBs are focused on preventive control and development of meaningful (timely and comprehensive) and practicable corrective measures;
- Effective communication was established with colleagues from operating divisions at all stages of operations;
- A proactive approach to change management was adopted;
- There was an increase in demand for advisory services provided by SICBs from executives managing core operations of ROSATOM's organisations.

ROSATOM became the first state-owned company to carry out a comprehensive independent assessment of compliance of its internal control and audit specialists with the requirements of the Internal Auditor professional standard.

In order to improve SICB performance, the following documents were drafted and approved:

- A Road Map for Comprehensive SICB Development in 2020 and 2021. Measures implemented in 2020 included identifying possibilities for establishing integration links between the 1C: ICAF and 1C: Consolidation IT systems and other industry-wide IT systems; drafting a statement of work for the automation of the calculation of a number of performance indicators of ROSATOM's organisations that are calculated based on financial and managerial accounting data stored in industry-wide IT systems;
- A Road Map for Professional Development of SICB Specialists. In 2020, a list of basic and special competences in the sphere of internal control and audit was compiled; a practice of holding online case study meetings in order to share experience was introduced; 24 online training courses were developed based on control and inspection practices.

A number of internal audits were conducted, including an audit of requirements management in NPP construction projects (as part of efforts to 'rebuild' pilot end-to-end processes), an audit of performance of the end-to-end management system of the Akkuyu NPP construction project (covering all levels, from the Corporation to the construction site) and an audit of efficiency of project management in the sphere of NPP construction digitisation. These audits made an important contribution to making the management of complex interdivisional projects more efficient. Based on the findings of the internal audits, recommendations were produced for making project management more efficient and customer-centric.

Amid the COVID-19 pandemic, remote inspection techniques were mastered; a project audit technique was developed and adopted; 12 projects were implemented to make internal control and audit processes more efficient.

To address the challenges arising in the course of control activities, 27 expert groups were formed across various business areas. The expert groups comprise 92 employees from 45 nuclear organisations.

The quality of control activities was rated highly by ROSATOM's senior executives (scoring 6 points out of a maximum of 7).

Outcomes of control activities in 2020

In the reporting year, ROSATOM's SICBs conducted 646 inspections in Russian nuclear organisations.

External supervisory bodies conducted 18 inspections, including 12 inspections by the Accounts Chamber of the Russian Federation. No instances of misuse or illegal use of budget funds or assets were detected.

Following the inspections, the ICAF developed 667 corrective measures and approved them for implementation.

Based on the findings of inspections conducted in the reporting year, disciplinary sanctions were imposed on 369 employees of ROSATOM and its organisations, including 12 senior managers.

Stakeholder control

In 2020, an updated version of the Partner Special Monitoring and Analytics Unit became operational. This is a solution designed for integrating ROSATOM's information systems in real time; it contains full information on complaints regarding procurement processes in the nuclear industry, as well as indicators for online monitoring of procurement procedures.

ROSATOM 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 Corporation carries out methodological work to make recommendations and proposals for improving procurement processes in the nuclear industry based on the findings of investigation of complaints.

The Central Arbitration Committee and the arbitration committees of the Power Engineering, Fuel and Engineering Divisions received 899 reports (complaints) from stakeholders regarding violations of procurement rules established by Russian legislation, ROSATOM's Uniform Industrial Procurement Standard (UIPS) (the Regulations on Procurement) and other regulations of ROSATOM and its organisations supporting the UIPS. 596 complaints were investigated; 140 complaints (23.5% 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 an arbitration committee.

Systematic efforts of arbitration committees (including detailed explanations provided to customers/procurement authorities during the investigation of complaints concerning the nature of detected violations), the publication of biannual practice reviews and a library of arbitration practices maintained on the official procurement website of the nuclear industry helped to minimise the number of violations in the procurement process, which was reflected in a 10% decrease in the number of valid complaints as a percentage of the total number of purchases (from 0.21% in 2019 to 0.19% in 2020).

Changes in indicators pertaining to control activities

Indicator	2018	2019	2020
Third-party inspections			
Number of inspections			
Number of inspections by external supervisory bodies	15	22	18
including inspections by the Accounts Chamber of the Russian Federation	7	13	12

Indicator	2018	2019	2020
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
Quality of organisation and performance of internal financial control and internal financial audit as assessed by the Russian Ministry of Finance, %	100	96.8	100
Internal inspections			
Number of inspections			
Number of inspections by specialised internal control bodies (SICBs)	726	704	646
Outcomes of inspections			
Number of corrective measures implemented following the inspections	484	622	667
Number of employees on whom disciplinary sanctions were imposed	811	586	369
including senior managers	4	11	12
Stakeholder control			
Number of complaints			
Number of complaints filed with the arbitration committees of ROSATOM and its Divisions regarding violations of procurement rules	914	902	899
Number of reports (complaints) accepted for investigation	588	606	596
Outcomes of investigation of complaints			
Number of valid complaints	154	157	140
Valid complaints as a percentage of the total number of investigated complaints	28	26	23.5
Valid complaints as a percentage of the total number of purchases	0.23	0.21	0.19

Plans for 2021

- To monitor the implementation of federal projects and strategic programmes involving ROSATOM and organisations in the industry.
- To continue to improve control activities of the SICBs at the level of organisations.
- To shift the focus of the SICBs to control and analysis.
- To master project audit and strategic audit techniques.

1.12.4. Prevention of corruption and other offences

Key results in 2020:

- All measures forming part of ROSATOM's Anti-Corruption Plan were implemented.
- Employees provided information on their income, expenses, property and liabilities, and the information was posted on ROSATOM's official website (http://www.rosatom.ru/about/ protivodeystvie-korruptsii/svedeniya-o-doxodax-rabotnicov).

1.12.4.1. Prevention of corruption

ROSATOM's Code of Ethics

GRI 103-1

ROSATOM's anti-corruption system

ROSATOM is committed to preventing corruption and works systematically to ensure that all its employees, including senior executives of ROSATOM and its organisations, comply with legislation. These efforts are based on anti-corruption regulations.

GRI 103-2

Prevention of corruption and protection of ROSATOM's assets are one of the key corporate functions; the relevant measures were implemented in accordance with:

- ROSATOM's Anti-Corruption Plan for the period from 2018 through 2020;
- Federal Law No. 273-FZ on Combating Corruption dated 25 December 2008;
- Decree No. 378 of the Russian President on the National Anti-Corruption Plan for the Period from 2018 through 2020 (the National Plan) dated 29 June 2018;
- Other anti-corruption regulations issued by the President of the Russian Federation and the Government of the Russian Federation.

Uniform Industry-Wide Anti-Corruption Policy of ROSATOM and Its Organisations

GRI 102-17

GRI 103-3

The Hotline is one of the key tools of ROSATOM's anti-corruption system. Employees in the industry and other persons can use it to report suspected instances of corruption and other violations https://www.rosatom.ru/about/protivodeystvie-korruptsii/obratnaya-svyaz-dlya-soobshcheniy-o-faktakh-korruptsii/.

More than 600 reports were received in 2020. All reports were investigated under the established procedure, and corrective measures were implemented as required.

Key results in 2020

In 2020, a number of events were held with a focus on the implementation of the national anti-corruption policy. These included:

- Operational meetings chaired by ROSATOM's Director General;
- Industry-wide meetings involving deputy directors of ROSATOM's organisations in charge of security; they also participated in a business simulation game aimed at developing managerial competences in the sphere of corruption prevention;
- Meetings of the heads of anti-corruption departments of nuclear organisations, which involved identifying the ways to enhance anti-corruption efforts.

GRI 103-3

In addition, in 2020, anti-corruption efforts of nuclear organisations were monitored on a regular basis; the findings of the monitoring confirmed that organisations under ROSATOM's jurisdiction had adopted local anti-corruption regulations required by law and consistent with recommendations from the competent executive body responsible for methodological support of anti-corruption efforts and with industry-wide standards, and that sanctions imposed by employers against persons guilty of corruption and other offences were sufficiently strict.

A website titled 'Business Gifts' is maintained on ROSATOM's portal (https://portalgn.rosatom.local/sites/presents/SitePages/MainPa ge.aspx) and is regularly updated. All gifts are handed over to the authorised department under the established procedure for subsequent sale.

Ahead of holidays and anniversary celebrations, ROSATOM publishes annual reminders about the need to comply with the ban imposed by law with regard to receiving gifts. More specifically, email messages are sent out concerning the ban on receiving gifts; the relevant information is posted on the corporate website, and posters are put up on information boards on the Corporation's premises, including in reception areas.

In the reporting year, the Anti-Corruption section of ROSATOM's official website was updated on a regular basis: https://rosatom.ru/about/protivodeystvie-korruptsii/.

Sanctions for offences

Financial and disciplinary sanctions were imposed against more than 1,500 executives of nuclear organisations for detected instances of corruption and other offences. The relevant materials were submitted to law enforcement agencies, where applicable.

Employee training in anti-corruption practices

GRI 205-2

ROSATOM engaged experts from the Russian Presidential Academy of National Economy and Public Administration, the Institute of Legislation and Comparative Law under the Government of the Russian Federation and the Academy of the Russian Prosecutor General's Office to assist in developing a set of nine anti-corruption training programmes for employees of ROSATOM and its organisations.

As part of the National Anti-Corruption Plan, a total of 1,250 employees of nuclear organisations completed ROSATOM's anti-corruption training programmes, including 116 employees newly hired by ROSATOM and appointed to positions included in 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.

Number of employees who completed face-to-face anti-corruption training, persons

2018	2019	2020
179	654	417

ROSATOM also runs a training programme titled 'Introduction to the Company', which is designed to provide all newly hired employees with information on ROSATOM's anti-corruption efforts and on restrictions and prohibitions applicable to ROSATOM's employees.

Given the threats posed by the COVID-19 pandemic, starting from April 2020, face-to-face training was replaced with various distance learning formats, such as webinars, online conferences, awareness campaigns, etc. Modern digital technologies enable employees in the industry not only to watch presentations by qualified experts but also to do practical assignments, get answers to their questions and do tests.

As part of the development of an online anti-corruption training system for employees in the nuclear industry (including newcomers), a number of online courses were developed in 2019 and posted on the internal distance learning portal of ROSATOM's Corporate Academy (which is an industry-wide educational institution) and in the Record Industry-Wide Talent Development System. These include courses titled 'Avoiding Conflicts of Interest'; 'You Have Received a Gift. What Should You Do?'; 'Basics of Combating Corruption in the Nuclear Industry'; 'Anti-Corruption Standards of Conduct in the Nuclear Industry'; 'Reporting Inducement to Corruption'. The online training courses were completed by more than 7,300 employees in the nuclear industry.

In 2020, a mobile distance learning platform (which includes anti-corruption training courses) became operational; it is available to 220,000 employees in the nuclear industry.

To make anti-corruption training more accessible, a new type of awareness campaigns has been developed and is being introduced; it has been nicknamed the 'Anti-Corruption Advance Party'. This is an onsite event held in the regions where ROSATOM's organisations are located; it includes a panel discussion featuring leading Russian and industry experts and practical group activities (training sessions and workshops tailored to the needs of the target audience) for employees of the organisations.

This format enables the persons undergoing training (including executives of the organisations, their deputies and heads of departments) to have a face-to-face discussion of central aspects of anti-corruption efforts with the key coordinators of these efforts in the nuclear industry without leaving the region. This training format is highly efficient, including from the economic perspective, as it does not involve travel expenses and helps to significantly reduce the amount of time diverted from core work activities.

Amid COVID-related restrictions, arrangements were made to hold the Anti-Corruption Advance Party events in the form of an online conference.

Preventing corruption in the sphere of procurement

In 2020, ROSATOM enhanced anti-corruption practices in the sphere of procurement of goods, work and services for government or municipal needs and in the sphere of procurement of goods, work and services by certain types of legal entities.

In the reporting year, ROSATOM updated its Uniform Industrial Procurement Standard (the Regulations on Procurement); the relevant amendments abolish a number of discretionary provisions to prevent the Regulations on Procurement from being interpreted too loosely and applied arbitrarily.

The annual procurement programme, the procurement plan and the procurement schedule, as well as amendments thereto, are posted in the integrated procurement information system and are made publicly available. Procurement is conducted electronically through online trading platforms; ROSATOM also maintains an electronic register of contracts. All procurement procedures are subject to approval by asset protection departments.

To finalise technical specifications for products to be standardised, an open professional discussion of these specifications with product manufacturers is held on the industry-wide procurement website.

ROSATOM's Corporate Academy jointly with the Procurement, Logistics and Quality School developed and introduced face-to-face and online anti-corruption training courses for employees of ROSATOM and nuclear organisations involved in the procurement process.

ROSATOM tops corporate transparency and procurement transparency rankings according to anti-corruption NGOs and a number of civil society organisations.

A large share of procurement is conducted on behalf of ROSATOM and its organisations by the authorised bodies of qualified buyers, which prevents the risk of corruption on the part of customers and suppliers. Employees of the authorised bodies file tax returns on an annual basis.

To minimise corruption risks amid the COVID-19 pandemic, in 2020, ROSATOM issued orders establishing special terms and conditions for procurement; this included simplifying and speeding up individual procedures and appointing executives responsible for applying them, with priority given to open competitive tendering.

To make the procurement of simple standardised goods more transparent, ROSATOM adopted a new procurement method: the online store. As part of this approach, procurement has been fully automated and is conducted electronically using the UIS Procurement system and electronic trading platforms. This is an efficient measure for preventing corruption and other wrongdoings. ROSATOM is also taking steps to make non-competitive procurement methods more transparent.

For details, see the section 'Procurement Management'.

Preventing and resolving conflicts of interest

In 2020, ROSATOM took systematic steps to prevent and resolve conflicts of interest. More than 1,100 inspections were conducted to verify compliance with requirements for preventing or resolving conflicts of interest.

The following documents were filed on time and in full:

- The Director General of ROSATOM filed certificates of income, expenses, property and liabilities for the reporting year with the Presidential Anti-Corruption Directorate;
- Deputy and First Deputy Directors General and the Chief Accountant of ROSATOM filed certificates of income, expenses, property and liabilities for the reporting year with the Department of Public Service and Personnel of the Government of the Russian Federation.

The Presidential Anti-Corruption Directorate and the Department of Public Service and Personnel of the Government of the Russian Federation did not raise any issues when accepting the certificates.

Plans for 2021 and for the medium term

The key aim of ROSATOM's anti-corruption efforts in 2021 and in the medium term is to ensure the effective implementation of the National Anti-Corruption Plan for the Period from 2021 through 2024.

1.12.4.2. Personal data protection

ROSATOM processes and protects personal data in accordance with Federal Law No. 152-FZ on Personal Data dated 27 July 2006.

ROSATOM is a data processor and is on the register of data processors compiled by the relevant department of the Federal Service for Supervision of Communications, Information Technology and Mass Media (Roskomnadzor) (registration number 77-18-011535).

ROSATOM has approved local regulations governing the handling of personal data in the Corporation and has adopted a Personal Data Processing Policy.

To raise awareness among ROSATOM's employees with regard to matters related to personal data handling, the Corporation issues local regulations and has developed an introductory training course on personal data handling, as well as guidance handouts. ROSATOM also regularly sends out newsletters on matters related to personal data use and protection.

ROSATOM's Personal Data Processing Policy

Public enquiries and complaints are handled on an ongoing basis.

Key results in 2020

To ensure compliance with the requirements of the Russian Ministry of Labour and Social Protection for the transition to paperless document management, develop a digital environment in ROSATOM and enable quicker access to information required for managerial decision-making, an information system, the Employee's Personal Account, was put into operation.

The system fully complies with Russian data protection laws.

Enhanced unqualified electronic signatures were created for ROSATOM's employees.

Fifty-nine public enquiries and complaints were processed.

Plans for 2021

- To continue to provide secure remote access to ROSATOM's information systems.
- To create biometric authentication subsystems for remote users requiring an additional authentication factor and compliant with personal data protection laws.

1.12.5. Financial and investment management

Financial management

Key results in 2020:

- A total of about RUB 40.5 billion was saved through intra-group financing between 2010 and 2020.
- The Analytical Credit Rating Agency (ACRA) confirmed ROSATOM's credit rating at the highest possible level, ruAAA.
- The 'Big Three' international rating agencies (S&P, Moody's Investors Service and Fitch Ratings) and the national rating agency, Expert RA, confirmed the ratings assigned to JSC Atomenergoprom at the level of Russia's sovereign credit ratings.

Implementation of ROSATOM's financial strategy in 2020

GRI 103-1

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 the Corporation 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, 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 in all of ROSATOM's organisations on a daily basis.

GRI 103-3

Targets set for 2020 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 2020, the Corporation continued to work towards:

- Accumulating spare cash in the accounts of pool leaders[51];
- 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 2020, ROSATOM continued to work towards further centralisation of the treasury function, including the development of a Payment Factory at JSC Atomenergoprom. This project is aimed at further improving the performance of the treasury function in the industry.

A total of about RUB 40.5 billion was saved in the industry through intra-group financing between 2010 and 2020.

Maintaining credit ratings

In the reporting year, the Corporation continued to take measures to maintain credit ratings assigned to JSC Atomenergoprom by the 'Big Three' international rating agencies (S&P, Moody's Investors Service and Fitch Ratings) and the national rating agency, JSC Expert RA.

As at 31 December 2020, JSC Atomenergoprom was rated at the level of Russia's sovereign credit ratings:

- BBB-/A-3 with a stable outlook by S&P;
- BBB with a stable outlook by Fitch Ratings;
- Baa3 with a stable outlook by the Moody's Investors Service international rating agency;
- ruAAA with a stable outlook by the national rating agency, JSC Expert RA.

In addition, in 2020, the Analytical Credit Rating Agency (ACRA) confirmed the credit rating assigned to the Corporation at the highest possible level, AAA(RU), with a stable outlook.

[51] A pool leader is an organisation of the Corporation on whose accounts spare cash is accumulated and subsequently redistributed between ROSATOM's organisations through loan agreements. The organisation performing the functions of a pool leader is appointed under the resolution of ROSATOM's executive bodies.

Raising financing for day-to-day operations and for projects

GRI 201-4

As part of its day-to-day operations, the Corporation successfully maintained the average interest rate on its total debt portfolio denominated in Russian roubles below 7% as at 31 December 2020. Despite the economic crisis caused by the COVID-19 pandemic, throughout 2020, the Corporation maintained sufficient liquidity to ensure that it and its organisations operate normally and fulfil their contractual obligations on time.

GRI 103-2

13 of ROSATOM's organisations (those included in the list of systemically important organisations, as well as their subsidiaries) obtained funding totalling about RUB 15 billion on preferential terms under a subsidy programme launched pursuant to Decree No. 582 of the Government of the Russian Federation dated 24 April 2020.

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).

JSC AtomCapital (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 outside its scope.

ROSATOM continued to search for sources of financing for projects in traditional and new business areas:

- ROSATOM jointly with a major Russian bank developed a project finance arrangement for the construction of a wind farm with installed capacity totalling 340 MW. This is the first project involving the use of sustainable finance mechanisms: the price terms of the credit facility are linked to target indicators for the construction and operation stages. The use of this model is vitally important for the Corporation in the context of its efforts to accomplish long-term sustainable development objectives. The bank will provide RUB 40 billion for a 12-year period;
- Under a letter of intent between the Government of the Russian Federation and ROSATOM aimed at developing a high-technology area, Technology for New Materials and Substances, in Russia and in accordance with the approved road map, a financing model (with the total budget of the road map exceeding RUB 440 billion) and methodological guidelines for ranking individual investment activities (projects) under the road map were developed in 2020. Approaches to financing the road map and the methodological guidelines were adopted by the interdepartmental Executive Committee for the Road Map and the Expert Panel of the Competence Centre tasked with implementing the road map for the Polymer Composite Materials product area; the Expert Panel is chaired by Andrey Klepach;

- As a follow-up to the agreement on export credit support for ROSATOM's projects from the French Export Credit Agency Bpifrance Assurance Export, the Corporation continued to cooperate with the French Ministry for the Economy and Finance in order to develop a fundamentally 'new mechanism' for financing ROSATOM's overseas NPP construction projects. Despite challenges posed by the pandemic, throughout 2020 ROSATOM held talks with the Ministry, which resulted in the development of a prototype of the 'new mechanism'. The fine-tuning of the 'new mechanism' and its adaptation to the special features of ROSATOM's projects will continue in 2021;
- As a follow-up to the resolution on the approval of participation of a banking syndicate in the project to build the multipurpose fast neutron research reactor (MBIR) based on the principles of the Project Finance Factory, independent due diligence of the project's organisational and legal structure was completed, and the terms of the syndicate's participation in the project were approved (with the target amount of funding to be raised from the banks totalling RUB 23.3 billion);
- As part of the implementation of projects to develop the Northern Sea Route, the Government of the Russian Federation approved Decree No. 11 dated 15 January 2020 on budget investment in the construction of the flagship icebreaker, Lider (totalling RUB 127.6 billion); in addition, the interdepartmental working group on the financing of icebreaker construction projects adopted an approach to the financing of Lider-class follow-on nuclear icebreakers under a federal concession model. The development of optimal concession terms will continue in 2021;
- As a follow-up to the resolution of the Government Subcommittee on the Implementation of Investment Projects under the Government Commission on Social and Economic Development of the Far East chaired by Yury Trutnev, Deputy Chairman of the Government of the Russian Federation and Plenipotentiary Representative of the President of the Russian Federation in the Far Eastern Federal District, ROSATOM raised a loan on preferential terms (with the interest rate set at 5% per annum and the loan amount totalling up to RUB 5 billion) from the Far East and Arctic Region Development Fund for the project to build Mine No. 6;
- In order to promote project finance instruments in the industry, accumulate and share the relevant experience, ROSATOM established an industry expert panel on the structuring of project finance;
- ROSATOM continued to promote financial and non-financial support instruments offered by JSC Russian Export Centre in the industry (including holding regular working group meetings attended by representatives of JSC Russian Export Centre and nuclear organisations). More specifically, JSC Russian Export Centre supported the signing of corporate competitiveness improvement programmes (CCIPs) by the Ministry of Industry and Trade of Russia with three of ROSATOM's organisations;
- An interdepartmental working group on cooperation on strategic priorities and promising development areas was formed with the Autonomous Non-Profit Organisation Agency of Technological Development (the competent agency of the International Fund of Technological Development).

Plans for 2021 and for the medium term

- 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 focus on maintaining relations with supporting banks as the most reliable partners providing accessible funds in terms of both volumes and cost.
- To fulfil all obligations (including covenants) to existing lenders and rating agencies.
- To discuss project financing arrangements in order to reduce recourse on the group and minimise the use of ROSATOM'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 discuss potential areas of cooperation in the sphere of digitisation with credit institutions.

GRI 103-3

Investment management

Key results in 2020:

- The investment programme was 73% completed.
- Return on the investment portfolio stood at 14.2%.

ROSATOM's approaches to investment management

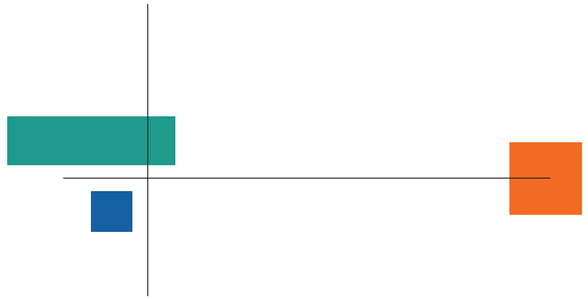
- A distributed system has been built for investment decision-making by the governing bodies of ROSATOM and its organisations; it is aligned with the distribution of competence centres in the industry.
- A phase-gate approach is applied to project implementation, with decisions on key milestones made 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.
- Investment activities are based on an 'open innovation' model, which involves searching for ideas and projects outside the industry (through the Innovation Hub and a venture capital fund).
- 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 2020

In 2020, ROSATOM's investment programme was 73% completed[52]. A decline in performance against the targets of the investment programme (including in the Divisions) compared to previous periods was caused by a postponement of project activities due to restrictions imposed in 2020 in response to the COVID-19 pandemic.

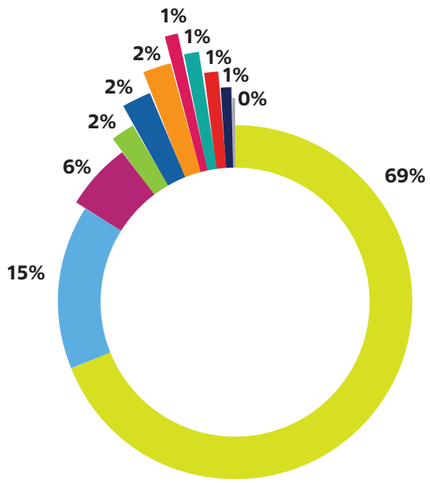
At the same time, overall return on ROSATOM's investment portfolio stood at 14.2%[53], or 1.5 percentage points above the target for 2020.



[52] Including the investment programme of JSC Rosenergoatom.
[53] Calculated for the period from 2020 through 2088.

Breakdown of investments in significant projects[54], %

- Akkuyu NPP
- Proryv Project
- Hanhikivi NPP
- Mine No. 6
- U1
- Khiagda
- Establishment of a pilot and demonstration centre for spent nuclear fuel processing
- FTP New-Generation Nuclear Technologies: MBIR
- Pavlovskoye deposit
- Development and implementation of gas centrifuges
- Manufacture of equipment for NPPs
- Mantra
- Concentration of manufacturing operations of JSC Vladimir Tochmash Production Association and PJSC Kovrov Mechanical Plant
- TVS-K Programme



Operations of the industry venture capital fund

A venture capital fund, Digital Evolution Ventures, founded by JSC Atomenergoprom and LLC Orbita Capital Partners in 2018, continues to work actively towards creating a diversified portfolio of promising projects in various development stages. The fund's investment activities are focused on innovative projects, including those aimed at developing breakthrough technologies, new materials and products that can be used in various sectors of the Russian economy and at maintaining competitiveness on the global market in the long term.

To date, the fund has already invested over RUB 1 billion. Its investment portfolio comprises 12 projects in the following areas: Energy Storage Systems, the Smart City, Digital Medicine, Artificial Intelligence, the Internet of Things and Neurotechnology. A list of about 200 promising projects has been compiled.

The format of the fund (an investment partnership) enables it to generate interest among market investors and attract them to the fund, doubling or even tripling the initial amount of investments.

[54] Apart from NPP construction in Russia.

Measures to improve investment efficiency

As part of preparation for the implementation of the Comprehensive Programme titled 'Development of Technical Capabilities, Technology and Scientific Research in the Use of Nuclear Energy in the Russian Federation until 2024' (the Programme), in the reporting year, ROSATOM formulated the key principles and developed a model for managing the Programme in the Corporation and its organisations.

The Corporation updated the Comprehensive Programme of Measures to Improve the Maturity of Project Management in ROSATOM and Its Organisations.

Employees in the industry continued to develop their competences at the Project Management School. 428 people underwent assessment and subsequent training in 2020.

Challenges in the reporting period and mitigation measures

Challenges	Mitigation measures
Restrictions on face-to-face contact due to the global pandemic	Investment processes have been adapted to remote work: processes have been set up for remote review, alignment and approval/sign-off of decisions on individual projects and the portfolio as a whole.
Slow speed of review of initiatives for the purposes of investment decision-making	An industry-wide competence centre in the sphere of project management has been established; the centre provides resources for project review and implementation. Processes for preparing project data sheets and arranging investment and financial project reviews have been optimised.
Lack of a single mechanism for accumulating and sharing project experience	A methodology for documenting project experience has been adopted. A statement of work for maintaining a knowledge base has been drafted and has been included in the action plan for improving the corporate IT system for portfolio management.
In-house development is too slow to meet the business need for market promotion	ROSATOM has launched systematic efforts and has started to form business partnerships with development institutions, industrial parks, incubators, small and medium-sized businesses in order to search for and select technological solutions to meet the industry needs for the development of promising business areas: organisations in the industry have placed more than 150 orders for technologies with 80 organisations; about 50 proposals have been received.

Plans for 2021 and for the medium

- To continue to develop project methodology on a systematic basis; to expand the scope of resources provided to project initiators by the specialised industry-wide centre.
- To implement the Comprehensive Long-Term Programme of Measures to Improve the Maturity of Project Management in the Russian Nuclear Industry.
- To expand the practical application of road maps in portfolio investment management.
- To adjust project execution plans in order to minimise the lag caused by restrictions imposed in 2020 in response to the pandemic.
- To increase the level of digitisation of projects and investment activities.

1.12.6. Procurement management

Key results in 2020:

- Overall savings from competitive procurement procedures (using ROSATOM's own funds and federal budget funds) totalled RUB 30.87 billion.
- The share of electronic procurement (excluding procurement for foreign projects) totalled 99%.
- 40,036 contracts worth a total of RUB 165.2 billion were concluded with small and medium-sized enterprises, with the value of contracts concluded following tendering exclusively among small and medium-sized enterprises totalling RUB 61.7 billion.
- Pursuant to the order of the Prime Minister of Russia to disclose information on counterparties, ROSATOM disclosed information on 21,757 counterparties (100%).

ROSATOM ranks high in professional procurement rankings every year. More specifically, in 2020:

- The Corporation topped the National Transparency Ranking in the Guaranteed Transparency category;
- JSC Russian Small and Medium Business Corporation presented ROSATOM with an award for the biggest savings on procurement from SMEs;
- ROSATOM's Director for Procurement, Logistics and Quality Management was included in the top 5 in the Ranking of the Best Chief Procurement Officers by the RAEX rating agency (RAEX Analytics) and the Procurement Officers' Association.

Official procurement website

GRI 103-2

The Uniform Industrial Procurement Standard (UIPS) (the Regulations on Procurement) is the main document that regulates the procurement activities of ROSATOM and organisations in the industry.

Uniform Industrial Procurement Standard (Regulations on Procurement) of ROSATOM

Governing and supervisory bodies in the sphere of procurement include:

- The Central Procurement Commission;
- Permanent procurement commissions of the Divisions;
- The contract management function[55];
- The Central Arbitration Committee of ROSATOM and arbitration committees of the Divisions;
- The Chief Controller.

Uniform Industrial Procurement Standard (Regulations on Procurement)

Under the resolutions of ROSATOM's Supervisory Board, the Corporation updated the Uniform Industrial Procurement Standard (the Regulations on Procurement). More specifically, the following amendments were made:

- Thresholds were raised for various procurement methods (to RUB 50 million for requests for proposals; to RUB 20 million for requests for quotations, with an option of rebidding for requests for quotations with prices starting from RUB 0; to RUB 2 million for small-scale procurement; the scope of special powers of the customer's executives was expanded to RUB 50 million);
- Two new reasons were added for concluding a supplementary agreement without obtaining approval from the permitting authority: when a revenue contract with an external or internal customer is revised to align the terms and conditions of a subcontract; and when changes are made to design documentation for the construction of nuclear facilities in Russia and abroad or for renovation or modernisation of nuclear facilities in Russia, provided that such changes have been properly documented (when such changes have an impact on the cost of nuclear facilities (the relevant limits));
- The duration of investigation of complaints was reduced to five working days; furthermore, if a complaint is received after the deadline for the submission of bids has expired, procurement activities are not suspended, except for the conclusion of the contract;
- Limits were imposed on the number of requests that may be submitted by authorised bidders participating in competitive tendering (no more than three requests) and deadlines were set for the submission of requests, in line with the provisions of Federal Law No. 44-FZ of 5 April 2013;
- The simplified procurement procedure was revised to align it as closely as possible with competitive procurement procedures: a procurement notice is posted on official websites at the same time when personal requests are sent out.

In 2020, ROSATOM continued to roll out a new procurement method: the online store. As the threshold for the purchase value has been raised to RUB 3 million (including VAT), the number of procurement procedures involving the use of the new method has increased.

[55] For procurement using federal budget funds in accordance with Federal Law No. 44-FZ on the Contract System of the Federal and Municipal Procurement of Goods, Work and Services dated 5 April 2013.

The Corporation recorded a significant reduction in procurement lead time (more than five-fold). Customers using the online store gave favourable reviews, highlighting the automation of the procurement process (from the calculation of the initial maximum price to the generation of records and the drafting of the contract), a reduction in the amount of time and effort spent compared to small-scale procurement, as well as the transparency of the procurement process.

Implementation of the annual procurement programme[56]

In 2020, the demand of nuclear organisations for products with the required price and quality was met in full.

ROSATOM and its organisations placed 37,123 orders worth a total of RUB 903.3 billion under a competitive tendering procedure. The Corporation achieved savings totalling RUB 29.7 billion (6.6% of the value of completed purchases); overall, over the past 11 years, savings totalled RUB 310.7 billion.

GRI 201-4

300 orders worth a total of RUB 47.75 billion were placed by ROSATOM under a competitive tendering procedure using federal budget funds. Savings on procurement activities totalled RUB 1.17 billion (2.5% of the value of completed purchases)[57].

As a result of the implementation of the annual procurement programme, contracts were concluded with 22,223 counterparties. The share of electronic procurement (excluding procurement for foreign projects) totalled 99%.

Value of competitive purchases and achieved savings[58], RUB billion

Indicator	2018	2019	2020
Total value of orders placed under an open competitive tendering procedure	683.48	822.9	951.05
Using ROSATOM's own funds	663.16	701.9	903.3
Using federal budget funds	20.32	121.0	47.75
Total savings, including:	28.86 (6.2%)	36.45 (6.1%)	30.87 (6.2%)
Savings from competitive procurement procedures using ROSATOM's own funds	28.5 (6.4%)	36.1 (7.6%)	29.7 (6.6%)
Savings from competitive procurement procedures using federal budget funds	0.36 (1.9%)	0.35 (0.29%)	1.17 (2.5%)

[56] The annual procurement programme is publicly available at: http://zakupki.rosatom.ru/Web.aspx?node=gpzz.

[57] Taking into account open competitive procurement procedures conducted and orders placed using the funds allocated through the Russian Ministry of Industry and Trade under the relevant legislation.

[58] Savings from competitive purchases 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.

Expansion of access to procurement procedures for small and medium-sized enterprises (SMEs)

In 2020, nuclear organisations concluded 40,036 contracts with SMEs worth a total of RUB 165.2 billion, with the value of contracts concluded following tendering exclusively among SMEs totalling RUB 61.7 billion. The target share of procurement from SMEs was achieved.

In the reporting year, ROSATOM improved the UIS Procurement system. This included its integration with the integrated information system and selected electronic trading platforms, which made it possible to halve the amount of time and effort spent by procurement managers of ROSATOM and its organisations using the system and enabled additional monitoring in order to minimise the number of errors in the course of procurement from SMEs.

In 2020, JSC Russian Small and Medium Business Corporation in cooperation with representatives of ROSATOM and its organisations held 19 workshops for SMEs in 18 regions of Russia. They were attended by representatives of 1,410 SMEs. Overall, between 2016 and 2020, a total of 62 workshops were held, which were attended by 5,458 representatives of SMEs.

GRI 103-2
GRI 103-3

Data reliability audits, including supplier assessment

In 2020, ROSATOM continued to improve the procedure for auditing the reliability of data provided by bidders. This is a tool for confirming that a supplier/contractor/manufacturer and entities that they engage are able to carry out a contract in good faith.

In December 2020, the audit procedure was revised: data reliability audits were combined with an initial assessment of the level of maturity of a supplier's production system[59].

For details on the ROSATOM Production System, see the section 'ROSATOM Production System'.

In 2019, a Supplier Code of Conduct and standardised recommendations for its implementation were developed in the Sales and Trading Division (JSC TENEX); in 2020, a pilot sustainability audit of suppliers in the industry was conducted at JSC SCP (an organisation of TVEL). The requirements of the Code are being incorporated into standard contracts, to be followed by regular supplier audits. The Code is available at:

https://www.tenex.ru/#sustainability
https://www.tenex.ru/en/#sustainability

In addition, in 2020, ROSATOM introduced the option of a remote audit involving the use of information and communication technology. This approach enabled it to resume full-scale data reliability audits without potential restrictions related to the COVID-19 pandemic.

In the reporting year, 128 audits were conducted among manufacturers, contractors and service companies participating in procurement procedures:

- 105 manufacturers/suppliers successfully passed the audit;
- 6 potential suppliers of products failed the audit;
- 17 organisations refused to undergo an audit.

Analytics on contract performance show that the audit procedure helps to increase the share of contracts performed on schedule.

In the reporting year, ROSATOM continued to develop the category management system for procurement in the nuclear industry. ROSATOM's organisations acting as customers were allowed to set additional requirements for suppliers/contractors, which enables them to select better counterparties. In addition, the scope of powers of the Committee on Procurement Strategies was expanded, enabling it to lay down requirements/criteria for preventing risks related to the imposition of restrictions.

In addition, in 2020, the Corporation developed and approved a methodology for developing the production system of suppliers working with ROSATOM's organisations. The use of this methodology will enable customers to enhance the monitoring of performance of supply contracts.

The Regulations on Procurement establish a number of general and special requirements for bidders, which help to minimise the risk of non-performance or improper performance of a contract and to standardise the requirements set out in procurement documents; they also enable automated monitoring and analysis of information on procurement activities in order to minimise the risk that access to procurement procedures may be restricted without a valid reason.

More specifically, the Regulations impose the following key requirements, which are grouped by type of products purchased by ROSATOM:

- Civil legal capacity (being registered in the Russian Federation or incorporated in the country of operation);
- Financial stability (providing a balance sheet and a methodology for assessing financial solvency);
- Human resources (confirming that the bidder has the required personnel having the necessary qualifications);
- Experience (confirmed experience of manufacturing and supplying comparable equipment, performing similar work or providing similar services during the stated period);

[59] Order No. 1/1027-P of ROSATOM dated 11 September 2020 on Amending the Uniform Industry-Wide Methodological Guidelines on Data Reliability Audit; Instruction No. 1-1/1012-R of ROSATOM dated 29 December 2018 on Incorporating the Methods, Tools and Standards of the ROSATOM Production System into the Production Operations of Suppliers.

- Material resources and technical capabilities (sufficient material resources and technical capabilities: machinery and equipment, special devices and tools);
- Licences and permits (permits required by applicable Russian laws for Russian enterprises; permits required by the laws of the country where products supplied under the contract will be used for foreign enterprises);
- Certification and data reliability audit (the contractor organisation must confirm its ability to manufacture equipment ordered by the customer, which the customer verifies by conducting an on-site or remote audit);
- The manufacturer's quality assurance programme (absence of instances where approval of the quality assurance programme of the manufacturer specified in the bid as the manufacturer of equipment on offer has been revoked);
- Absence of failure to address the root causes of irregularities.

Requirements are also set for subcontractors/joint contractors and manufacturers engaged by the bidder; this is done in order to verify the qualifications of all contractors throughout the supply chain.

Requirements for subcontractors/joint contractors serve as a tool used by the customer to verify as early as at the tendering stage that the bidder is capable of performing the work or providing the services that they are offering, namely that contractors to be engaged have been selected and have the required legal capacity (they have the relevant licences, authorisations and permits and are members of self-regulatory organisations) and the necessary qualifications and that the bidder's offer is based on specific offers from subcontractors/joint contractors. This helps to minimise the risk of non-performance or improper performance of a contract.

In the reporting year, ROSATOM reviewed the experience of application of the selection criterion stipulating that measures to address the root causes of irregularities detected during the performance of contracts concluded earlier must be implemented on time. The scope of application of this criterion was expanded: it is currently applied by more than 200 organisations in the industry in the course of procurement of safety class 1, 2 and 3 equipment, as well as safety class 4 equipment subject to compliance assessment in the form of acceptance in accordance with the quality plan; the criterion is also applied in the course of procurement of materials and equipment worth a total of more than RUB 100 million, as well as construction and installation services worth more than RUB 100 million.

The design of an integrated industry-wide contractor management system was completed; the development of the first release of the system was initiated. The first and second releases are scheduled for implementation in 2021.

Unified Industry-Wide Quality Management System

ROSATOM's Unified Industry-Wide Quality Management System, UIS Quality, is designed for automating irregularity management and inspection management processes in order to reduce the lead time and improve product quality. The use of the system will enable a transition to electronic document management involving the use of electronic signatures.

In 2020, the first three stages of the project to develop the UIS Quality system were completed.

To date, more than 12,038 users from 663 organisations have been connected to the system, and more than 31,201 irregularities have been recorded.

Given restrictions imposed to prevent the spread of COVID-19, a mechanism for centralised monitoring and support of important contracts was introduced in the industry. In addition, rules and principles were established for managing contract performance amid the restrictions.

To streamline procurement planning and preparation processes, a number of simplifications were made; these included:

- The fullest possible transition to electronic document management (documents drafted while preparing for and conducting procurement procedures are approved and signed in the integrated industry-wide document management system and are considered to be equivalent to documents signed in hard copy);
- To provide assistance to organisations in the industry during the outbreak of the new coronavirus disease, special terms and conditions were established for procurement (Order No. 1/357-P dated 8 April 2020). For instance, on non-working days, the organisations were allowed to refrain from setting/applying the selection criteria requiring a data reliability audit to be conducted and the reliability of information provided in the bid concerning the availability of human and material resources and technical capabilities to be verified as part of the data reliability audit;
- A remote meeting format was introduced: the Procurement Commission held its meetings using audio/video conferencing. The requirement that complaints related to procurement should also be handled remotely was taken into account.

UIS Procurement

Technical specifications for the UIS Procurement system were developed and agreed with ROSATOM's Divisions. In 2020, the development of a digital solution named 'Brief' was initiated in accordance with the specifications. This solution is aimed at reducing procurement lead time by creating digital profiles of suppliers containing information on their track record, which enables a comprehensive assessment and continuous updates.

This solution is designed to improve operational efficiency of ROSATOM's organisations and minimise the risk that the products supplied to them may be of poor quality. In addition, the proposed solution will help to enhance the digital culture in the industry.

Qualified Buyer Service

In 2020, ROSATOM continued to develop the Qualified Buyer Service (QBS). The QBS performs the full range of competitive and non-competitive procurement activities; as a result, procurement lead time has more than halved. In 2020, the average level of satisfaction exceeded 98%, with the QBS given a 'very high' rating.

The Qualified Buyer Service also demonstrated its effectiveness during the pandemic: in the reporting year, all procurement procedures were completed on time and met the needs of the customers. In addition, the QBS jointly with the HR Department and the Department for Liaison with Regions successfully organised the procurement of equipment and supplies for healthcare institutions in CATFs.

The QBS was set an urgent industry-wide task, and in April and May 2020, critical special medical equipment and personal protective equipment was purchased within the shortest possible time frame (with lead time averaging 11 days) to assist healthcare institutions in CATFs in the fight against COVID-19.

The QBS introduces and improves new procurement tools, concludes long-term contracts and develops category strategies. Key milestones are stipulated in each contract in order to ensure that goods and services are supplied and work is performed on time and to the required standard and to monitor contract performance.

Given the high level of satisfaction with the performance of the QBS among procurement initiators and the fact that it successfully accomplishes its tasks, ROSATOM initiated the roll-out of the service across the industry. Similar procurement functions are being established in nuclear organisations.

In order to streamline communication and cooperation between competent procurement authorities, a new competent authority was formed as a result of a transformation of competent authorities of JSC Atomkomplekt and JSC Consolidated NPP Equipment Procurement Directorate. The new competent authority established in JSC Atomkomplekt performs the functions of a 'qualified buyer' within the scope stipulated by Order No. 1/283-P of ROSATOM dated 21 March 2019. More specifically, the Uniform Industry-Wide Procedure for Planning and Preparing for Procurement Procedures and Reporting on Procurement Activities Involving the Use of ROSATOM's Own Funds for the Needs of ROSATOM and Its Organisations was updated; the fee schedule and the list of services provided by the competent authority were revised, and a standard agency agreement was drafted for the new competent authority (Order No. 1/283-P dated 21 March 2019, as amended by Order No. 1/325-P dated 26 March 2020).

For information on ROSATOM's law drafting activities, see also the section 'Performance of Government Functions'.

Improvement of foreign procurement processes

In the reporting year, amendments were made to the UIPS, making it possible to include a clause in procurement documents stipulating the official language to be used in the procurement process, with bidders required to submit their bids in the relevant language. This simplifies the procedure for the participation of foreign suppliers in procurement procedures of nuclear organisations, as they are no longer required to provide a Russian translation of bidding documents.

To make ROSATOM's procurement system more transparent, supplements to the UIPS describing the procedure and the special features of procurement processes in nuclear organisations were translated into English. In addition, translations of standard forms of procurement documents were prepared for nuclear organisations.

To promote competition and attract foreign suppliers, ROSATOM introduced the option of confirming a bid through a cash payment instead of submitting the bid in hard copy if the bidder does not have an electronic signature.

In order to manage, implement and monitor projects to build large NPPs and Nuclear Research and Technology Centres (NRTCs) abroad more efficiently and reduce the risk of project cost and schedule overruns, in 2020, ROSATOM started to use contract strategies for the El Dabaa and Paks II NPP projects for the first time.

In 2020, English translations of lists of additional requirements compiled earlier for five overseas projects were made publicly available on the procurement website of the nuclear industry.

In addition, in the reporting year, ROSATOM held open training sessions (webinars) for foreign suppliers, including those participating or intending to participate in NPP construction projects in Hungary, Turkey and Egypt.

Training and development in the sphere of procurement

In 2020, the Procurement, Logistics and Quality School conducted a wide range of activities.

All face-to-face training was converted to the online format, with training quality maintained at the required level. A new framework was developed for the Procurement, Logistics and Quality School, whereby the required individual training programme is selected based on the results of entrance tests; in addition, training on topics of interest at the Procurement, Logistics and Quality School is available to all comers without entrance testing. An additional development track was created to support comprehensive employee development by providing training in the form of webinars, podcasts and interviews.

About 1,000 people completed training programmes of the Procurement, Logistics and Quality School in 2020.

In the reporting year, ROSATOM's Technical Academy provided specialists with training in irregularity management techniques and the use of modules of the UIS Quality system. A total of 2,093 specialists completed continuing professional education courses on these topics and received the relevant certificates. The number of people who underwent training increased by 71% compared to 2019 (1,223 people). In addition, specialists in the industry were provided with online training using the RECORD system. A total of 3,240 people completed online training programmes in 2020.

To provide assistance in the sphere of procurement for nuclear organisations and to streamline internal communication and cooperation in the course of procurement, ROSATOM took the following steps:

- A document titled 'The Procurement Officer's Genome' was published; it outlines the key competences, principles, goals, objectives, rules of engagement with customers/suppliers, priorities, etc. for employees engaged in procurement activities;
- Patterns of communication and cooperation with new organisations and new executives in the industry were established as part of the procurement system adaptation;
- The Procurement Assistance Portal information system, which enables employees of nuclear organisations to continuously gather information on existing and emerging issues without sending official letters to ROSATOM, was rolled out in all nuclear organisations, including ROSATOM's overseas organisations. In addition, all organisations in the industry were provided access to the Q&A section of the Procurement Assistance Portal as a starting point for the development of an integrated procurement knowledge base on the website;
- As part of the development of the Procurement Assistance Portal, a new section titled 'Quality Assistance Portal' was created to provide methodological guidance on matters related to the quality of products purchased by ROSATOM;
- An integrated industry-wide support system was created to handle complaints filed with antitrust authorities or courts when appeals are lodged against requirements set out in procurement documents in accordance with the UIPS.

In addition, in 2020, representatives of ROSATOM and nuclear organisations regularly participated in conferences and other external events focused on the development of the procurement system:

July	ROSATOM's Head of Quality Leonid Letchford took part in the Webinar on COVID-19 and Its Impact on the Nuclear Power Supply Chain run by the International Atomic Energy Agency (IAEA), where he made a presentation titled 'COVID-19. Measures and Actions'. The webinar was attended by 155 people from 52 countries worldwide.
August	Representatives of the Department for Methodology and Procurement Organisation took part in the 6th International Military and Technical Forum ARMY 2020. The Director of the Department for Methodology and Procurement Organisation Inna Melchenko made a presentation titled 'Diversification of the Military-Industrial Complex as Part of National Projects. ROSATOM's Experience'. The Forum was attended by about 1.5 million people from 92 foreign countries.
November	ROSATOM held an industry-wide session on procurement in the nuclear industry. ROSATOM's Director General Alexey Likhachev delivered an opening address to the participants of the event. The session was focused on matters related to improving procurement practices. More than 300 attendees took part in an online broadcast arranged by ROSATOM's Corporate Academy. A new framework governing the work of ROSATOM's Council for Improving Transparency was approved during the session, and new members were elected to the Council.
December	Representatives of ROSATOM's Quality Management Department shared the experience of the nuclear industry in preventing the promotion of counterfeit and fake products with the participants of the Anti-Counterfeiting 2020 Forum titled 'Combating Counterfeiting as a Prerequisite for Sustainable Economic Development of the EAEU Member States'.

Plans for 2021 and for the medium term

The key objectives for 2021 and for the medium term in the sphere of procurement, logistics and quality management are as follows:

- To continue to develop contract strategies for ROSATOM's overseas nuclear construction projects based on the methodology developed in 2019;
- To pilot a risk forecasting system covering the entire process chain, from the identification of needs to supplies, using data from both internal and third-party AI-powered systems;
- To expand the design of the industry-wide contract performance management system;
- To continue the modernisation of the UIS Procurement system and its migration to domestically developed software;
- To develop a price audit methodology and revise the procedure for the calculation of the initial maximum price to incorporate price audits;
- To launch the functions of the first and second releases of the system for creating a shared information space for customers and suppliers; 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 continue to implement the Brief digital solution;
- To continue to adjust standardised technical specification forms and develop new technical specifications;
- To expand the scope of the methodology for managing risks posed by potential COVID-related restrictions;
- To optimise the methodological framework of orders, including its automation to enable quick search (at different stages of the logistics business process);

- To update uniform procedures for tendering conducted exclusively among SMEs and the relevant document forms to incorporate new requirements of Russian Federal Law No. 223-FZ of 18 July 2011 on the Procurement of Goods, Work and Services by Certain Types of Legal Entities;
- To improve the Information One-Stop Shop on the Strana ROSATOM portal in order to centralise internal corporate resources and develop a uniform approach to information for ROSATOM's organisations;
- To establish a framework for developing the Qualified Buyer function in nuclear organisations in order to free procurement initiators from functions that are not relevant to their role;
- To enable efficient work of ROSATOM's Council for Improving Transparency;
- To establish a framework for the Procurement for Everyone Procurement Officers' Club;
- To update online training courses developed jointly with ROSATOM's Technical Academy: Irregularity Management in the UIS Quality Systems for Key Users and Irregularity Management in the UIS Quality Systems for Local Administrators, which form part of the Inspection Management module, due to a change in the range of functions;
- To release a set of new face-to-face and online training programmes of the Procurement, Logistics and Quality School.

1.12.7. Strategic communications

1.12.7.1. Stakeholder engagement

Key results in 2020:

- 75.2% of the population in Russia support the use of nuclear energy.
- 20 Nuclear Energy Information Centres in Russia and 2 Centres abroad.
- Viewership of channels broadcasting the Strana ROSATOM TV programme in various regions of Russia totals 7.3 million people.
- ROSATOM took part in more than 40 forums and conferences abroad and organised 16 displays at overseas exhibitions.

GRI 102-42
GRI 102-43

Approaches to stakeholder engagement

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.

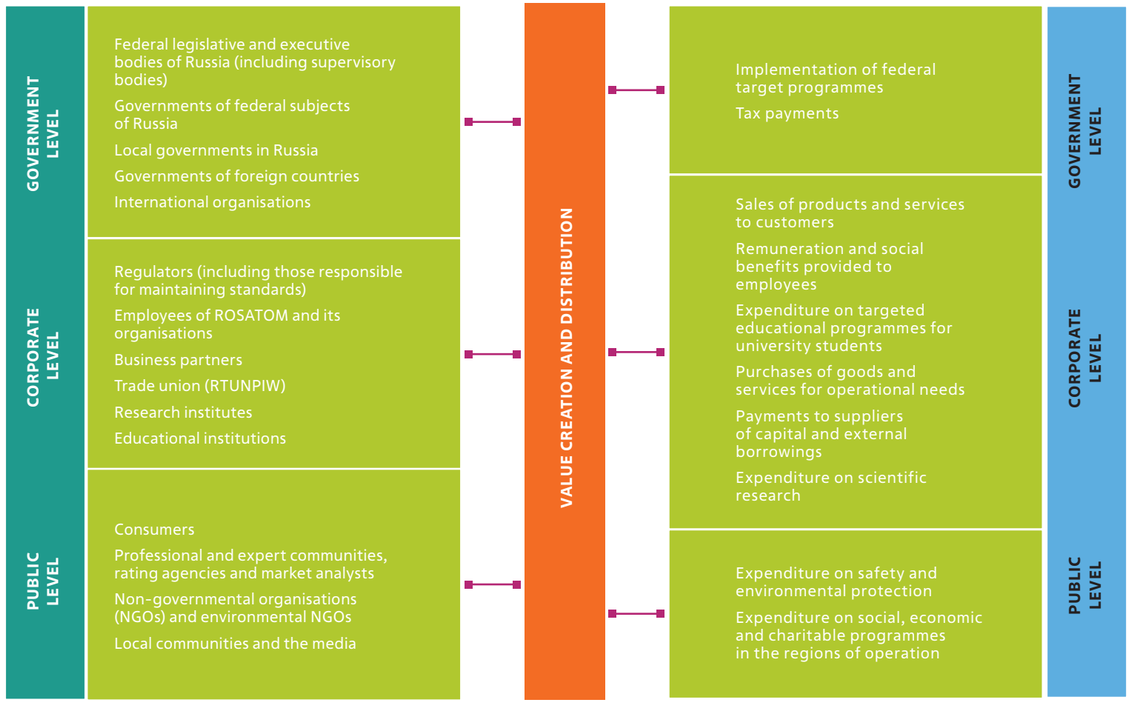
The Corporation promotes systematic and constructive stakeholder engagement across all areas of its business and conducts communication and information campaigns for the general public.

Fundamental principles underlying stakeholder engagement 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;
- Fulfillment of obligations.

GRI 102-40
GRI 102-44

Stakeholder map



Stakeholder interests

1	Ensuring non-proliferation of nuclear materials and technologies
2	Nuclear and environmental safety
3	Technological modernisation in the nuclear industry
4	Efficient use of budget funds
5	Economic efficiency of ROSATOM's organisations
6	Compliance with international and Russian legislation
7	Fair competition and responsible behaviour in the market
8	Competitiveness in global markets
9	Improvement of product and service quality
10	Transparency of ROSATOM's operations, including transparency of procurement activities
11	Dealing with the legacy of past business operations and defence efforts in the industry
12	Reliable electricity supply
13	Adoption of international governance norms and standards
14	Adequate remuneration to employees; support for professional development of employees; safe working conditions
15	Improvement of the quality of life in the regions of operation
16	Talent development in ROSATOM and its organisations

Types of stakeholder engagement

A	Cooperation with specialised international organisations, participation in international programmes and projects
B	Participation in law-drafting activities
C	Public consultations and public environmental impact assessments of NPP power unit construction projects
D	Employee training and development programmes
E	Social programmes and projects
F	Participation in the development of the regions of operation
G	Opinion polls, customer satisfaction surveys
H	Charity work
I	Hotlines
J	Programmes of cooperation with specialised universities
K	Dialogues, presentations, forums, conferences
L	Open and competitive procurement procedures
M	Programmes of cooperation with other companies
N	Programmes of cooperation with government regulators (supervisory bodies) and law enforcement agencies
O	Public governing and supervisory bodies
P	Information and communication
Q	Public reports

Stakeholder interests and types of stakeholder engagement

Government bodies of the Russian Federation	1–16, B, C, E, F, G, P, Q
Government regulators (supervisory bodies)	1, 2, 4, 6, 7, 10, B, C, N, P, Q
Regional governments	2, 6, 10, 15, B, C, E, F, G, P, Q
Local governments in the regions of operation	2, 11, 15, C, E, F, G, K, P, Q
Government bodies of foreign countries	1, 2, 6, 7, 10-13, 16, A, D, J, K, P, Q
International organisations, including those in the nuclear sector	1, 2, 6, 7, 10-13, 16, A, D, J, K, P, Q
Organisations forming part of ROSATOM	3, 5, 6, 13, 16, D, K, P, Q
Manufacturers and suppliers of equipment and services	5, 7, 10, K, I, P, Q
Consumers of technologies, products and services	3, 5, 6, 7, 8, 9, 12, K, H, P, Q
Business partners	5, 6, 7, 8, 9, 12, K, M, P, Q
Professional associations	6, 14, 16, F, D, K, O, P, Q
Non-governmental organisations, including environmental NGOs	2, 10, 11, 15, C, E, G, K, O, P, Q
Employees of the Corporation and its organisations, as well as organisations representing their interests	6, 10, 14, 16, F, D, I, E, O, P, Q
Local communities in the regions of operation	11, 15, C, E, F, G, H, K, O, P, Q
Educational institutions	3, 14, 16, D, J, P, Q
Financial institutions	3, 5, 8, 10, K, P, Q
Rating agencies, market analysts, experts	5, 10, 13, K, P, Q
Citizens of the Russian Federation	1, 2, 4, 6, 10, 11, 12, 15, H, O, P, Q
Research institutes	3, 11, K, O, P, Q

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.

In 2020, the NEIC network comprised 20 centres in Russia, including the Atomarium in Sochi, as well as centres in Belarus (Minsk) and Kazakhstan (Nur-Sultan). In 2020, 110,000 people visited the centres. Due to the pandemic, the NEIC network utilised the online format. Recordings of popular science talk shows and KSTATI online science festivals gathered more than 1.5 million views in 2020.

City-wide events took place in a number of centres when coronavirus restrictions were partially lifted. The Trolleybus of Knowledge was launched in Vladimir and Smolensk, while in Nizhny Novgorod, the MetroBrain project was launched, and a technology and art exhibition entitled 'Engineering as Art' was held to mark the 75th anniversary of the nuclear industry. The Surf Picnic town festival was held in the town of Sosnovy Bor (Leningrad Region). A festival of icebreakers was held in Saint Petersburg. Employees of the NEIC in Kursk held an outdoor town festival, AtomDvizh, while the NEICs in Zheleznogorsk (Krasnoyarsk Territory) and Rostov-on-Don organised the Science Lawn festival. The centres in Kirov, Saint Petersburg, Smolensk and Rostov-on-Don took part in the Brighter Together energy conservation festival. In addition, NEIC employees conducted the practical section of the educational programme forming part of the Vostok Youth Forum and provided communication and organisational support at the Forsazh forum for young power engineers.

As part of a special project, in the reporting year, the NEIC network organised a series of meetings at the Flacon Design Factory (Moscow) titled 'Atomic Fridays'. These events provided local residents and visitors with an opportunity to learn about nuclear technologies, hear the sounds of nuclear power plants and construction sites harmonised with electronic music, take part in tours titled 'Atomic Moscow through the Eyes of an Engineer', which were focused on buildings associated with science and the nuclear industry, and talk to famous scientists. In addition, in 2020, the NEICs held six KSTATI online science festivals.

During the pandemic, 14 Nuclear Energy Information Centres underwent renovation, which involved comprehensive repairs of the centres' facilities and replacement of equipment. This will help to modernise communication with visitors to the centres and transform the NEIC network into an integrated inter-regional digital platform that brings together people who are passionate about science and technology and have a positive attitude toward the nuclear industry.

Highlight of the year: the 75th anniversary of the nuclear industry

2020 marked the 75th anniversary of the Russian nuclear industry. The programme of anniversary celebrations under the motto '75 Years: Ahead of the Times' was launched on 20 August 2020 and continued until the end of the reporting year.

During this time, more than 200 events of different formats and scale were held, both offline and online. All events were held taking into account the epidemiological situation in the country and globally: after restrictions were imposed, some of the events on the anniversary programme were held online or in a mixed format. The programme included a wide variety of awareness-raising, educational and cultural projects, ranging from photo exhibitions at specialised universities and articles on scientific portals to contests on social media and animated series.

Media projects. Special projects, including tests, quizzes and in-depth feature articles about the present, past and future of the nuclear industry, were published on various media platforms. This included the publication of detailed guides to various areas of atomic science on the PostNauka portal, Andrey Sakharov's Rules of Life in the Arzamas online magazine, a special project by RBC titled 'People and Atoms', a photo project by TASS to mark the 75th anniversary of the industry, broadcasts on the Echo of Moscow and Silver Rain radio stations, and other projects.

Cultural events. The anniversary campaign kicked off with a large-scale online event, ROSATOM's House Concert, hosted by atom75.ru and featuring performances by the Turetsky Choir and the Soprano Art Group. On 20 August, a monument to Efim Slavsky, the Minister of Medium Machine-Building, was unveiled in front of ROSATOM's headquarters in Moscow; memorial plaques to famous Soviet nuclear scientists were unveiled in Moscow and the regions; medals in honour of the 75th anniversary of the Russian nuclear industry were awarded; and awards were presented to veterans and honoured employees.

The Sovremennik Theatre, the Helikon Opera, the Moscow Drama Theatre of Armen Dzhigarkhanyan and the School of Modern Drama successfully toured in nuclear towns and cities. The audience was shown plays about the atomic project, as well as programmes, documentaries and stories about ROSATOM's history, its achievements and promising technologies.

In November, a miniseries titled The Bomb was premiered on the Russia 1 channel and became one of the highlights of the TV season. The series was directed by Igor Kopylov and focused on the scientists who worked on the Soviet atomic project.

In 2020, ROSATOM became the general sponsor of the Tovstonogov Bolshoi Drama Theatre (BDT) and provided support for BDT's new digital projects, including a new platform at https://bdtdigital.ru.

Campaigns in the industry. As part of a project titled ‘The Story of a Photo’, ROSATOM’s employees shared photos of people involved in the development of the Russian nuclear industry on the portal at https://atomphoto.ru/media/. Participants of the ATOM IS HERE contest made videos about nuclear technology in everyday life: about 5,000 videos were submitted, and 850 winners went on tours in nuclear towns and cities.

Sporting events. All of ROSATOM’s employees were offered an opportunity to take part in an online running marathon marking the anniversary. In addition, a nation-wide intellectual running race, Running Book 2020, was held to celebrate the 75th anniversary of the nuclear industry.

Events in Moscow and regions. On 15 September, the first-ever ‘atomic train’ was launched on the Circle Line of the Moscow Metro, showcasing the most important milestones in the history of the nuclear industry and its key achievements. Thematic photo exhibitions were organised on boulevards in the centre of Moscow, in the core universities, at ROSATOM’s headquarters and in a number of nuclear organisations.

On ROSATOM’s initiative, the Bank of Russia issued a commemorative silver coin to mark the 75th anniversary of the Russian nuclear industry. The Federal Communications Agency issued a commemorative stamp depicting representatives of various professions in the nuclear industry against the backdrop of the industry’s achievements: RDS-1, the world’s first nuclear power plant in Obninsk and the Lenin nuclear icebreaker.

On 28 September, the Roll Call of Nuclear Towns and Cities was held to mark the Nuclear Industry Worker’s Day; this event entered the Russian Book of Records. This was a teleconference on a federal channel linking 25 nuclear towns and cities and the central studio in Moscow. On 28 September, the Icebreaker of Knowledge contest for year 7 to 10 school students and first-year students of vocational colleges was launched with support from ROSATOM, with almost 30,000 teenagers competing in it; the finalists will go on an expedition to the North Pole on a nuclear icebreaker in 2021.

Educational and awareness-raising projects. Entertaining projects for schoolchildren and students showcasing nuclear technology included the nation-wide Atomic Lesson, which was held in many schools across the country. Animated films for children and young people were released, including a special episode of The Fixies; a series about a blogger, #Vasyaatomnydvizh; the Nuclear Pass animated series. A special project titled ‘Atomic Moscow through the Eyes of an Engineer’ included walking and virtual tours of places of interest to nuclear engineers in Moscow, a series of public lectures put on by ROSATOM and thematic AtomTalks for students and young people.

Popular science projects. ROSATOM became the general sponsor of the year of the NAUKA 0+ National Science Festival, which is aimed at promoting new knowledge and making science as a profession more prestigious. ROSATOM also became the partner of NeForum of Bloggers, an annual conference on blogging and the Internet culture held on 17 October 2020. In addition, the scientific session of the General Meeting of the Russian Academy of Sciences in 2020 was focused on the 75th anniversary of the nuclear industry. More than 1,000 people participated in the event in person and online.

Highlights of the programme marking the 75th anniversary of the nuclear industry included the NEXT 75 International Youth Conference held on 16 December 2020. It involved a dialogue between famous scientists and the young generation from five continents focused on global problems and challenges facing humanity and the future of the planet.

The reach of media coverage of the 75th anniversary totalled more than 300 million contacts in the Russian Federation and beyond.

An academic publication titled ‘A Story Told by the People’ was published in the reporting year. It tells the stories of people who fought in the Great Patriotic War and their descendants who dedicated themselves to the nuclear industry. The creative team working on the project included prominent figures from leading nuclear organisations.

ATOMEXPO International Forum

The ATOMEXPO International Forum is the main event in the global nuclear industry. The Forum has been held annually since 2009 and is the largest exhibition and business platform for discussing the current state of the nuclear industry and setting future trends.

The Forum is attended by executives of key companies in the global nuclear industry, government agencies, international and non-governmental organisations, as well as leading experts.

In 2020, it was decided to postpone the 12th Forum until October 2021 due to COVID-related restrictions imposed in the reporting year.

Participation in the work of international corporate organisations

ROSATOM and its organisations are members of the World Nuclear Association (WNA). Because of the global pandemic, in 2020, WNA held its events online. The Corporation actively participated in the WNA Strategic eForum in September, where ROSATOM’s representatives made presentations on the impact of nuclear technology on sustainable development and project financing.

In the reporting year, the Patron Agreement between ROSATOM and the World Energy Council was renewed. During the year, ROSATOM participated in expert dialogues as part of working groups; it also took part in the Council’s expert surveys on the impact of the COVID-19 pandemic on energy markets and the ‘energy transition’. ROSATOM also participated in online sessions of the World Energy Week (WEW 2020). In addition, the Corporation assisted with preparations for the anniversary 25th World Energy Congress, which will be held in 2022 in Saint Petersburg.

Throughout 2020, ROSATOM and its organisations successfully participated in online events hosted by international industry organisations, including the European Nuclear Society (ENS), the trade association for the nuclear energy industry in Europe FORATOM, the NICE Future international initiative, etc.

Overall, in the reporting year, ROSATOM took part in more than 40 forums and conferences abroad and organised 16 displays at overseas exhibitions.

For details on cooperation with international intergovernmental organisations, see the section 'International Cooperation'.

Projects in the sphere of communication and the humanities implemented in cooperation with foreign partners

In 2020, ROSATOM organised 25 events in the field of the humanities in Russia and seven partner countries. As part of these events, foreigners learnt about Russia, the Russian culture and way of life. The events were attended by more than 2,000 people from 43 countries.

Four international shifts were organised as part of the International Smart Holidays project, with 94 children from the Corporation's partner countries participating in the project.

The Corporation provided support for community relations projects in the countries in which it operates (the Benois de la Danse World Ballet Festival, the Geographical Dictation, the FIDE World Chess Championship, etc.).

About 25 technical tours of nuclear facilities in Russia and construction sites of Russian-design NPPs abroad were organised for Russian and foreign journalists and experts (more than 200 people).

Communications in the sphere of digitisation

In 2020, ROSATOM's Digitisation Unit supported the implementation of the Uniform Digital Strategy and the sales of digital products, including through communication and marketing activities.

ROSATOM actively participated in federal events, including INNOPROM, the IT in the Military Industry Forum (ITOPK), the Army 2020 Forum, the Open Innovations International Forum in Moscow, the Digital Industry of Industrial Russia (CIPR) conference, AI Journey, etc. ROSATOM also acted as a partner of the Digital Breakthrough National Competition, which is a flagship project of the Russia – the Country of Opportunities presidential platform.

In the reporting year, ROSATOM's digital projects and initiatives received regular and systematic media coverage. Six official presentations supporting the launch of digital products on the market were organised in compliance with all the relevant epidemiological safety requirements. More than 10 webinars on the roll-out of digital products, including a series of meetings titled 'Logos Days', were held for prospective customers and partners.

Two meetings of the Digital Seasons Production Technology Club were organised jointly with ROSATOM's Corporate Academy. The Club hosted the VR/AR in Industry exhibition and a research and development conference; moreover, the Club's session was held in a fully immersive VR environment.

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'):

- A newspaper (published weekly in all enterprises in the Russian nuclear industry, with a circulation of 59,000 copies and a readership of more than 250,000 people);
- A TV programme (aired weekly in 20 nuclear towns and cities; the viewership of the channels broadcasting the programme totals 7.3 million people).

In 2021, ROSATOM plans to broadcast weekly programmes in 24 nuclear towns and cities, with the viewership of the channels broadcasting the programme expected to total 12.18 million people.

Nuclear Kids

Nuclear Kids (NucKids) (http://www.nuckids.ru/) is an annual international charitable art project for children from nuclear towns and cities across Russia, as well as children of employees of overseas nuclear enterprises partnered with ROSATOM. Since its launch, the project has covered 22 countries. Many NucKids alumni study and work at famous universities, such as the Russian Institute of Theatre Arts (GITIS), the Moscow Art Theatre School, the Russian State University of Cinematography (VGIK), the Oleg Tabakov Studio and the Sergey Zhenovach Theatre Art Studio. They perform in films and work in show business.

In 2020, amid a worldwide pandemic, a project was launched online with a total of 112 participants from Russia, Hungary, India, Belarus and Uzbekistan. In August 2020, 67 participants from Russia continued to participate in the project in its traditional format: under the supervision of professional choreographers, directors, voice coaches and singing teachers, a full-length feature film was shot and a musical titled *Once Upon a Time in the Future* was simultaneously produced and presented to the audience on the main stage of the Et Cetera Theatre in Moscow directed by Alexander Kalyagin. The musical was based on William Shakespeare's tragedy Romeo and Juliet, with the story set in the future. Three sets of cast members were trained for the musical, and four performances were given.

Online communications

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: VKontakte, Odnoklassniki, Facebook, Twitter, Instagram and YouTube.

In 2020, ROSATOM's official website was visited by more than 990,000 people, or an average of 4,000 to 6,000 people every weekday. ROSATOM published press releases informing the general public about the activities of the Corporation and its organisations almost every day. Key events involving ROSATOM received extensive coverage. During the year, a new section, Sustainable Development, was created; it provides stakeholders with structured information on three key aspects: environmental, social and corporate governance (ESG).

The number of followers of ROSATOM's official community pages on social media increased rapidly. As in the previous year, ROSATOM recorded the largest increase in the number of followers on social media platforms focused on visual content: YouTube (where the community expanded by 176%) and Instagram (+43%). Steady growth was also demonstrated by 'flagship' communities on VKontakte (where the group passed the 100,000-follower milestone) and Facebook. At year-end 2020, ROSATOM's communities on social media comprised a total of more than 285,000 people. This strong growth was driven largely by the information campaign focused on the 75th anniversary of the Russian nuclear industry.

Opinion polls

GRI 103-1

ROSATOM 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 an independent opinion survey by the Levada-Centre[60], 75.2% of the Russian population supported the use of nuclear power (73.7% in 2019; over the past few years, the figure has remained consistently high).

— Do you think that nuclear power should be actively developed, maintained at the current level, phased out or completely abandoned?

Actively developed	**51.8%**
Maintained at the current level	**23.4%**
Phased out	**5.6%**
Completely abandoned	**8.5%**
I do not know	**10.7%**

[60] The survey was conducted on 16–24 February 2021 across a representative sample of the Russian population consisting of 3,922 people aged 18 and older.

— Do you agree with the following statement: 'Nuclear power is a "green", environmentally friendly type of power generation'?

I completely agree	**19.7%**
I partly agree	**36.9%**
I partly disagree	**20.5%**
I completely disagree	**12.7%**
I do not know	**10.2%**

1.12.7.2. Public reporting system

Dialogues with stakeholders

GRI 102-44

In order to improve transparency and accountability at ROSATOM, representatives of key stakeholders are engaged in the preparation of the report through participation in discussions of socially important aspects of the Corporation's business and their reflection in the Report to be prepared. In addition, stakeholder representatives participate in public assurance of the Report. Stakeholder engagement is one of the key requirements of international standards such as the AA1000 Stakeholder Engagement Standard (2015), the Global Reporting Initiative Sustainability Reporting Standards (GRI SRS) and the International Integrated Reporting Framework (International <IR> Framework). When preparing the previous report, ROSATOM assumed a number of obligations that were later fulfilled in the 2020 report.

In 2021, ROSATOM and its Divisions held dialogues with stakeholders (by correspondence and directly). During these events, stakeholder representatives voiced their requests and provided recommendations as to what information should be disclosed in the Report, and put forward proposals for developing the public reporting system (minutes of the dialogues have been posted on the reporting portal)[61].

In 2021, ROSATOM held public consultations on its Public Annual Report; as part of this event, ROSATOM's representatives presented the concept and content of the Report, and stakeholders voiced their recommendations and comments on ways to improve the Report. All comments were taken into account during the preparation of the Report.

In the second half of 2021, ROSATOM plans to give a presentation of the Report for 2020; during the presentation, stakeholder representatives will be given an opportunity to put forward their recommendations concerning the content of the Public Annual Report for 2021 and the development of the Corporation's public reporting system.

[61] https://www.report.rosatom.ru/555.html.

Incorporation of stakeholders' proposals

GRI 102-44

Proposals and comments concerning ROSATOM's Public Annual Report for 2020[62]

No.	Stakeholders' recommendations	Incorporation and implementation of recommendations for the 2020 Report
1	To use ROSATOM's Integrated Annual Report as a tool for presenting the outcomes of implementation of the Corporation's Policy on Sustainable Development and its sustainability initiatives	Implemented
2	To present a programme for achieving the Sustainable Development Goals adopted by the Corporation in the 2020 Annual Report	Implemented See the section 'Sustainable Development Management' and the Appendix 'Sustainability Report'
3	To disclose information on the contribution of ROSATOM's Public Council to resolving the issues related to depleted uranium hexafluoride in the 2020 Annual Report in view of the Council's role as a platform for stakeholder engagement and development of a positive and constructive approach to problem-solving	Implemented See the chapter 'Report on the Development of Nuclear Towns and Cities'
4	To develop a programme or approaches to prevent excessive use of plastic in ROSATOM's organisations	Not implemented, as the development of such programmes or approaches is outside ROSATOM's scope of responsibility. The Corporation does not use plastic packaging for its products or services. ROSATOM is developing a system for managing hazard class 1 and 2 industrial waste
5	To reflect the status of the pandemic response (hospital bed capacity, the quality of healthcare services and medical treatment) in healthcare institutions under ROSATOM's jurisdiction in the 2020 Annual Report	Implemented within ROSATOM's scope of responsibility See the chapters 'Social Report' and 'Report on the Development of Nuclear Towns and Cities'
6	To provide substantiated information on the incidence of disease among employees of ROSATOM and its organisations in 2020 compared to other industries	Not implemented The data will be provided after the publication of the relevant statistics on other industries
7	To demonstrate that operations in the industry are long-term in nature and span centuries (outline the long-term development trajectory)	Implemented See the section 'About ROSATOM'
8	To prepare a table or a matrix showing links between national projects and the UN SDGs that ROSATOM seeks to achieve	Implemented See the section 'Sustainable Development Management'
9	To make a mention in the Annual Report of the project to write a book about the contribution of the industry to the victory in the Great Patriotic War, which has been implemented with assistance from prominent figures from leading nuclear organisations	Implemented See the section 'Strategic Communications'
10	To use the capabilities of the reporting portal in order to enable non-profit organisations participating in contests to provide feedback to ROSATOM's Public Council as the body responsible for awarding grants	These functions will be implemented upon request
11	To disclose information on tools (methods, mechanisms) for implementing sustainability principles throughout the value chain in the Annual Report, visualise this process and show how individual sustainability principles are applied in the production process and how they drive changes in business processes	Partially implemented with regard to the application of sustainability principles in the operations of ROSATOM's Divisions See the section 'Performance of Divisions' The proposal is scheduled to be implemented in full in the next reporting year
12	To finalise the structure of Appendices to ROSATOM's Annual Report containing reports of ROSATOM's Divisions and to improve the structure on an annual basis	Implemented Measures to improve the structure of reporting materials are scheduled to be implemented on an annual basis
13	To develop mechanisms for accelerating the preparation of ROSATOM's integrated report and reschedule its publication for June	Implemented The publication of the 2021 Report has been rescheduled for July
14	To maintain a balance between digital and in-person communications and stakeholder engagement	The recommendation will be implemented, provided that the epidemiological situation in the country does not deteriorate
15	An additional comment on the allocation of responsibilities of ROSATOM's executives needs to be provided in the section 'Report Profile'	The structure of the Report reflects the responsibility of ROSATOM's executives for the information presented in the Report
16	To reflect information on ROSATOM's contribution to maintaining the country's sovereignty and defence capabilities	Implemented See the chapters 'Strategic Report' and 'Safety Report'
17	To disclose information on the total amount of heat removed from NPP reactors, including heat transfer into cooling ponds or into the environment, in order to assess the energy efficiency of NPPs	Partially implemented. The request has been forwarded to Rosenergoatom; the relevant information will be disclosed in Rosenergoatom's report in the next reporting period
18	To disclose information on environmental requirements for suppliers	Partially implemented See the Appendix to the Report covering the performance of the Sales and Trading Division for 2020
19	To change the topic name from 'Environmental safety' to 'Environmental impacts' and expand its scope, including by providing information on ROSATOM's carbon footprint	Implemented The name has remained unchanged; information on ROSATOM's environmental impacts, including its carbon footprint, has been added to the relevant section

[62] Following public consultations on ROSATOM's Public Annual Report for 2019 and a foresight dialogue on the materiality of topics covered in ROSATOM's Public Annual Report for 2020.

No.	Stakeholders' recommendations	Incorporation and implementation of recommendations for the 2020 Report
20	To disclose information on supply chain management	Not implemented The proposal will be incorporated in the next reporting year
21	To disclose information on procurement activities in chapter 1 (Strategic Report) or chapter 2 (Business Development Report)	Implemented
22	To incorporate reports of the Divisions' subsidiaries prepared in accordance with the Sustainability Reporting Standards in the Divisions' reporting materials (appendices to the Report)	Not implemented due to the transition to a single brand of ROASTOM and the Corporation's reporting standards
23	To cover ROSATOM's contribution to fulfilling national objectives and implementing national projects in the Strategic Report or in a separate section, and to explain ROSATOM's role in increasing Russia's economic strength and enhancing its defence capabilities	Implemented See the chapters 'Strategic Report', 'Safety Report' and 'Report on the Development of Nuclear Towns and Cities'
24	To present the topic '34. Response to the pandemic (business continuity, personnel, external stakeholders)' in a more generalised form by describing ROSATOM's response to emergencies, including the pandemic	Implemented The description of ROSATOM's response to the COVID-19 pandemic includes information on measures taken in emergencies of this kind
25	To change the wording of the topic from '38. Emissions' to: '38. Emissions and discharges'	Implemented
26	To eliminate the duplication of information in disclosures on the topics '7. Participation in international "mega science" projects' and '12. Development of international business and international cooperation'	Implemented
27	To disclose information on ROSATOM's greenhouse gas emissions	Implemented
28	To consider preparing two reports: for the international and domestic audience, given that different audiences have differing goals and objectives and this solution would help to address cognitive issues related to the perception of the report. Alternatively, the same topics could be covered in different versions of the report with a different level of detail	Implemented ROSATOM does not consider this solution to be practicable
29	A tip on searching for information relevant to different stakeholder groups should be added to ROSATOM's reporting portal in the navigational section titled 'Report Profile', which should specify which stakeholders each section is primarily targeted at	ROSATOM plans to implement this proposal with regard to its Public Annual Report for 2020
30	It is important to cover the topic of community relations with regard to large-scale vaccination efforts, as the development of herd immunity is central to both fighting the current pandemic and meeting future challenges	Implemented with regard to fighting the COVID-19 pandemic See the chapters 'Social Report' and 'Report on the Development of Nuclear Towns and Cities'
31	To disclose information on ROSATOM's role in the implementation of the Ecology National Project in the section of the Strategic Report on national objectives and to describe ROSATOM's contribution to other national projects	Implemented. See the chapter 'Strategic Report'
32	Information on environmental impacts presented in ROSATOM's Report is fragmented and has a low level of traceability over time; this issue needs to be addressed *(Information on the generation of waste posing radiation hazards at NPPs operated by Rosenergoatom; generation of waste posing radiation hazards by category for each year, as mentioned in public environmental reports of JSC Rosenergoatom's branches)*	Implemented
33	To add a section outlining the advantages of nuclear power and its share in the country's energy mix (at present, in the short and long term) to the introductory part of the Report	Implemented See the Appendix 'Sustainability Report'
34	To consider preparing a Report of ROSATOM structured by focus areas of ROSATOM's Strategy until 2030, which are described with a focus on the contribution of ROSATOM's activities to sustainable development	Implemented See the Appendix 'Sustainability Report'
35	To show the links between employee training and ROSATOM's strategic goals and objectives and the comprehensive nature of employee training practices when covering the topic of employee training	Implemented See the chapter 'Social Report'

GRI 102-56

Statement of Public Assurance

Background

ROSATOM has suggested that we assess its modular public report for 2020 (the Report), which comprises five reporting modules (the Strategic Report, the Business Development Report, the Social Report, the Report on the Development of Nuclear Towns and Cities and the Safety Report) and an appendix titled 'Sustainability Report', and which also includes appendices on the performance of ROSATOM's Divisions, namely the Mining, Engineering, Mechanical Engineering, Fuel, Power Engineering, and Sales and Trading Divisions (hereinafter referred to as the modular Report).

Our analysis and evaluation during the public assurance process focused on the materiality and completeness of information disclosed in the Report and on the Corporation's response to stakeholders' requests and proposals. Our conclusion is based on an analysis of the Report, additional materials provided to us (minutes of stakeholder engagement events and tables reflecting the incorporation of stakeholders' proposals) and the feedback provided by ROSATOM's employees.

We received no remuneration from ROSATOM for our participation in the public assurance procedure.

Assessments, comments and recommendations

We are unanimous in the opinion that the Report is of high quality in terms of both its format and the scope of information that it provides. In our opinion, ROSATOM adheres to a consistent approach to ensuring the transparency and accountability of its business. During the preparation of the modular Report, the Corporation demonstrated strong commitment to ensuring that the development of nuclear technology is publicly acceptable and willingness to hold an open dialogue with stakeholders on various aspects of its operations.

In our view, the modular approach to public reporting adopted by ROSATOM has enabled it to provide information to stakeholders in a more targeted way while continuing to offer a deep and comprehensive insight into the operation of the nuclear industry. Through a detailed examination of the Corporation's business model, the Report clearly presents its complex value chain. It provides information on ROSATOM's governance system, strategic goals and management approaches, social, environmental and economic impacts, challenges and plans for the medium and long term. We would also like to highlight and express our full support for ROSATOM's decision to reflect its sustainability performance in a standalone Sustainability Report, which is an appendix to the Report. Thus, the readers of the Report can obtain a complete picture of ROSATOM's operations, including their socially important aspects.

An indisputable advantage of the Report is the use of Russian and international corporate reporting standards during its preparation. These are, first and foremost, the Global Reporting Initiative Sustainability Reporting Standards (the Core 'in accordance' option). In addition, during the preparation of the Report, the Corporation traditionally used the International Integrated Reporting Framework, the AccountAbility AA1000SES Standard, the Basic Performance Indicators of the Russian Union of Industrialists and Entrepreneurs (RSPP), as well as the Uniform Industry-Wide Public Reporting Policy and the Public Reporting Standard of ROSATOM.

Materiality of information

To incorporate stakeholders' requests as fully as possible, ROSATOM and its Divisions held dialogues with stakeholders (directly (online) and/or in the form of a questionnaire survey) to identify material topics to be disclosed in the Report (the information received was compared with the results of a questionnaire survey conducted among the Corporation's managers). We highly appreciate this initiative and recommend that ROSATOM should continue active collaboration with stakeholder representatives on this matter in the future as they represent the target audiences for the Corporation's public reports.

Completeness of information

We believe that the reporting information adequately covers all material aspects and enables readers to draw conclusions on the Corporation's performance in the reporting year.

Response to stakeholders' requests and proposals

At the request of stakeholder representatives, corrections were made and additional information was included in the final version of the Report (or substantiated explanations were provided as to why the requested information could not be disclosed).

The Corporation took into account key proposals put forward by stakeholders during the preparation of ROSATOM's previous Report in the form of recommendations on the draft Report for 2020, during the foresight dialogue aimed at identifying material topics to be disclosed in the 2020 Report and during the collection of written comments and recommendations on the draft Report for 2020.

For details on the activities undertaken by ROSATOM, see the sections 'Report Profile' and 'Strategic Communications' in Chapter 1 'Strategic Report'.

We took part in determining material topics to be disclosed in the Report and the reporting materials of ROSATOM's Divisions (presented in appendices to the Report). At the request of stakeholder representatives, corrections were made and additional information was included in the final versions of the reporting materials of the Divisions (or substantiated explanations were provided as to why the requested information could not be disclosed).

We are willing to take part in subsequent activities aimed at discussing the Report and formulating proposals concerning the Report for 2021 and the development of ROSATOM's public reporting system.

To summarise, we would like to point out that in recent years ROSATOM has made significant progress in public reporting and, consequently, continues to improve confidence in its business. The modular approach to public reporting used by ROSATOM in 2021 has enabled it to make information disclosure more specific and targeted at the relevant stakeholders. We consider it advisable to continue to use this approach to public reporting at ROSATOM in the future.

We hope that ROSATOM will continue to consistently implement the principles of responsible business conduct in the future, work systematically on the sustainable development agenda and disclose information on its performance in this context.

Persons who took part in the public assurance of ROSATOM's public annual report for 2020

Alexander Ageev
Director General of the Institute for Economic Strategies of the Russian Academy of Sciences

Sergey Baranovsky
President of the Inter-Regional Environmental Non-Governmental Organisation Green Cross, Deputy Chairman of ROSATOM's Public Council

Pavel Belousov
Head of the Innovation and Technology Centre of Obninsk Institute for Nuclear Power Engineering of NRNU MEPhI, Associate Professor

Andrey Vetluzhskikh
Member of the State Duma Committee on Economic Policy, Industry, Innovation and Entrepreneurship

Natalia Davydova
Director of the Environmental Projects Consulting Institute (Autonomous Non-Profit Organisation), member of ROSATOM's Public Council

Konstantin Dolgov
Deputy Chairman of the Committee on Economic Policy of the Federation Council of the Federal Assembly of Russia

Alexey Ekidin
Senior Researcher of the Institute of Industrial Ecology of the Urals Branch of the Russian Academy of Sciences, member of ROSATOM's Public Council

Alexander Martynov
Director of the ERA Environmental Rating Agency

Alexander Nikitin
Chairman of the Board of the Environmental Rights Centre Bellona, Chairman of the Environmental Commission of ROSATOM's Public Council

Olga Plyamina
Director General of the Vernadsky Non-Governmental Environmental Foundation

Gennady Sklyar
Member of the State Duma Committee on Energy

Elena Feoktistova
Managing Director for Corporate Responsibility, Sustainable Development and Social Entrepreneurship of the Russian Union of Industrialists and Entrepreneurs (RSPP)

Igor Fomichev
Chairman of the Russian Trade Union of Nuclear Power and Industry Workers

Andrey Khitrov
Director General of the Russian Union of Employers in the Nuclear Industry, Power and Science

CHAPTER 2

BUSINESS DEVELOPMENT REPORT

GRI 102-14

Statement by Kirill Komarov

Dear colleagues and partners,

You are reading the Business Development Report of State Atomic Energy Corporation Rosatom. Today, ROSATOM's business is not confined to the traditional nuclear power sector but also includes innovative products and services targeted at the international market.

In the context of business development, the past year can certainly be described as successful. **Furthermore, it is important to emphasise the growing role of our new businesses outside the nuclear power industry**. In 2019, our 10-year portfolio of orders for new products grew by 8% compared to 2018, and in 2020, its year-on-year growth accelerated to 37%, with the portfolio expanding from RUB 1,169.1 billion to RUB 1,602.1 billion. Revenue from new products outside the scope of the Corporation increased by 15% for two years in a row (from RUB 196.7 billion to RUB 227.9 billion and then to RUB 261.6 billion in 2020).

Indeed, new businesses have become a driver of ROSATOM's sustainable development. We have been working on non-nuclear products and nuclear products for non-energy applications since 2012, but it was last year that some of them were given the status of strategic programmes in accordance with ROSATOM's updated strategy. At present, we have 87 new product areas and 12 strategic programmes, including wind power, composite materials, nuclear medicine, waste management, products and services for the fuel and energy sector, Digital ROSATOM, the Smart City, international logistics and additive manufacturing.

Kirill Komarov
First Deputy Director General for Corporate Development and International Business of ROSATOM

We consistently invest in the development of clean energy sources, which are not confined to nuclear power, and we have made significant progress in **wind power generation**. In 2020, revenue from this business area reached RUB 3 billion, with the order portfolio totalling RUB 216.9 billion.

Last year, the Corporation completed the construction of its first wind power plant, the Adygea WPP (150 MW), and the Kochubeyevskaya WPP (210 MW), which is currently the largest wind power plant in Russia. This was followed in 2021 by the commissioning of the Karmalinovskaya WPP (60 MW). We are currently building three more wind power plants. It should be noted that this business of ROSATOM uses 65% local content, and in the longer term we seek to increase this figure to 85%. ROSATOM collaborates with more than 50 Russian companies, including small and medium-sized businesses; as a result, we have already created more than 2,000 new jobs.

The Corporation prioritises those products that help to improve the quality of people's lives. More specifically, we have a proven track record in developing and introducing **environmental solutions** at our own facilities; now we are leveraging this experience at the federal level. In 2020, revenue from this business area totalled RUB 4.1 billion, with the order portfolio totalling RUB 5.3 billion. ROSATOM's expertise has been recognised by the country's government, and we have been tasked with implementing critically important projects:

- The municipal landfill in Chelyabinsk: the remediation project was launched in 2019 and is 80% completed; it is scheduled for completion by the end of 2021;
- The Krasny Bor industrial landfill in the Leningrad Region: stage 1 design documents were submitted in 2020;
- The industrial site in Usolye-Sibirskoye in the Irkutsk Region: work was started in August 2020;
- The industrial site of the Baykalsk Pulp and Paper Mill: work was started in late 2020.

Along with cleaning up historical municipal landfills and abandoned industrial sites, we are creating infrastructure necessary in order to eliminate bad practices leading to the accumulation of environmental damage. The total capacity of a network of seven facilities that we are building will be sufficient to process waste generated across the country.

In the **nuclear medicine** segment, which is one of the areas prioritised by ROSATOM, revenue totalled RUB 11.8 billion, with the order portfolio totalling RUB 52.9 billion. In 2020, we achieved a year-on-year increase in revenue from exports of isotope products.

The first batch of lutetium-177 was supplied to a clinic in Italy for product quality assessment in order to enable ROSATOM to expand into the radiopharmaceuticals segment on developed European and Asian markets. We fulfilled the largest-ever order for the supply of molybdenum-100 to the Institute for Basic Science in the Republic of Korea. A large batch of iodine-131 produced by JSC Karpov Institute of Physical Chemistry was delivered to a European manufacturer to substitute for supplies from other sources. In 2020, ROSATOM signed a contract for the supply of a stable germanium-76 isotope to China for a new research project, PandaX-III, which involves searching for a rare physical phenomenon: neutrinoless double beta decay.

This year, we plan to design and build radionuclide therapy centres and nuclear medicine centres in Lipetsk, Irkutsk and Ufa. In 2021, a Multipurpose Processing Centre will be launched at FSUE Mayak Production Association in Chelyabinsk. The Centre will specialise in the processing (sterilisation) of medical devices and pharmaceuticals, agricultural and food products, as well as modification of various types of polymers in order to improve their quality. In the second quarter of 2022, a similar centre will be put into operation in Obninsk.

As for our traditional nuclear power business, we successfully maintain the long-term portfolio of overseas orders within the USD 130-140 billion range (USD 138.3 billion in 2020). As we proceeded to fulfil numerous overseas orders, revenue increased to USD 7.475 billion compared to USD 7.228 billion in 2019.

ROSATOM remained a leader on the market for **NFC** products. All obligations under existing contracts for the export of uranium products and uranium enrichment services were fulfilled on time and in full, with products supplied to 41 customers in 19 countries. The annual sales volume exceeded USD 2 billion. The Corporation has a firm foothold on the global uranium enrichment market, ranking first for many years with a 36% market share. ROSATOM also remains a leader in other NFC segments as well, ranking second on the uranium mining market and third on the fuel fabrication market with a market share of 15% and 17% respectively.

The Corporation is also an undisputed leader on the overseas NPP construction market. At present, we have documented commitments to build 36[63] power units in 12 countries, with 24 power units in nine countries currently at the active implementation stage. Importantly, we not only conclude contracts but also successfully carry them out: since last year, our track record includes 17 power units connected to the grid over 15 years (including power units in Russia).

The launch of power unit No. 1 of the Belarusian NPP became a landmark event in 2020. This is the first power unit with a VVER-1200 reactor abroad and the first nuclear power unit in many years to be connected to the grid outside of Russia, in Europe. We are currently preparing to launch the second power unit of the Belarusian NPP. In the Middle East, ROSATOM is actively working on three power units of Akkuyu NPP, and we expect to obtain a licence for power unit No. 4. Work at the site of Rooppur NPP in Bangladesh is progressing on schedule. The start of concreting at power units No. 5 and 6 of Kudankulam NPP in India is scheduled for 2021. We expect to obtain a licence for the construction of El Dabaa NPP in the second half of 2022. In Europe, ROSATOM continues to take steps to obtain licences for the construction of Paks II NPP in Hungary and Hanhikivi 1 NPP in Finland.

In the past year, we made progress at the site of our reference project forming part of our nuclear non-energy offer: the **Nuclear Research and Technology Centre (NRTC)** in Bolivia. Despite the challenges that faced ROSATOM last year, the construction of the centre is progressing smoothly. Process equipment has been delivered, and its installation and pre-commissioning are underway. We plan to hand over stage 1 and 2 facilities to the customer as early as this year.

ROSATOM provides **maintenance services** for 49 Russian-design power units abroad that are currently in operation or at the design/construction stage. In 2020, we successfully carried out scheduled preventive maintenance at power unit No. 2 of Metsamor NPP and completed all scheduled activities. In December 2020, we initiated preparations for scheduled preventive maintenance to be carried out in 2021; following its completion, we expect to obtain a licence for extending the service life of the power unit at least until 2026. The importance of maintenance services for our Armenian partners cannot be overestimated, given that the power plant accounts for more than a third of the country's energy mix.

Looking back on 2020 and speaking of plans for the future, we certainly ought to mention the coronavirus pandemic. First of all, I would like to remind that our organisations shifted their focus to supporting the national efforts to fight the pandemic within the shortest possible time frame. We sterilised dozens of millions of face masks, as well as medical transport systems used for COVID-19 testing.

Speaking of the business aspect, I can confidently say that we successfully adapted to restrictions: none of our overseas construction projects were suspended. Although regular air travel was halted, we managed to arrange regular personnel rotation. As a result of ROSATOM's cooperation with the relevant government agencies, starting from April 2020, about 22,000 people were transported as more than 40 flights were made under fly-in fly-out arrangements to countries where NPP construction projects are at an active stage. This work continues in 2021.

Project implementation became more complex, but we made use of this time by speeding up our internal processes focused on the implementation of state-of-the-art IT solutions in order to digitise our operations to the maximum possible extent.

We thoroughly revised work organisation at all our overseas sites. We introduced strict medical supervision, with employees undergoing regular temperature checks. We installed hand sanitiser dispensers in common areas and production facilities. We provided employees with face masks and other personal protective equipment; their use is still compulsory at all production sites and in all offices. In addition, we increased the number of buses used to transport employees to and at the sites in order to maintain social distancing.

For instance, at the Belarusian NPP, any employee showing symptoms of a respiratory infection had their access card blocked and were referred to the health unit. Where practicable, we sought to shift as many employees as possible to remote work, for instance in Hungary and Finland.

We hope that voluntary vaccination that we are currently arranging at our overseas sites will provide long-awaited relief and will enable a gradual return to normality. Our site in Belarus was our first overseas construction site where employee vaccination was launched on 11 February 2021.

[63] Including power unit No. 1 of the Belarusian NPP.

2.1 Business Diversification

Key results in 2020:

- Revenue from new products outside the scope of the nuclear industry totalled RUB 261.6 billion.
- The 10-year portfolio of orders for new products outside the scope of the nuclear industry reached RUB 1,602.1 billion.

GRI 103-1

One of ROSATOM's strategic goals is to develop new products. They provide new opportunities for developing healthcare and municipal infrastructure, improving environmental safety and making progress in other key areas relevant to sustainable development. In accordance with the Corporation's business strategy, it is intended that new products will make up 40% of the total revenue by 2030.

New business areas have been formed taking into account the maximum number of overlaps with existing technical, technological and research competences, including the research and production capabilities of ROSATOM's organisations.

GRI 103-2

2.1.1. Management system

The Corporation has developed an effective system for managing new businesses; it includes integrators and enterprises in the relevant business areas. The responsibility for business development at all levels is reflected in overarching key performance indicators:

- Short-term indicators, such as revenue from new products during the year;
- Long-term indicators, such as the 10-year portfolio of orders for new products.

The system for managing new businesses at the level of ROSATOM is focused on the development of strategic programmes. At the moment, there are 12 such programmes: Wind Power, Products and Services for the Fuel and Energy Sector, Industrial and Consumer Waste Management, 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, Automated Process Control Systems and Electrical Engineering. At the same time, ROSATOM is actively searching for areas that could become strategically important in the near future.

The Corporation also takes steps to stimulate the development of new businesses:

- Regulatory barriers have been lowered: the package of regulations which each new organisation in the industry is required to adopt has been reduced considerably;
- ROSATOM has created infrastructure for piloting any new business ideas; it includes the TeMP contest, the Business Accelerator of the Fuel Company, the corporate venture capital fund and the Innovation Hub; the Corporation is also developing a digital ecosystem of new businesses;
- Management processes have been speeded up, with operational decision-making on products under strategic programmes largely delegated to the steering boards of the relevant programmes and the management of product programmes and all other initiatives delegated to the Divisions.

2.1.2. Results in 2020

GRI 103-2
GRI 102-2
GRI 102-4
GRI 102-6

In the reporting year, revenue from the sales of new products by ROSATOM's organisations to counterparties outside the industry totalled RUB 261.6 billion, with the target set at RUB 250 billion.

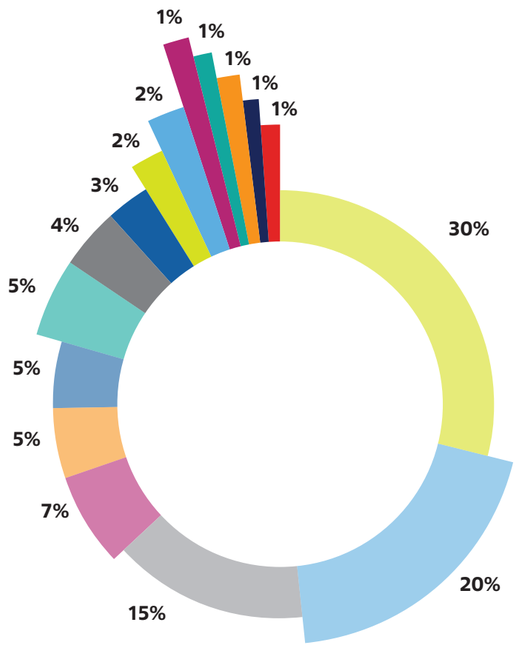
The 10-year order portfolio outside the scope of the industry reached RUB 1,602.1 billion, which is 37% above the actual figure for 2019 (RUB 1,169.1 billion).

Revenue from new products and 10-year portfolio of orders for new products outside the scope of the industry, RUB billion

	2018	2019	2020
Revenue from new products	196.7	227.9	261.6
10-year portfolio of orders for new products	1,082.6	1,169.1	1,602.1

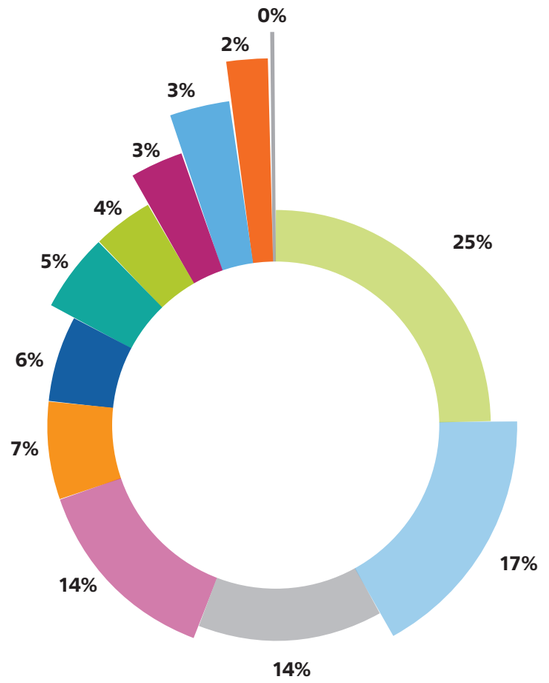
Contribution of ROSATOM's Divisions to revenue in 2020

- Power Engineering
- NWD
- Mechanical Engineering
- Fuel
- Science and Innovations
- Northern Sea Route
- Rusatom Healthcare
- Rusatom Infrastructure Solutions
- Sales and Trading
- Greenway
- Advanced Materials and Technologies
- Wind Power
- Overseas
- Mining
- APCS and Electrical Engineering
- Environmental Solutions



Contribution of ROSATOM's Divisions to the order portfolio in 2020

- Sales and Trading
- Power Engineering
- Mechanical Engineering
- Wind Power
- Northern Sea Route
- NWD
- Environmental Solutions
- Overseas
- Rusatom Healthcare
- Rusatom Infrastructure Solutions
- Fuel
- Mining
- Greenway
- APCS and Electrical Engineering
- Science and Innovations
- Advanced Materials and Technologies



Wind power

In 2020, revenue from this business area totalled RUB 2.9 billion, with the order portfolio totalling RUB 216.9 billion.

The Corporation is actively developing the Russian wind power market. In the reporting year, ROSATOM completed the construction of the 150 MW Adygea WPP and the 210 MW Kochubeyevskaya WPP, with local content reaching 65%.

ROSATOM expanded its portfolio of wind power projects on the Russian market to 1.2 GW in terms of capacity, or more than 30% of the Russian wind power market.

ROSATOM launched the production of wind turbine components at a plant in Volgodonsk with a design capacity of 300–350 MW per year.

In addition, in the reporting year, four WPPs with a total capacity of 360 MW were under construction in the Rostov Region and the Stavropol Territory: the Marchenkovskaya WPP (120 MW), the Karmalinovskaya WPP (60 MW), the Bondarevskaya WPP (120 MW) and the Medvezhenskaya WPP (60 MW). Sites were selected for the construction of additional wind farms with a total capacity of 500 MW in 2022 and 2023.

Following the latest round of selection as part of the first programme to support renewable energy based on long-term capacity supply contracts (DPM), in December 2020, JSC Novawind won tenders for all WPP projects with a total capacity of 192.5 MW. The wind power plants are scheduled to be commissioned in 2023 and 2024.

Nuclear medicine

In 2020, overall revenue from this business area totalled RUB 11.8 billion, with the order portfolio totalling RUB 52.9 billion.

In the reporting year, JSC Rusatom Healthcare started the first stage of construction of the radiology department building of the East Siberian Cancer Centre in Irkutsk.

In order to form partnerships and expand research and production capabilities for the development of cancer treatment technologies, ROSATOM took the following steps:

- Licensing of the Ir-Lu production site;
- Engineering tests of the KLT-6 radiation therapy facility;
- A licence was obtained from the Russian Ministry of Industry and Trade for the production of pharmaceuticals to be sold by healthcare institutions in Moscow;
- A cyclotron and radiochemistry facility was delivered to the Kingdom of Thailand.

JSC Rusatom Healthcare initiated front-end engineering design as part of a project to set up a modern pharmaceutical plant to produce medical isotopes at the site of JSC Karpov Institute of Physical Chemistry.

Vital ultra-short-lived products used for the diagnosis of diseases in children were delivered from Saint Petersburg to Moscow to provide a substitute for supplies from the Moscow manufacturer during its scheduled shutdown. The Charitable Foundation for People with Neuroblastoma and Their Families NB and the National Society of Paediatric Haematologists and Oncologists thanked ROSATOM for addressing this long-standing issue.

The first batch of an active pharmaceutical ingredient based on lutetium-177 was supplied to a clinic in Italy in order to assess the quality of products manufactured in accordance with EU GMP standards as part of a production outsourcing initiative aimed at enabling ROSATOM to expand into the radiopharmaceuticals segment on developed European and Asian markets.

All obligations assumed under a long-term contract with the Institute for Basic Science (Republic of Korea) and related to fulfilling the largest-ever order for the supply of molybdenum-100 were fulfilled.

A contract was signed for the supply of a stable germanium-76 isotope to China for a new research project, PandaX-III, which involves searching for a rare physical phenomenon: neutrinoless double beta decay.

A large batch of iodine-131 produced by JSC Karpov Institute of Physical Chemistry was delivered to a European manufacturer to substitute for supplies from other sources.

In 2020, ROASTOM's isotope division not only maintained revenue from the sales of isotope products but increased it by 8% year on year.

New materials

In 2020, revenue from this business area totalled RUB 3.9 billion, with the order portfolio totalling RUB 2.8 billion.

In the reporting year, a new high-modulus carbon fibre production line with a capacity of 40 tonnes was launched at the site of LLC Carbon and Composite Materials Plant (LLC C&CMP) in Chelyabinsk. ROSATOM also established composite fabrics plants with a total capacity of 2,500 tonnes at the production sites of LLC Prepreg-Dubna (Moscow Region), JSC Prepreg-ACM (Moscow), LLC Argon (Balakovo) and LLC Porcher Advanced Materials (Kaluga) and a prepreg plant with a capacity of 2,000 tonnes at the site of JSC Prepreg-ACM.

In addition, in 2020, ROSATOM completed the construction of a PAN plant with a capacity of 5,000 tonnes in the Alabuga Special Economic Zone. In 2021, the Corporation plans to pilot the technology and products based on PAN produced in-house for key customers. As a result, an integrated process chain for the production of carbon composite materials will be established in Russia.

The Corporation produced substitutes for imported composite materials for a line of helicopters and gas centrifuges. The Corporation also supplies materials for launch vehicles such as Angara and Soyuz-5 (currently at the R&D stage) and the ExoMars satellite, and exports non-resource high-technology products.

An agreement on the development of a Comprehensive R&D Programme titled 'New Composite Materials: Design and Production Technologies' was concluded with Lomonosov Moscow State University, JSC RUSNANO, NRC Kurchatov Institute and stakeholders including federal executive agencies and organisations.

Equipment for the oil, gas and petrochemical industry

In 2020, revenue from this business area totalled RUB 800.3 million, with the order portfolio totalling RUB 500.7 million.

In the reporting year, pilot tests of a cryogenic electric pump were completed. The pump will be used to load liquefied natural gas onto LNG carriers. The pump underwent pilot testing under normal operating conditions using liquefied natural gas; it was accepted by the customer and continues to be operated at the site.

Environmental protection

In 2020, revenue from this business area totalled RUB 4.1 billion, with the order portfolio totalling RUB 5.3 billion.

As part of the Federal Project titled 'Creation of Infrastructure for Hazard Class 1 and 2 Waste Management':

- Stages 1 and 2 of the development of a state information system for keeping records and monitoring the management of hazard class 1 and 2 waste were completed;
- A federal road map for the management of hazard class 1 and 2 waste was developed and approved;
- Input data were prepared, and environmental and engineering surveys were carried out to develop designs and cost estimates for the construction of three new industrial and engineering complexes;
- Design documents were developed and positive opinions of the State Expert Review Panel were obtained for the establishment of four industrial and engineering complexes.

As part of its business initiatives aimed at repairing environmental damage from past operations, in 2020, ROSATOM implemented the following measures:

- Municipal landfill in Chelyabinsk
  The installation of metal structures at wastewater treatment facilities, construction of a reinforced earth embankment and the reshaping of the landfill body were completed. Work on the project is 80% completed; the project is scheduled for completion by the end of 2021.
- Industrial site in Usolye-Sibirskoye (Irkutsk Region)
  Measures were taken to ensure the safety of 17 tanks, which were in a dilapidated condition; the dismantling and clean-up of the superstructure of the mercury cell electrolysis shop were completed; an underground waterproofing system was installed to prevent the contamination of the Angara River.
- Krasny Bor industrial landfill (Leningrad Region).
  A concept was developed for repairing historical environmental damage; engineering surveys were completed, and design documentation was prepared for the first stage of the project.
- Site of the Baykalsk Pulp and Paper Mill
  Front-end engineering design under the contract was commenced.

JSC Rusatom Greenway launched a project to establish a centre for polyethylene terephthalate recycling into PET flakes in the Alabuga Special Economic Zone (Republic of Tatarstan).

In April 2020, ROSATOM, a major Russian industrial company and the state development corporation concluded an agreement on the construction of at least 25 waste-to-energy plants, which will incinerate sorted municipal solid waste. The parties are willing to build plants using primarily locally manufactured equipment in order to service major tourist destinations in Russia and urban areas with a population of 500,000 people or more.

Smart City

In 2020, revenue from this business area totalled RUB 9.4 billion, with the order portfolio totalling RUB 41.2 billion.

ROSATOM continued its active cooperation with the regions on the introduction of digital products forming part of this business area. The Smart City digital platform became fully operational in 11 nuclear towns and cities in six regions of Russia: Zheleznogorsk, Zelenogorsk (Krasnoyarsk Territory), Zarechny (Penza Region), Glazov (Udmurt Republic), Novouralsk, Lesnoy, Zarechny (Sverdlovsk Region), Snezhinsk, Tryokhgorny, Ozersk (Chelyabinsk Region) and Polyarnye Zori (Murmansk Region), following several months of operation in test mode.

The Corporation offers its solutions not only to towns and cities, but also to regions. It is currently cooperating on digitisation initiatives with the Nizhny Novgorod, Tomsk and Murmansk Regions and the Stavropol Territory. The Our North portal, a digital solution with a range of functions similar to those of the Active Citizen platform, has been developed and implemented in the Murmansk Region within the shortest possible time frame.

The progress made by Russia in the implementation of smart city technologies is recognised globally. The UN has published the first voluntary national review of Russia's progress towards achieving the Sustainable Development Goals. Among other things, the review contains information on ROSATOM's contribution to the development of the urban environment, with the Lean Smart City, a set of state-of-the-art technological solutions implemented by JSC Rusatom Infrastructure Solutions, cited as one of the best practices.

Hydrogen energy

JSC Rusatom Overseas (RAOS) initiated the development of industry solutions for hydrogen energy, which is a promising area, with support from ROSATOM's Innovation Management Unit.

Under the current memorandum of cooperation between the Ministry of Economy, Trade and Industry of Japan and JSC RAOS, in 2020, the company continued to implement the planned pilot projects, including the development of a project to supply hydrogen to Japan, as well as the establishment and development of a passenger railway system on Sakhalin Island which will use trains powered by hydrogen fuel cells, as well as the relevant support systems.

2.1.3. Plans for 2021 and beyond

Nuclear medicine

- To design and build radionuclide therapy centres and nuclear medicine centres in Lipetsk, Irkutsk, Ufa and Obninsk. The centres are scheduled to be launched in 2023 and 2024 and are expected to provide services to over 100,000 patients per year.
- In 2022, a Multipurpose Processing Centre (MPC) will be put into operation in Obninsk; it will specialise in the sterilisation of medical devices and polymer modification for major industrial companies. ROSATOM is also considering building an MPC in Kazan (Republic of Tatarstan) and sterilisation centres in Samara and Penza.
- ROSATOM's existing centres are expected to process up to 3,000 tonnes of various products.
- To complete the development of a line of new radiation and radionuclide therapy facilities and diagnostic equipment and launch them on the market:
  1. To complete the licensing of an upgraded Brachium brachytherapy facility, obtain the relevant registration certificate and start mass production.
  2. To complete technical and clinical trials and assembly of a prototype of the ONYX radiation therapy facility. Licensing and the start of mass production are scheduled for 2022.
  3. To localise the production of diagnostic equipment manufactured by Elekta at ROSATOM's industrial site and start mass production.
  4. To complete the construction of the first production site in Russia to produce MRI devices manufactured by General Electric and prepare it for commercial operation.
- To restore logistics routes which are suitable for the transportation of radioactive isotopes and resume product shipments to a number of destinations that have been suspended due to lack of logistics infrastructure.
- To expand Mo-98 and Mo-100 supplies for projects involving alternative methods of production of Mo-99/Tc-99m to Europe and North America; to consolidate the status of the key supplier of isotopically enriched products for major research projects by fulfilling the obligations under the concluded contracts for the supply of Ge-76 and Mo-100.
- To develop new products: targeted drugs based on the 227Th and 223Ra isotopes, a drug for targeted therapy of hormone-resistant cancer based on the 213Bi isotope, innovative technology for the 13C isotope production, methods for assessing radiation exposure in patients undergoing therapy using radiopharmaceutical drugs labelled with alpha-emitting radionuclides.

Renewable energy development

In 2021, ROSATOM will continue to build four WPPs in the Rostov Region and the Stavropol Territory with a total capacity of 360 MW.

In 2023 and 2024, JSC NovaWind plans to commission WPP projects with a total capacity of 192.5 MW.

In the long term, ROSATOM plans to gradually increase renewable energy generation from 192.36 GWh in 2020 to 2,911.64 GWh in 2024, with local content reaching 85%.

2.2 International Business Development

Key results in 2020:

- The 10-year portfolio of overseas orders totalled USD 138.3 billion.
- The portfolio of overseas orders covering the entire NPP life cycle totalled USD 204 billion.
- Revenue from overseas orders reached USD 7.5 billion (USD 7.2 billion in 2019).
- The overseas NPP construction project portfolio comprised 36 power units in 12 countries around the world*.
- Contracts were signed for the supply of nuclear fuel for NPPs and research reactors in the Czech Republic, Egypt and India.
- Projects were underway in more than 50 countries worldwide.

* Including power unit No. 1 of the Belarusian NPP.

2.2.1. Promoting ROSATOM's technologies on foreign markets

Despite the challenges posed by the COVID-19 pandemic, in 2020, the Corporation continued to work towards securing new orders for the construction of Russian-design NPPs abroad.

GRI 103-1

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 uranium supply and NPP construction to assistance in project financing 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 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 those based on Russian technology).

In 2020, ROSATOM continued to participate in the procedure for selecting a strategic investor for Belene NPP in Bulgaria.

ROSATOM also held consultations with the China Atomic Energy Authority on the draft long-term cooperation programme on the peaceful use of nuclear energy. As part of the programme, the parties reached agreement in principle on a number of areas outlined in the minutes of the 24th meeting of the Nuclear Subcommittee under the Russian-Chinese Commission on Preparing Regular Meetings of the Prime Ministers.

As part of its efforts to develop integrated sales on international markets, in 2020, ROSATOM held overseas workshops on its product areas related to the construction of NPPs and Nuclear Research and Technology Centres (NRTCs). The Corporation also submitted a number of offers concerning NPP and NRTC projects to its partners.

Overall, in 2020, ROSATOM took part in more than 50 overseas events, including 3 overseas industry exhibitions and 4 overseas industry workshops. ROSATOM's organisations took part in 44 overseas events.

In 2020, ROSATOM's divisions and organisations held and participated in more than 25 international events in new and innovative online formats. This included organising ROSATOM's virtual exhibition displays at the European Research Reactor Conference 2020 (RRFM 2020), the Hanhikivi 1 Business Seminar & Meeting and other conferences. ROSATOM's speakers gave presentations at international online events, such as the WNA Strategic eForum 2020, World Energy Week LIVE (WEW LIVE), etc.

> ROSATOM arranged the first-ever virtual tour in the Russian nuclear engineering industry as part of a webinar for potential Saudi Arabian suppliers to the nuclear industry; the tour included presentations and a live broadcast from a production workshop.

ROSATOM continued to promote its offers in such areas as large and small NPPs and NRTCs in a number of countries, including South Africa, Hungary, Brazil, Bangladesh, the Philippines, Saudi Arabia, Indonesia and the Czech Republic.

In 2020, ROSATOM continued to maintain communication with potential customers for small NPPs in the form of marketing presentations, technical workshops and direct negotiations. Numerous countries in Latin America, Africa, the Middle East and Southeast Asia express considerable interest in small NPPs.

2.2.2. Changes in the portfolio of overseas orders and overseas revenue

In the reporting year, ROSATOM's 10-year portfolio of overseas orders reached USD 138.3 billion.

Changes in the portfolio of overseas orders, USD billion

	2018	2019	2020
10-year portfolio of overseas orders, including:	**133.2**	**140.1**	**138.3**
NPP construction abroad	92.0	97.4	89.1
Uranium products	13.9	13.2	13.3
Nuclear fuel assemblies and other activities	27.3	29.5	35.8

At year end, overseas revenue totalled USD 7.5 billion.

Changes in overseas revenue, USD million

	2018	2019	2020
Overseas revenue, including:	**6,462**	**7,228**	**7,475**
NPP construction abroad	2,820	3,595	4,098
Uranium products	1,717	1,742	1,670
Nuclear fuel assemblies and other activities	1,926	1,892	1,707

2.2.3. NPP construction abroad

In 2020, ROSATOM's overseas NPP construction project portfolio included 36 nuclear power units at various stages of implementation. Russian-design nuclear reactors that are currently under construction fully meet international safety requirements.

GRI 103-3

NPP, country	Results
Asia	
Rooppur NPP, Bangladesh	Concreting of the fourth layer of the internal containment vessel up to the +38.500 metre level was completed at power unit No. 1. The supporting truss of the reactor at power unit No. 2 was moved into final position. The Padma River cargo terminal at the construction site of the future NPP became fully operational.
Kudankulam NPP, India	ROSATOM was actively supplying equipment to the construction site of the second stage of Kudankulam NPP. Since the start of 2020, seven shiploads of equipment were delivered to India, including the eighth steam generator for power unit No. 4.
Tianwan NPP, China	Detailed engineering designs are being prepared for power units No. 7 and 8; long-lead equipment is being manufactured.
Xudabao NPP, China	Licensing documents are being drafted. Long-lead equipment is being manufactured.
Europe	
Paks II NPP, Hungary	The foreign customer submitted the full set of documents required for obtaining a licence for the construction of power units No. 1 and 2 for review to the Hungarian Atomic Energy Authority. Supplementary agreement No. 4 to the contract for engineering design, supply and construction of power units No. 1 and 2 of Paks II NPP was signed; the agreement enables the start of soil stabilisation and waterproofing before the foreign customer obtains the licence for the construction of power units No. 1 and 2 of Paks II NPP.
Belarusian NPP, Belarus	Power unit No. 1 was connected to the power grid of the Republic of Belarus. Testing was performed as part of the power start-up programme in order to commence pilot operation. The testing of safety systems with an open reactor was started at power unit No. 2 and was successfully completed in January 2021.
Hanhikivi 1 NPP, Finland	The development of design documents for the first phase was completed, and they were accepted by the Finnish customer, Fennovoima Oy.
Middle East and North Africa	
El Dabaa NPP, Egypt	Grading and levelling was completed at the sites of construction and installation facilities. Permits were obtained for the construction of the first construction and installation facilities.
Akkuyu NPP, Turkey	The supporting and thrust trusses of the reactor pit were moved into final position in the reactor building of power unit No. 1; the reactor vessel and a set of steam generators were delivered to the site. Concreting of the foundation of the reactor building was completed at power unit No. 2; the core catcher was moved into final position. The licence was obtained for the construction of power unit No. 3. Construction of storage facilities for new and spent nuclear fuel was commenced.

In 2020, ROSATOM continued negotiations over the draft general contract for NPP construction in Uzbekistan, with engineering surveys underway on the NPP construction site in order to prepare engineering designs of the NPP.

2.2.4. NPP servicing abroad

ROSATOM provides maintenance services for 49 Russian-design power units abroad that are currently in operation or at the design/construction stage.

The Corporation's product portfolio targeted at international markets includes a wide range of services covering the entire NPP life cycle: from assessing and developing key nuclear infrastructure components in customer countries to NPP decommissioning.

As part of the project to extend the life of power unit No. 2 of the Armenian NPP, in 2020, ROSATOM completed scheduled preventive maintenance and signed contracts for the performance of work and supply of equipment in 2020 and 2021, reactor vessel annealing and upgrades to the emergency core cooling system.

The reporting year also saw the signing of an intergovernmental protocol to the Agreement on the Construction of Rooppur NPP concluded in 2011; the protocol establishes a framework for expanding cooperation in NPP servicing.

ROSATOM provided support for scheduled preventive maintenance at power units No. 1 and 2 of Kudankulam NPP (India) and power units No, 1, 2 and 3 of Tianwan NPP (China), including remote support amid COVID-related restrictions imposed globally.

570 members of operating and maintenance personnel at foreign NPPs underwent training as part of long-term and short-term training programmes in 2020, including 344 employees at Rooppur NPP (Bangladesh), 126 employees at Akkuyu NPP (Turkey) and 100 employees in other regions.

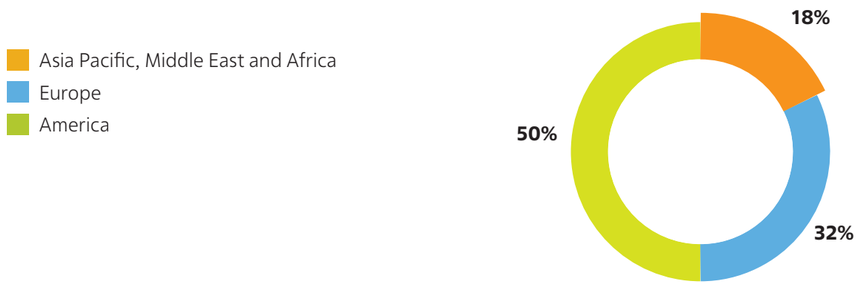
ROSATOM jointly with the expert community carried out an assessment of Egypt's nuclear infrastructure.

2.2.5. Export of uranium products and natural uranium enrichment services

JSC TENEX is ROSATOM's main organisation promoting uranium conversion and enrichment services on the global market and supplying enriched uranium for power and research reactors. In 2020, JSC TENEX remained one of the leading suppliers of nuclear fuel cycle front-end products.

All obligations under existing contracts in the reporting year were fulfilled by JSC TENEX on time and in full, with uranium products supplied to 41 customers in 19 countries worldwide. The annual sales volume exceeded USD 2 billion.

Regional structure of uranium product sales in 2020



In the reporting year, JSC TENEX concluded 30 deals with 17 customers in seven countries (including side agreements to existing contracts). The value of the deals totalled about USD 1.6 billion.

In 2020, ROSATOM and the US Department of Commerce signed a new amendment to the Agreement Suspending the Antidumping Investigation on Uranium from the Russian Federation, enabling the Corporation to fulfil all of its existing contractual obligations, which include uranium supplies until the end of the next decade, and to compete for new long-term orders.

Uranium mining abroad

In 2020, uranium mining enterprises of JSC Uranium One Group implemented the annual production programme in full. They produced 4,300 tonnes of uranium. A decline in production compared to previous years was caused by the suspension of operations of joint uranium mining ventures in the Republic of Kazakhstan for more than three months due to the impact of the COVID-19 pandemic.

Uranium mining by Uranium One Group enterprises, tonnes

	2018	2019	2020
Kazakhstan	4,375	**4,617**	4,276
US	10	–	–
Total	**4,385**	**4,617**	**4,276**

As at 31 December 2020, the mineral resource base of JSC Uranium One Group (including a 100% stake in Mantra Resources Pty Limited) under international reporting standards totalled 187,000 tonnes.

The Corporation plans to consolidate its position on the global uranium market, develop its mineral resource base and continuously improve the economics of its natural uranium mining projects.

2.2.6. Nuclear fuel export

The foreign revenue of JSC TVEL, which exports nuclear fuel, totalled about USD 0.7 billion in 2020. The 10-year portfolio of overseas orders reached USD 15.7 billion.

In 2020, ROSATOM's share on the global nuclear fuel fabrication market totalled 17%. In the reporting year, Russian nuclear fuel fully met the demand of Russia, Armenia, Belarus, Bulgaria, Hungary, Slovakia and the Czech Republic for reactor fuel. Russian nuclear fuel is also used in NPP reactors in India, China, Ukraine and Finland. In addition, ROSATOM, in cooperation with Framatome, supplies fuel and components manufactured in Russia from reprocessed uranium to Western European NPPs.

The following contract documents were signed or came into force in 2020:

- A contract with the Bangladesh Atomic Energy Commission (BAEC) for the supply of nuclear fuel for Rooppur NPP;
- A contract with the Nuclear Power Corporation of India Limited (NPCIL) for the transition of the two power units of Kudankulam NPP that are currently in operation to new fuel, TVS-2M, and the extension of the fuel cycle from 12 to 18 months;
- A contract with a Czech company (ALTA, a.s.) for the supply of a batch of fuel for the LWR-15 research reactor in the Czech Republic;
- A contract with a Czech research organisation Centrum výzkumu Řež (CVR) for the supply of a batch of uranium dioxide powder for research;
- A 10-year contract between PJSC NCCP and the Egyptian Atomic Energy Authority (EAEA) for the supply of uranium and aluminium components of low-enriched nuclear fuel for the ETRR-2 research reactor..

2.2.7. New products for international markets

Construction of Nuclear Research and Technology Centres

In 2020, construction of a Nuclear Research and Technology Centre (NRTC) continued in Bolivia. Despite a national political crisis that arose in Bolivia in late 2019 and early 2020 and the COVID-19 pandemic, the NRTC construction is proceeding smoothly. Construction and installation at stage 1 and 2 facilities are nearing completion; process equipment has been delivered, and equipment installation and pre-commissioning are underway.

In the reporting year, ROSATOM negotiated with a Vietnamese customer on the contract for a feasibility study for an NRTC project. The Vietnamese party is expected to complete formal contractor selection procedures and proceed to sign the contract for the feasibility study.

In 2020, the Corporation also took steps to expand the NRTC product line in order to meet the needs of foreign customers: a design concept was developed for an NRTC based on a small-scale research reactor with natural coolant circulation. Steps were taken to create a single trademark, RIVER (Research Innovative VErsatile Reactor), with differences in the capacity/type of reactor units reflected in their names.

Promoting life cycle back-end services

The Corporation is promoting the Balanced Nuclear Fuel Cycle, an integrated product for the back end of the nuclear fuel cycle, on the global market. This is an offer incorporating certain elements of a closed nuclear fuel cycle and enabling effective recycling of regenerated nuclear materials and a significant decrease in the volume and radioactivity level of radioactive waste sent for disposal. This is achieved through spent nuclear fuel processing and high-level waste fractionation.

In 2020, JSC TVEL, the integrator responsible for the decommissioning of facilities posing nuclear and radiation hazards, developed a comprehensive integrated offer covering the full cycle of services ranging from designing a facility to site remediation following its decommissioning. The annual revenue exceeded RUB 4 billion. 11 contracts worth a total of more than RUB 1 billion were concluded on the international market. The geographical scope of these deals includes Belgium, Finland, Germany, Spain, Bulgaria and the People's Republic of China.

Other areas of new product sales

In June 2020, JSC Rusatom Service and a Hungarian corporation MVM established a joint venture, European Power Services Ltd., in order to enable ROSATOM and JSC Rusatom Service to maintain a presence on local markets in Central and Eastern Europe, integrate local capabilities of MVM enterprises and the expertise of Russian companies more effectively and adopt flexible approaches to contracting and project implementation.

As part of the Road Map for Hydrogen Energy Development in the Russian Federation until 2024 approved by the Government of the Russian Federation, ROSATOM continued to take active steps to promote cooperation with international companies in order to jointly assess prospects for hydrogen exports to Europe and Asia. Under a cooperation agreement signed in 2019, the Corporation jointly with the Agency for Natural Resources and Energy of the Ministry of Economy, Trade and Industry of Japan is preparing a feasibility study for a project to export hydrogen from Russia to Japan.

In early 2020, JSC ETC GET became part of ROSATOM. The company develops computer-based NPP and TPP simulators and performs mathematical modelling of processes and process systems. Its integration in the industry will enable ROSATOM not only to fulfil its commitments to develop and export full-scale, analytical, local and other NPP simulators but also to develop a strong global market player providing mathematical modelling services, including for other industries.

2.2.8. Plans for 2021

In 2021, ROSATOM plans to maintain its 10-year portfolio of overseas orders at the level of USD 140 billion.

In addition, ROSATOM plans to:

- Implement current NPP and NRTC construction projects, where systematic cooperation has been initiated and established. The Corporation expects to obtain licences for the construction of power unit No. 4 of Akkuyu NPP in Turkey and power units No. 5 and 6 of Paks II NPP in Hungary. ROSATOM also plans to move steam generators at power unit No. 1 of Rooppur NPP (Bangladesh) into final position and deliver four steam generators to the construction site of power unit No. 2. In addition, the Corporation plans to hand over stages 1 and 2 of the NRTC in Bolivia to the customer;
- Develop cooperation with foreign energy companies and industrial partners to promote TVS-K fuel, expand the range and the sales geography of fuel and components for foreign-design research reactors and participate in competitive tendering for nuclear fuel supply to NPPs in Europe;
- Diversify its product offer and launch new products on new markets. In the small NPP segment, ROSATOM plans to accelerate the preparation of preliminary feasibility studies for the first small NPP construction projects in cooperation with foreign customers;
- As part of its efforts to expand its NRTC product line to meet customer needs, ROSATOM will continue to improve its integrated offer to promote the RIVER product line on overseas markets. ROSATOM will also continue to implement IGAs on cooperation in NRTC construction in partner countries.

In order to proceed with the project to build a multipurpose irradiation centre in Uzbekistan, in 2021, ROSATOM expects to obtain approvals and conclude contracts for the supply of process equipment for the centre, place orders with manufacturing enterprises, perform front-end engineering design and start the construction of the centre.

Given the scale of the nuclear decommissioning business, in 2021, the Corporation plans to expand its footprint on the relevant overseas markets.

ROSATOM will continue to drive the development of the hydrogen energy sector in Russia and work towards becoming its integrator. It will also develop hydrogen projects and take steps to become a technology leader in this area.

In the coming years, ROSATOM plans to launch a number of products in the hydrogen energy segment on the Russian and international markets; these will include hydrogen produced with zero carbon emissions or using carbon capture and storage technology, as well as the relevant equipment for hydrogen production, storage and transportation.

2.3 Energy Efficiency

2.3.1. Energy efficiency management system

GRI 103-1
GRI 103-2

Energy conservation is an important prerequisite for the efficient use of ROSATOM's energy resources, making the Corporation more competitive and reducing its negative environmental impact. An energy conservation and energy efficiency improvement programme for the period from 2018 through 2022 is being implemented in the Russian nuclear industry.

In accordance with the government programme of the Russian Federation 'Development of the Nuclear Power and Industry Complex' (hereinafter referred to as the 'DNPIC programme'), between 2015 and 2020, ROSATOM set and achieved the following targets for reduction in energy consumption as a percentage of the actual consumption volume in 2015:

Year	2016	2016	2017	2017	2018	2018	2019	2019	2020	2020
Indicator	target	actual	target	actual	target	actual	target	actual	target	actual
Energy savings against 2015, %	3.0	6.6	4.0	6.7	5.0	8.9	6.0	9.7	7.0	9.84
Cumulative total savings between 2016 and 2020, RUB billion (excluding VAT)	-	1.6	-	2.4	-	2.6	-	2.9	-	2.95

Implementation of energy efficiency management and energy management systems

Nuclear organisations use most of the following energy efficiency management tools:

- An action plan or programme for energy conservation has been developed and approved;
- The achievement of energy efficiency targets is monitored, and progress in the implementation of the energy conservation programme is reviewed;
- Most elements of an energy management system compliant with the international ISO 50001 standard are in place;
- Energy consumption is assessed at the main stages of the production cycle;
- Formalised energy efficiency requirements for investment and procurement activities have been approved;
- Employee remuneration is linked to energy conservation performance in all core divisions.

In addition, nuclear organisations use the Automated Energy Efficiency Management System (AEEMS) for reporting on energy conservation and improvement of energy efficiency.

Number of organisations covered by the AEEMS

Within the scope of consolidation of:	2018	2019	2020
ROSATOM	78	78	80
JSC Atomenergoprom	44	48	50

2.3.2. Results in 2020[64]

In 2020, energy costs of ROSATOM's organisations (under comparable conditions, in 2015 prices) were as follows.

[64] Information is provided on 92 of ROSATOM's organisations.

Energy consumption in the industry in physical terms (reduction against 2015 as the base year)

Division/complex	Heat		Water		Electricity		Other (gas, fuel oil)	
	Actual consumption in the reporting period under comparable conditions, '000 Gcal	%	Actual consumption in the reporting period under comparable conditions, '000 m³	%	Actual consumption in the reporting period under comparable conditions, '000 kWh	%	Actual consumption in the reporting period under comparable conditions, tonnes of fuel equivalent	%
JSC Atomredmetzoloto	633.99	27.56	4,220.17	3.06	564,282.44	5.96	-	-
JSC Atomenergomash	61.22	2.99	2,834.15	3.75	120,427.88	28.82	66,488.88	14.44
JSC Rosenergoatom	347.83	1.87	1,107,344.16	6.08	840,034.64	4.06	-	-
JSC Science and Innovations	235.08	12.21	6,265.12	12.64	174,142.40	7.07	916.01	9.18
JSC RIR	-	-	262,994.35	-1.33	-	-	2,145,359.70	7.06
FSUE Atomflot	-	-	183.63	5.99	25,788.97	6.07	5,780.43	6.02
Environmental Solutions	564.76	22.15	25,540.25	35.66	270,915.08	29.49	6,158.70	3.98
NWD	1,943.22	9.54	66,690.40	1.12	825,881.18	10.52	203,839.72	9.21
Other	2,196.08	9.64	477,113.54	8.16	2,921,327.21	6.42	13,849.93	3.90
Total across the industry	**5,982.18**	**12.85**	**1,953,185.77**	**6.09**	**5,742,799.80**	**8.68**	**2,442,393.35**	**7.43**

Energy consumption in JSC Atomenergoprom in physical terms (reduction against 2015 as the base year)

Division/complex	Heat		Water		Electricity		Other (gas, fuel oil)	
	Actual consumption in the reporting period under comparable conditions, '000 Gcal	%	Actual consumption in the reporting period under comparable conditions, '000 m³	%	Actual consumption in the reporting period under comparable conditions, '000 kWh	%	Actual consumption in the reporting period under comparable conditions, tonnes of fuel equivalent	%
JSC Atomredmetzoloto	633.99	27.56	4,220.17	3.06	564,282.44	5.96	-	-
JSC Atomenergomash	61.22	2.99	2,834.15	3.75	120,427.88	28.82	66,488.88	14.44
JSC Rosenergoatom	347.83	1.87	1,107,344.16	6.08	840,034.64	4.06	-	-
Other	2,412.31	9.69	740,479.40	4.79	2,961,681.16	6.72	2,048,560.70	7.26
Total across JSC Atomenergoprom	**3,455,350**	**12.83**	**1,854,877.88**	**5.56**	**4,486,426.12**	**6.92**	**2,115,049.58**	**7.50**

Total energy costs in the industry (excluding VAT) between 2018 and 2020

Division/complex	In the reporting period under comparable conditions (in 2015 prices), RUB billion		
	2018	2019**	2020
JSC Atomredmetzoloto	1.64	1.60	1.57
JSC Atomenergomash	0.76	0.81	0.77
JSC Rosenergoatom	1.89	1.91	1.77
JSC Science and Innovations	0.85	0.85	0.84
JSC RIR	-	5.29	5.04
FSUE Atomflot	0.13	0.13	0.13
Environmental Solutions	1.97	1.94	1.81
NWD	5.58	5.48	5.46
Other	9.23	9.15	9.60
Total across the industry	**22.06**	**27.16**	**26.99**

Total energy costs of JSC Atomenergoprom's organisations (excluding VAT) between 2018 and 2020

Division/complex	In the reporting period under comparable conditions (in 2015 prices), RUB billion		
	2018	2019**	2020
JSC Atomredmetzoloto	1.64	1.60	1.57
JSC Atomenergomash	0.76	0.81	0.77
JSC Rosenergoatom	1.89	1.91	1.77
Other	9.39	15.07	14.45
Total across JSC Atomenergoprom	**13.68**	**19.40**	**18.56**

** An increase in the indicator was caused by the inclusion of JSC RIR in the scope of reporting.

GRI 302-4

In accordance with the DNPIC programme, the energy conservation target for ROSATOM for 2020 has been set at 7% of the actual consumption volume in 2015.

According to reports by nuclear organisations, in the reporting year, actual energy cost savings totalled 9.84% (as a cumulative total), or RUB 2,945 million (excluding VAT) under comparable conditions and using comparable units of measurement against 2015 as the base year, including a breakdown by Division/complex.

Savings totalled RUB 2.95 billion (excluding VAT) in monetary terms and 11,405,271.83 GJ in physical terms. An increase in savings in GJ was achieved primarily at JSC RIR.

Energy cost savings (against 2015 as the base year, excluding VAT) between 2018 and 2020

Division/complex	2018		2019		2020	
	RUB million	%	RUB million	%	RUB million	%
JSC Atomredmetzoloto	163.91	9.11	197.19	10.95	227.60	12.64
JSC Atomenergomash	213.22	21.85	138.07	14.48	187.35	19.65
JSC Rosenergoatom***	116.33	5.78	95.94	4.78	90.40	4.86
JSC Science and Innovations	65.35	7.10	71.29	7.75	82.92	9.01
JSC RIR	-	-	56.88	1.06	303.34	5.67
FSUE Atomflot	8.65	6.02	8.67	6.04	8.69	6.05
Environmental Solutions	409.87	17.20	446.59	18.74	570.99	23.97
NWD	538.83	8.81	613.82	8.31	645.03	10.57
Other	1,158.96	7.49	1,285.87	12.33	829.65	7.95
Total across the industry	**2,675.12**	**8.90**	**2,914.31**	**9.70**	**2,945.97**	**9.84**

Energy cost savings in JSC Atomenergoprom's organisations (against 2015 as the base year, excluding VAT) between 2018 and 2020

Division/complex	2018		2019		2020	
	RUB million	%	RUB million	%	RUB million	%
JSC Atomredmetzoloto	163.91	9.11	197.19	10.95	227.60	12.64
JSC Atomenergomash	212.95	21.85	138.07	14.48	187.35	19.65
JSC Rosenergoatom***	116.33	5.78	95.94	4.78	90.40	4.86
Other	1,176.58	11.13	1,304.63	7.92	1,163.43	7.45
Total across JSC Atomenergoprom	**1,669.77**	**10.87**	**1,735.83**	**8.17**	**1,668.77**	**8.25**

*** A reduction in savings in RUB million accompanying an increase in savings as a percentage (in 2020 compared to 2019) was due to the revision of indicators for the base year at some NPPs (Beloyarsk NPP, Kalinin NPP, Kursk NPP, Novovoronezh NPP).

2.3.3. Plans for 2021 and for the medium term

ROSATOM (through JSC RIR) is implementing a project to improve the reliability and performance of the Corporation's energy facilities. The project involves implementing an information system for calculating technical and economic indicators and operational planning between 2020 and 2022; the system will incorporate certain elements of end-to-end digital technologies. It will help to automate the collection and analysis of process status data, equipment monitoring, the calculation of indicators and operational planning at CHPPs. The system is being implemented at five energy facilities of JSC RIR in Novouralsk (Sverdlovsk Region), Glazov (Udmurt Republic), Krasnokamensk (Zabaykalsky Territory), Seversk (Tomsk Region) and Dimitrovgrad (Ulyanovsk Region). The project will provide substantial economic and environmental benefits.

In order to meet the energy conservation target for 2021 set under the DNPIC programme at 1%, the following individual differentiated energy conservation targets (against 2020 as the baseline) have been set and included in KPI maps of executives of ROSATOM's Divisions/complexes:

Division/complex	Target for 2021 (%)
JSC Atomredmetzoloto	1
JSC Atomenergomash	1
JSC Rosenergoatom	0.20
JSC Science and Innovations	0.30
JSC RIR	0.50
FSUE Atomflot	0.20
Environmental Solutions	0.30
NWD	1
Other	from 0.20 to 4

In the medium term, ROSATOM will also continue to take steps to meet the requirements of the DNPIC programme until 2027:

Reduction in energy consumption (under comparable conditions):	Target (%)						
	2021	2022	2023	2024	2025	2026	2027
against 2020	0.5	1	1.5	2	2.5	-	-
against 2025	-	-	-	-	-	0.5	1

In addition, between 2021 and 2027, ROSATOM plans to:

- Develop and approve the Energy Conservation and Energy Efficiency Improvement Programme for the period from 2023 through 2027 in 2022;
- Monitor progress on scheduled energy audits in 53 nuclear organisations;
- 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 industry-wide efforts to increase the Corporation's level of maturity in the sphere of sustainable development;
- Continuously improve the range of functions in the AEEMS, including updating the scope of reporting in the organisations.

2.4 Business Efficiency

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 ROSATOM 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 2020

RPS organisations

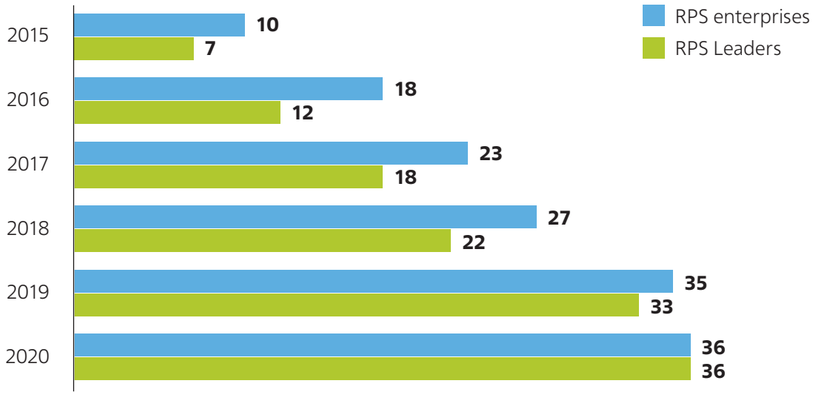
Since 2015, ROSATOM has been working systematically to develop RPS in nuclear organisations:

- Goals are decomposed to the level of area supervisors;
- The manufacture of an organisation's core products (production flows) is optimised;
- RPS projects are implemented;
- Training is provided for employees;
- Incentive systems are being developed to encourage continuous improvement.

In 2020, the scope of RPS roll-out included 36 organisations. In Q1 2021, these organisations underwent peer reviews of progress in RPS development, which are aimed at promoting RPS development. Following the peer reviews and an assessment of progress on business goals by the Steering Board of the project aimed at comprehensive production optimisation in nuclear organisations, the status of an RPS Leader was given to 36 organisations.

According to the RPS development concept, all organisations participating in the systematic roll-out of the system are divided into three levels: RPS Leaders, RPS Candidates and RPS Reserve. RPS Leaders are provided with a package of privileges.

Changes in the number of rps enterprises in the industry



RPS benchmarks

An RPS benchmark is a processing stage or a process in the process flow for a key product of ROSATOM's organisation that has achieved the level of global best practices in production engineering. The Corporation tasks its organisations with creating RPS benchmarks that could be used as a basis for employee training in the ROSATOM Production System both in the industry and nationwide.

In 2020, 26 benchmarks were created and rolled out across various types of manufacturing processes, and 10 benchmarks were rolled out across production support processes. The creation of each benchmark was preceded by at least five to seven years of preparatory work.

The pandemic necessitated a new approach to creating and rolling out RPS benchmarks. This task was addressed by shop floor clubs established in early 2020. These are voluntary professional communities facilitating open exchange of knowledge and experience and collaborative problem-solving as part of the implementation of the ROSATOM Production System. To date, three shop floor clubs have been established and are active: Mechanical Assembly Operations, Multi-Product Manufacture and Design Organisations.

Lean Smart Plant

ROSATOM continued to implement a project to transition to a digital RPS enterprise (Lean Smart Plant). This transition includes three stages:

- Establishment of RPS enterprises where process flows are organised and RPS benchmarks are created for manufacturing processes and production support processes;
- Digitisation of core process architecture of the enterprises based on flexible digital work cells operating as a pull system; the use of an automated planning system and an information system for managing assembly lines and equipment maintenance and repairs;
- Large-scale digitisation, which includes digital design, computer-aided and supercomputer engineering, industrial sensors and the industrial Internet, the use of virtual and augmented reality technologies, expert systems and artificial intelligence.

Six RPS organisations participated in the project in 2020 (JSC CDBMB, JSC Afrikantov OKBM, PJSC ZIO-Podolsk, JSC CMP, PJSC KMP and PJSC MSZ); they created 10 RPS benchmarks for production support processes. In addition, a second batch of pilot projects was selected and launched. Organisations developing production support processes independently were provided assistance in developing road maps for the independent development of production support processes.

RPS engineering

In 2020, RPS engineering standards were applied at construction sites of 25 organisations in the industry.

In 2020, Kursk NPP successfully validated a level 2 RPS engineering benchmark in the sphere of construction. In addition, in 2020, five RPS construction benchmarks were created for the first time to promote the sharing of experience at construction sites in the Divisions:

- The fuel fabrication/refabrication module forming part of the pilot and demonstration energy facility at JSC SCP;
- Shaft 19-RESh at Mine No. 6 of PJSC PIMCU;
- The regional centre for RAW conditioning and long-term storage at FEC DalRAO;
- The construction project to renovate the Granit Sports Centre at FSUE Mayak Production Association;
- Construction and installation management at JSC AEM-Technology.

In 2020, ROSATOM revised qualitative criteria and designed a new scale for assessing progress in adopting RPS engineering standards, which enables the most accurate assessment of progress in the introduction of RPS engineering by all parties involved in the construction process: the customer, contractors and the general contractor.

As part of training in RPS engineering, in 2020, 220 people completed face-to-face training courses, and 516 people completed online training courses. 35 tests were conducted to assess retained knowledge. 14 in-house coaches were trained. 9 case studies were conducted; they involved solving typical problems arising at construction sites; these exercises were aimed at sharing the relevant practices with organisations that had no facilities under construction in 2020.

Supplier development

In 2020, ROSATOM improved its approach to developing the production system of its suppliers: guidance documents were finalised, and uniform industry-wide methodological requirements for supplier development were issued. Work was initiated in accordance with the new uniform industry-wide methodological guidelines to develop the production system in more than 30 enterprises supplying the industry.

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 Productivity National Project. Introduction of the principles and tools forming part of the ROSATOM Production System enables a significant improvement in the efficiency of healthcare, education and utility systems and other sectors in Russia.

In 2020, the Efficient Region project was underway in 24 regions, with Saint Petersburg, the Voronezh and Kursk Regions and the Perm Territory joining the project during the year. More than 3,500 social and economic projects were implemented in the regions.

In 2019, the concept of a benchmark was introduced in the Efficient Region project. It was decided to group best practices into three levels: federal, regional and local. 32 benchmarks were created in 2020 in the following areas of social and economic life in the regions: public and municipal administration, education, healthcare, housing and utilities, job centres, multi-service centres, social security, sports and industry.

Six out of seven prizes in the Project Olympus competition in the sphere of professional project management in the public sector were won by benchmarks created as part of the Efficient Region project.

In 2020, workstreams within the Efficient Region project included End-to-End Flows in the Development of a Lean Personality. This workstream is focused on continuously shaping and developing competences within the educational system that are required by employers. End-to-end flows are supported by existing social clubs, such as the Club of Directors of Lean Schools and Kindergartens, the League of Lean Colleges and the Association of Lean Universities. In the reporting year, seven end-to-end flows were established in three regions.

Russian Production Systems Partnership

On 30 September 2019, senior executives of ROSATOM and major corporations held a meeting, which resulted in the establishment of the Russian Production Systems Partnership. At year-end 2020, the Partnership comprised 10 members, including:

- JSC Russian Railways;
- PJSC Rostelecom;
- State Space Corporation ROSCOSMOS;
- ROSATOM;
- PJSC United Aircraft Corporation.

In February 2020, the working group of the members' representatives held a meeting to discuss work plans for 2020. The following focus areas were prioritised:

- Creation of benchmark flows in leading factories and 'sister' factories;
- Supplier development and creation of benchmarks throughout the supply chain;
- Developing the regions of operation of companies that are members of the Association.

Examples of joint projects include cooperation between JSC Russian Railways and JSC ASE EC in the construction of the Minskoye and Sanino railway stops on the ring railway; as part of the project, the amount of time required to obtain approval for time slots for construction work was reduced four-fold, with work on the Sanino railway stop completed two months ahead of schedule.

Other successful joint projects aimed at reducing the lead time included collaborations between Krasnoye Sormovo Shipyard and JSC Afrikantov OKB Mechanical Engineering, JSC ISS-Reshetnev Company and FSUE Mining and Chemical Plant, PJSC Rostelecom and the RPS project office in Nizhny Novgorod, etc.

Projects to fight the COVID-19 pandemic

In the early spring of 2020, the ROSATOM Production System launched projects aimed at fighting COVID-19. During the first wave of the pandemic, work in this area, which is new to RPS, resulted in the development of solutions that enabled:

- A reduction in the amount of time spent by ambulances idling in front of inpatient hospitals from 9 hours to no more than 15 minutes;
- A two-fold reduction in the amount of time between receiving a call and the ambulance crew being dispatched to a COVID patient;
- A three-fold reduction in the amount of time required for hospital admission of patients in a serious condition;
- A 25% increase in the throughput capacity of the emergency department of an inpatient hospital;
- A reduction in patient waiting time in the emergency department from 30 minutes to no more than 3 minutes.

Recommendations for Russian regions were developed and made publicly available.

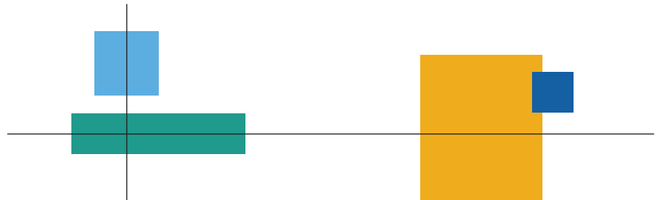
In addition to developing methodological recommendations, RPS specialists conducted training webinars on work organisation amid the COVID-19 pandemic for healthcare institutions, municipalities and other organisations. Training was provided to more than 700 specialists in healthcare institutions and regional healthcare departments.

Nuclear organisations took steps to adapt to the new environment and restrictions. Enterprises supplying medical products had an increased workload.

Since the start of the second wave of the COVID-19 pandemic, RPS has been actively cooperating with representatives of the Russian Ministry of Health in 16 regions where the outbreak of the disease is especially serious. Five to six lean projects have been implemented in each region to speed up PCR testing, improve the availability of emergency medical care and increase the throughput capacity of emergency departments of COVID hospitals.

RPS projects enabled a reduction in the amount of time required to conduct a PCR test and receive test results by a factor of 1.5 and 3.5 respectively, a 23% increase in the share of people who were able to contact the call centre, and a five-fold reduction in ambulance response time.

ROSATOM also worked in the same areas in nuclear towns and cities in cooperation with the FMBA of Russia.



The RPS participates in an intergovernmental working group on vaccination against COVID-19, along with the Russian Ministry of Health, the Russian Ministry of Industry and Trade, Rospotrebnadzor and other participants. The work is focused on two areas:

- Reducing the end-to-end lead time from vaccine bottling to vaccination;
- Increasing the throughput capacity of vaccination sites.

By early 2021, ROSATOM jointly with the Russian Ministry of Health, the Federal Service for Surveillance in Healthcare (Roszdravnadzor) and the Russian Ministry of Industry and Trade developed and implemented measures that helped to reduce the lead time three-fold. As part of efforts in the second focus area, pilot vaccination sites were set up with throughput capacity increased to 360 patients per day. This expertise is currently being replicated nationwide.

2.4.3 Plans for 2021

ROSATOM has prioritised the following four key topics for 2021:

- Project implementation across ROSATOM's new businesses;
- 360° Lean Smart: accelerated digital transformation. Incorporation of the Lean Smart logic into benchmark creation in all areas: the Lean Smart Plant, Lean Smart Engineering and the Lean Smart Government;
- Replication of experience of RPS benchmark creation and the sharing of best practices through the shop floor clubs, each of which is scheduled to have six to seven working meetings. In 2021, the number of their members is expected to grow; in addition, ROSATOM plans to establish the Design Engineers' Club;
- Development of the Efficient Region programme, creation of more than 50 benchmarks across various areas/sectors of the regional economy, cooperation with new regions.

Lean Smart Plant

The scope of the project to transition to a digital RPS enterprise (Lean Smart Plant) will be expanded. In 2021, ROSATOM plans to create at least 10 digital RPS benchmarks.

The list of key projects scheduled for 2021 in 20 organisations that have the status of an RPS Leader was presented by the heads of the RPS and IT functions at an industry-wide meeting in early December. In addition, during the event, a decision was made to develop comprehensive road maps combining RPS and IT projects under the Lean Smart Plant approach in early 2021, and the format of other joint Lean Smart initiatives was discussed.

RPS engineering

In 2021, ROSATOM plans to establish an RPS monitoring system for construction sites in the nuclear industry following the implementation of RPS monitoring at Akkuyu NPP and the MBIR project; continue to develop RPS construction benchmarks in the sphere of operational construction schedule management at five construction sites; continue to implement RPS engineering standards at construction sites of RPS organisations in the industry in 2021.

Supplier development

In accordance with ROSATOM's new uniform industry-wide methodological guidelines on developing suppliers' production systems, extensive systematic efforts will be made to develop suppliers in the nuclear industry; this will involve analysing supplier management experience gained during the past period and enhancing communication between a customer and a supplier as part of contract performance, with the scope of systematic development of suppliers' production systems including no less than 28 enterprises.

Introduction of lean techniques in Russia's social sector and industry

As part of the Efficient Region programme, ROSATOM will continue to create benchmarks in all areas of social and economic life in the regions and assess the level of development of the benchmarks. The programme will be joined by the Chuvash Republic, the Ulyanovsk Region and the Udmurt Republic.

Work will continue on the End-to-End Flows in the Development of a Lean Personality. The creation of benchmark flows of development of a lean personality will be initiated nationwide. ROSATOM plans to create such flows in nuclear towns and cities.

In terms of development of the production system among suppliers and in the regions, in 2021, ROSATOM will fulfil its commitments to improve labour productivity in Russian enterprises as part of the National Project to Improve Labour Productivity and Support Employment. JSC RPS has been tasked with creating benchmarks illustrating a comprehensive approach to engaging with enterprises participating in the programme.

Production Systems Partnership

In 2021, ROSATOM plans to actively engage all current members of the Partnership in the development of production systems with a focus on the following areas:

- Creation of benchmark flows in sister enterprises (the sharing of practices and joint work on the benchmarks);
- Training and internships using benchmarks (including conferences for coaches);
- Joint projects, including in new businesses.

The members of the Partnership are expected to join the Efficient Region project and the Lean Governors' Club in their regions of operation, as well as the Efficient Municipality project in nuclear towns and cities.

Another focus area will involve participating in pilot projects under a new Lean Tourism model and arranging pilot trips.

Projects to fight the COVID-19 pandemic

ROSATOM plans to continue to cooperate on the piloting of the lean healthcare model during the mobilisation period and to systematically apply the Corporation's approaches as part of the Lean Polyclinic project in nuclear towns and cities.

As part of the project to vaccinate the population, it is necessary to organise uninterrupted production and regular deliveries of the vaccine to the regions, with 69 million doses of the vaccine to be produced and supplied by August 2021. To achieve this, ROSATOM will continue to cooperate with the Russian Ministry of Health, Rospotrebnadzor, Roszdravnadzor and other participants of the intergovernmental working group.

CHAPTER 3

SOCIAL REPORT

GRI 102-14

Statement by Tatyana Terentyeva

Dear colleagues and partners,

Today, we are living in a global world and are facing not only tough competition in terms of technology, products and personnel, but also environmental and epidemiological risks. This has been made particularly evident by the COVID-19 pandemic. The Corporation's performance, stability of the economy and even people's lives depended on the speed of our response.

The past year has fundamentally reshaped our world, and we had to learn to live in a new reality. We adapted to the new environment fast enough and managed to ensure the continuity of all our processes and fulfil all our obligations, from defence procurement to international contracts.

Since nuclear enterprises must operate without interruptions, our employees had to be in the workplace during the pandemic. This posed a serious challenge for us in terms of safety, one of ROSATOM's key values. We closely cooperated with local authorities, heads of the regions and regional units of the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor) and the Russian Federal Biomedical Agency (FMBA) in towns and cities where nuclear enterprises operate. We purchased high-technology equipment for FMBA hospitals and systematically implemented lean techniques at hospitals, helping to improve the performance of healthcare institutions in terms of hospitalisation, testing, vaccine production and delivery. We improved existing and opened new PCR testing laboratories. We isolated critical operating personnel and separated production flows by increasing the number of shifts.

Tatyana Terentyeva

Deputy Director General for HR
of ROSATOM

We took timely steps to create an integrated platform underpinning our HR processes even before the pandemic: an Integrated Centre for Expertise, Policy and Standards, an Integrated HR Service Centre, an Integrated Career and Succession Management System and an Integrated Educational Environment. As a result, it was easy for us to adapt our internal systems to a new digital environment. Within a month after the lockdown was imposed, we created 40,000 mobile workplaces meeting all information security requirements, which enabled us to transition 70% of our office staff to remote work. 40% of office workers will continue working in a remote or hybrid format.

In addition to health and safety measures, during this period, people had an unprecedented need for support. We developed a strong communication system providing a direct link between the Corporation's management and each employee, including through video messages, live Q&A sessions with executives, extended briefings and crisis centres, in order to inform people about the situation and measures taken by ROSATOM through all available communication channels. We also continuously collected feedback from employees on the measures and executives' actions; we measured the stress level and set up mental health support hotlines. This approach enabled us to 'reach out' and support each employee; this helped people to show self-discipline and adopt a more responsible attitude to work.

The digital environment that we created enabled us to hold online conferences and removed all obstacles posed by the 'corporate hierarchy' and lack of approachability among executives. These barriers disappeared, and it became easy to ask a question in a chat or during a live conference and get an answer immediately. This hugely accelerated decision-making and brought trust and accountability to the next level. We created new digital formats for training and sports activities. Training was made available not only to employees but also to their families, children, schoolchildren and students. In total, ROSATOM held about 4,000 online training events with millions of views worldwide. Training connected people and the Corporation. We were the first in Russia to organise AtomSkills, our traditional corporate professional and engineering skills competition, online and became a runaway winner of the WorldSkills Hi-Tech online competition. We held the first international event, the Global Impact Conference, using AI and AR technologies, with participants from 26 countries globally.

The employee engagement rate increased by two percentage points to 84%, on a par with the best global companies. For us, this is a comprehensive indicator reflecting people's commitment to the development of the industry.

Our volunteers, whose number grew to 5,000 during the year of the pandemic, have done a great job supporting people. As part of the #WeAreTogether nationwide campaign, ROSATOM's volunteers processed over 11,200 requests for assistance in 42 towns and cities. In total, the Corporation conducted about 300 volunteer campaigns. At the same time, we launched a new initiative focused on collecting donations. Our top managers donated their monthly salaries to the Medical Volunteers Foundation. We joined the UN Global Compact for sustainable development and launched a research initiative to share our experience with both Russian and international partners, creating equal opportunities for all our employees to unlock their potential regardless of their gender, age, demographic or other aspects. The Corporation won the right to host the International Youth Nuclear Congress in 2022 in Russia for the first time.

I think that the main outcome of our efforts is that, despite the pandemic and associated challenges, the milestone year that marked the 75th anniversary of Russia's nuclear industry saw a number of major records. In that difficult year, ROSATOM not only was declared to be the best Russian employer among over 1,000 companies according to the rankings compiled by HeadHunter, Russia's largest recruitment platform, for the second time, but also simultaneously topped all subrankings based on scores assigned to the Corporation by the professional community, current and prospective employees and achieved the highest overall score in the rankings' ten-year history, breaking its own record set two years earlier. That and numerous other victories became possible thanks to the efforts of a big close-knit team of like-minded people, a personal contribution and a responsible attitude of each employee.

Key Results in 2020

- The average monthly salary totalled RUB 90,000 (up by 7.1% against 2019).
- The personnel turnover rate stood at 12%.
- The injury frequency rate stood and the lost time injury frequency rate (LTIFR) stood at 0.18 and 0.09 respectively.
- The employee engagement rate stood at 84%, on a par with the best employers in Russia.
- 79.65% of members of the executive succession pool were appointed to managerial positions in ROSATOM's organisations.
- Over 1,000 employees of ROSATOM and its organisations received government awards, certificates of appreciation and acknowledgements from the President of the Russian Federation.
- Over 15,800 employees and veterans received industry awards.

Awards

- ROSATOM was declared to be the best Russian employer by HeadHunter, Russia's largest online recruitment platform.
- ROSATOM's team won the WorldSkills Hi-Tech 2020 National Competition of Cross-Industry Skilled Professions for Workers in High-Technology Industries held in accordance with the WorldSkills methodology for the sixth time.
- ROSATOM was included in the top three in terms of social programmes for women in the first ranking of the best employers compiled by *Forbes Woman*.
- ROSATOM's Corporate Academy was included in the shortlist of the CIPD People Management Awards 2020, one of the largest international awards for HR, training and development specialists, in two categories: Best L&D Initiative – Public Sector and Best Resourcing Initiative.
- ROSATOM's Corporate Academy won the Crystal Pyramid 2020 Grand Prix award for its achievements in human capital management in the Corporate University of the Year category.

Key Events in 2020

- ROSATOM headed the Council for Sustainable Business Development, Corporate Social Responsibility and Volunteering of the Russian Chamber of Commerce and Industry.
- The Corporation joined the Coordination Council for the Development of Volunteerism and the Coordination Council for the Development of Communities of Young Professionals under the Civic Chamber of the Russian Federation.
- The Corporation joined the Expert Council for Sustainable Development of Russia's Ministry of Economic Development.
- ROSATOM's organisations put into effect the Uniform Industry-Wide Guidelines for Occupational Risk Management.
- The industry-wide Council for a Culture of Safe Behaviour was created; it is chaired by the Corporation's Director General.
- The Corporation launched a project titled 'Development of a Culture of Safe Behaviour at ROSATOM'.
- A visiting care service, We Are Responsible, was launched in the industry; it involves volunteers providing ongoing targeted assistance to retirees and veterans and participating in initiatives that contribute to the socialisation of the older generation.
- A comprehensive educational programme for volunteers was developed; it includes a total of more than 30 training and team-building events involving market experts, such as representatives of non-profit organisations and public figures.
- The AtomSkills industry-wide competition, the world's largest corporate professional skills competition organised in accordance with WorldSkills standards, was held.
- Individual career counselling, a new service for employees, was launched.
- 76% of face-to-face programmes were successfully converted to a distance learning format in a short time.
- ROSATOM launched new personnel training programmes: the Advanced Development Programme for Leaders of NPP Construction Projects in Russia and Abroad, the Executive E-School and the ProPartnership online training marathon.
- A marathon titled 'My ROSATOM' was held to promote youth initiatives, find and support young leaders.
- ROSATOM's young delegates participated in the Forsazh Forum focused on the UN Sustainable Development Goals.
- The first corporate series on challenges related to interaction in the team and horizontal interaction tools that help to respond to them was filmed.
- The Corporation's team took part in international 113-kilometre and sprint triathlon races for the first time.

3.1 Response to the Pandemic

GRI 103-1

Early 2020 saw an outbreak of a novel coronavirus disease around the world. In March, the World Health Organisation declared the COVID-19 outbreak a pandemic; accordingly, the Government of the Russian Federation imposed restrictions in the country. ROSATOM took all necessary measures to prevent the spread of the novel coronavirus in a timely manner.

The Corporation is exposed to significant risks and bears great responsibility; accordingly, ROSATOM attaches great importance to safety matters, including occupational safety and health.

Management approach

GRI 103-2

In March of the reporting year, ROSATOM and its organisations created two new governing bodies: crisis centres for preventing the spread of COVID-19 and an industry-wide analytical centre.

The crisis centres operate at all management levels; they promptly respond to risks posed by the spread of COVID-19, ensure safety in the course of operations, coordinate all preventive actions, monitor the epidemiological situation and make the relevant decisions if it deteriorates. To perform those functions, the crisis centres actively cooperate with municipal and regional governments, the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor) and the Russian Federal Biomedical Agency (FMBA).

The industry-wide analytical centre was created to assess risks and analyse the impact of the pandemic on the industry.

During the pandemic, the Corporation also redesigned its HR management system, including the shared service centre (JSC Greenatom). The internal transformation enabled ROSATOM to pay salaries to its employees on time, with all payments and bonuses remaining unchanged during stay-at-home days; ROSATOM also introduced additional benefits, such as sickness benefits.

Safety at work

To ensure operational continuity, the Corporation provided backups for all key jobs and introduced backup shifts for operating personnel. Backup employees were isolated and received regular and full updates on the current operational and epidemiological situation.

Critical employees operating nuclear facilities were isolated at health resort and rehabilitation centres of the Corporation's organisations. They were provided with 24/7 catering services on a shift basis, transportation between workplaces and temporary accommodation (places of isolation), full medical support and regular COVID-19 tests; in addition, ROSATOM introduced backup shifts. As at the end of 2020, 1,470 critical employees were isolated.

Remote work

At the peak of the pandemic, more than 40,000 people switched to remote work, with the number of business trips reduced by 55%.

Up to 90% of work meetings and conferences were converted to an online format. Twenty-four nuclear organisations were connected to Atom Space, a new video conferencing platform enabling the Corporation to hold over 700 webinars per month.

15,763 employees were granted remote access to corporate resources. A total of about 35,000 remote workplaces were created during the pandemic.

In 2020, ROSATOM decided to continue to develop the practice of remote work in the industry. At the end of December 2020, 17% of employees in the civilian sector of the industry worked remotely. According to a survey, nuclear organisations intend to allow up to 12% of their employees to work remotely on a permanent basis.

Sanitary and hygienic procedures

The Corporation established special sanitary and hygienic procedures for employees, including contactless thermometry, monitoring of the use of face masks and gloves, social distancing, the use of sanitisers, and regular disinfection of offices, common areas and industrial premises.

GRI 103-3

Testing and vaccination of employees

Following the outbreak of the pandemic, ROSATOM's organisations arranged COVID-19 PCR (polymerase chain reaction) testing and antibody testing for employees. In 2020, over 508,000 PCR tests and about 62,000 antibody tests were performed, which enabled early diagnosis and timely quarantine measures.

In late December 2020, employees in the industry started to get vaccinated against COVID-19 with Gam-COVID-Vac (Sputnik V). As at 31 May 2021, over 73,000 employees were vaccinated.

Prioritised personnel categories, such as critical employees, executives of industrial divisions and their backups, members of the crisis centres and executives of the organisations, were the first to be vaccinated. Vaccination is voluntary and is now available to everyone.

Order No. 33/1-1/128-r dated 1 March 2021 adopted jointly by ROSATOM and the FMBA stipulates that, to achieve herd immunity, at least 40% of employees in the industry and at least 60% of people living in nuclear towns and cities, except for those who already have immunity against COVID-19, must be vaccinated.

Communications

Amid the pandemic, the Corporation attached great importance to communications with employees. During severe crises caused by the pandemic, ROSATOM's Director General, executives of Divisions and organisations posted weekly video messages to employees. In 2020, the Director General posted at least 15 video messages answering most of employees' questions and addressing their concerns at the peak of the pandemic. The messages were posted on social media, the organisations' websites and in the corporate media. The messages by ROSATOM's Director General were regularly viewed by at least 400,000 people, garnering a total of over 6.5 million views.

Following the imposition of restrictions, the Corporation launched the COVID-19 hotline to inform employees and people living in nuclear towns and cities about anti-coronavirus measures and work organisation during the pandemic. In May, a mental health support hotline was also set up for employees and is still in operation.

In addition, at the peak of the pandemic, a large-scale campaign was launched to help employees in the industry combat COVID-19. Regular webinars were held on the topics of COVID and anti-COVID measures, remote work, work-life balance and self-discipline; numerous leaflets and posters on compliance with anti-COVID measures were issued; Golden Rules of Safe Conduct were developed, and their active implementation was initiated at the local level; and an industry-wide catalogue of 236 best practices of safe behaviour was compiled by 87 organisations.

In the reporting year, four pulse surveys were conducted to assess the emotional state of employees and the level of their satisfaction with pandemic-related measures taken in individual organisations and across the industry. The findings show that 81% of employees expressed a high opinion of care and support from executives during the lockdown. 76% of respondents considered actions taken by industry executives during the pandemic to be appropriate and effective.

Volunteering

In 2020, as part of response to the pandemic, ROSATOM's employees joined the #WeAreTogether national campaign, with over 1,100 volunteers from the Corporation participating in the campaign across Russia. During the pandemic, they processed more than 11,200 requests for assistance in 42 towns and cities.

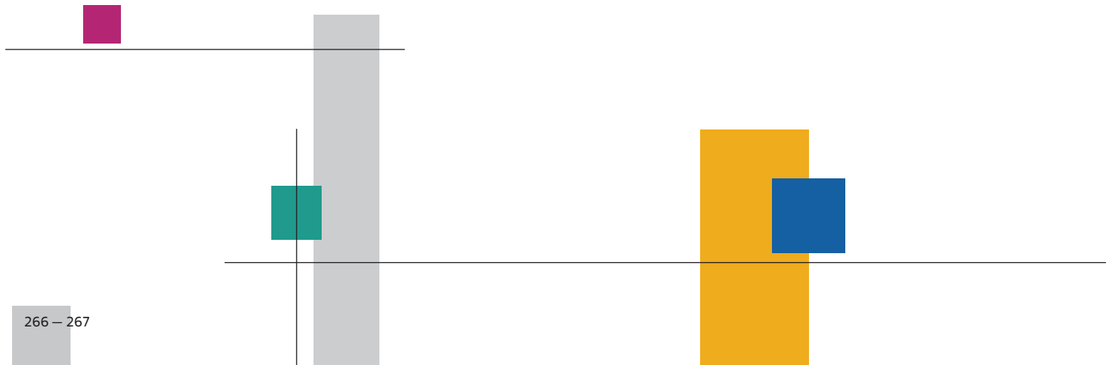
More than 19,500 families received food aid. In addition, at the very beginning of the pandemic, more than 200 top managers in the nuclear industry joined the campaign and donated their monthly salaries to its fund.

ROSATOM was awarded a commemorative medal and a certificate from the President of the Russian Federation 'For Selfless Contribution to the #WeAreTogether National Campaign for Mutual Assistance'. More than 10 employees in the nuclear industry were also awarded commemorative medals from the President for personal contribution to the campaign.

For details on assistance provided in nuclear towns and cities, see the section 'Response to the Pandemic' in the chapter 'Report on the Development of Nuclear Towns and Cities'.

Plans for 2021 and for the medium term

- To create an environment for continuous development.
- To shape an open culture and encourage employee involvement.
- To enable sustainable development.
- To develop a safety culture aligned with the Vision Zero paradigm.
- To improve the quality of employees' life and promote a healthy lifestyle.
- To continue to top the rankings of the best employers.



3.2 HR Policy

3.2.1. HR policy approaches and principles

GRI 102-16
GRI 103-2

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:

GRI 103-1

- The areas and priorities of the HR policy must support the achievement of the Corporation's strategic goals;
- Executives of the Corporation and 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 the Corporation and its organisations;
- Employees of the Corporation and its organisations 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 the Corporation and its organisations, except for classified information.

ROSATOM's Code of Ethics

Code of Ethics

ROSATOM has adopted a Code of Ethics and Professional Conduct for Employees. The Code of Ethics communicates corporate values 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 resources, property and information, occupational health and safety, industrial and environmental safety, conflict prevention and resolving conflicts of interest, as well as maintaining the corporate image.

3.2.2. Key personnel characteristics

GRI 102-7
GRI 102-8

In 2020, ROSATOM and its organisations employed 276,100 people (including 16,100 people in foreign organisations, branches and representative offices), with men and women accounting for 67% and 33% of the total headcount respectively.

Prominent people play a fundamental role in the history of the nuclear industry and its development. A group of brilliant scientists led by Igor Kurchatov have achieved an unprecedented technological breakthrough, while talented administrators, the legendary 'nuclear' minister Efim Slavsky being the foremost among them, have created a new industry which has become a driver of development for the entire economy.

Number of employees by employee category:

- Executives: 33,600 people;
- Specialists: 112,900 people;
- White-collar workers: 10,100 people;
- Blue-collar workers: 119,500 people.

An average of 286 employees worked under independent contractor agreements.

158,400 people (57.4% of the total headcount) have a university degree. 3,811 employees (1.4% of the total headcount) are Candidates or Doctors of Sciences.

The age of employees averaged 43.3 years (46.5 years for executives). 30.7% of employees were aged under 35.

New employees accounted for 17.76% of the total headcount.

In 2020, the personnel turnover rate stood at 12%.

Average headcount by business area, '000 people

Division/complex/organisation	2018	2019	2020
Nuclear Weapons Division	93.41	91.28	90.03
Emergency preparedness units	2.51	2.54	2.59
Northern Sea Route Directorate	-	2.26	2.35
Mining Division	7.24	7.17	7.25
Fuel Division	22.45	22.11	21.95 (0.11)
Sales and Trading Division	1.96 (1.35)[65]	1.95 (1.32)	1.92 (1.26)
Power Engineering Division	51.51 (0.29)	54.41 (0.47)	56.95 (0.78)
Mechanical Engineering Division	16.82 (1.70)	16.55 (1.72)	17.75 (1.85)
Advanced Materials and Technologies	0.79	0.86	0.90
Overseas Division	1.80 (0.35)	2.20 (0.58)	2.70 (1.09)
New businesses	0.66	0.04	0.10
Process Control Systems and Electrical Engineering	-	1.22	1.35
Engineering Division	19.20 (5.05)	26.71 (8.0)	31.66 (11.0)
Environmental Solutions Division	8.34	7.53	7.60
Innovation Management Unit	9.24	8.94	9.10
JSC Rusatom Infrastructure Solutions	3.20	3.10	3.03
Security units	8.66	9.15	9.25
JSC Rusatom Healthcare	1.53	1.47	1.45
Wind Power	0.29	0.27	0.31
Administrative units	5.70	6.60	7.80
Non-core assets	0.05	0.02	0.02
ROSATOM, total	**255.36 (8.74)**	**266.40 (12.09)**	**276.06 (16.09)**

Nuclear organisations operate in 52 Russian regions and employ a total of 260,000 people, accounting for 94% of the industry's total headcount.

ROSATOM's organisations with the highest headcount are situated in the following regions:

- Moscow and the Moscow Region: over 51,000 people;
- The Nizhny Novgorod Region: over 31,000 people;
- The Chelyabinsk Region: over 29,000 people;
- Saint Petersburg and the Leningrad Region: over 19,000 people.

[65] Figures in brackets indicate the average headcount in foreign organisations, branches and representative offices.

ROSATOM's organisations operate in 32 foreign countries, with 16,000 employees working abroad (6% of the total headcount):

- Bangladesh: 7,500 people;
- CIS countries (Belarus, Ukraine, Kazakhstan): over 6,000 people;
- Turkey: 1,400 people.

3.2.3. Personnel costs and remuneration system

In 2020, personnel costs totalled RUB 397.45 billion, up by 10.25% year on year. Costs per employee per year increased from RUB 1,347,700 in 2019 to RUB 1,433,910 in 2020 (up by 6.39%).

Structure of personnel costs, %

	2018	2019	2020
Payroll	75.1	74.9	75.4
Insurance contributions	21.0	21.1	21.0
Social and other expenses (including training)	3.9	4.0	3.6

Remuneration system

ROSATOM'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 has in place a flexible remuneration system which includes a variety of tools ensuring that employees achieve business targets and are closely focused on results.

The Corporation develops KPIs in accordance with the Methodological Guidelines on KPI Development and Application[66]; 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.

In 2020, the average monthly salary in ROSATOM increased by 7.1% compared to 2019 and totalled RUB 90,000 per month. The salary growth rate in the nuclear industry in 2020 was higher than the inflation rate in Russia (4.9%), which reflects an increase in employees' real income. This was possible largely due to the ongoing improvement of labour productivity and operational performance, and cost control.

3.2.4. 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.

ESP members are included in the succession pool through the career and succession planning process. The ESP is divided into four levels in order to select development programmes that are best suited to the target positions of ESP members. The ESP level is determined based on the target position:

- 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 5,000. 79.65% of ESP members were appointed to a new position by the end of 2020. ESP members account for 68.17% of appointments to executive positions.

[66] 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	2018		2019		2020	
	Number	Share	Number	Share	Number	Share
Men	2,884	79%	2,884	79%	3,918	78%
Women	765	21%	765	21%	1,093	22%

Appointments of ESP members to a new position, %[67]

	2018	2019	2020
Share of ESP members appointed to vacant top and senior executive positions (top 30 and top 1,000 executives in the industry)	63.60	67.50	68.17
Share of ESP members among senior, middle-level and junior executives appointed to a new (management) position	72.30	74.36	79.65

A special feature of succession pool development programmes is their practical focus. Future 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	Number of participants[68]		
			2018	2019	2020
Senior executives	ROSATOM's Assets	Shaping the Future, Virtuosos of Management, Communication in Times of Change, Marketing, Finance	304	324	368
	ROSATOM's Assets. Basic Level	Strategy, Leadership and People Management, Change Management and Horizontal Interaction, Marketing, Finance	180	250	368
Middle-level executives	ROSATOM's Capital	Leadership and Project Management, Advanced Leadership Skills, Data Management, Situational Leadership	1,490	1,800	2,060
Junior executives	ROSATOM's Talents		1,675	1,956	215
Total			**3,649**	**4,330**	**5,011**

[67] 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. In 2019 and 2020, the assessment focused on the share of promoted ESP members who had been included in the ESP in 2017 and 2018 respectively.

[68] The number of participants included in the ESP is shown as a cumulative total for the period from 2018 through 2020.

3.2.5. Successor assessment

In order to facilitate rapid competence development, which is one of the priorities of the Corporation's HR policy, an innovative approach to assessing high-potential employees has been introduced in the Russian nuclear industry. As part of this approach, executives are involved in talent pool assessment and have a greater personal responsibility for developing succession plans and reducing the duration and cost of assessments. The methodology is based on the best practices adopted in major international companies and was piloted in 2018.

In 2020, the methodology was rolled out in 10 Divisions in the industry (77 organisations), and 2,021 candidates for executive positions were evaluated by managers of organisations and holding companies. Following the evaluation, each candidate received feedback providing them with a clear insight into their career prospects and recommendations for development.

3.2.6. Career counselling

GRI 404-2

To achieve ROSATOM's 2020-2030 Vision of Being the Best in Unlocking Employees' Potential, in 2020, the Corporation launched a new service for employees: individual career counselling. During the year, 511 consultations were held in more than 20 organisations in the industry.

Following the pilot launch, the service has produced a positive response from employees: 94% would recommend the service to their colleagues, and 92% are satisfied with the advice they have received.

At the end of 2021, after training additional career counsellors, the service will be made available in about 40 organisations in the industry.

3.2.7. Employee training

GRI 103-1
GRI 103-2
GRI 404-1

Competence development and employee training are among the key objectives of ROSATOM's HR policy.

In 2020, 144,006 employees in the industry (52%) underwent training. The number of training hours per employee averaged 30.65 hours.

GRI 103-2

Training for specialists and executives in the industry is provided primarily by ROSATOM's Corporate Academy and Technical Academy. Currently, both Academies are full partners of the Corporation in the implementation of strategic objectives; they implement projects directly relevant to prioritised areas of business development.

In 2020, ROSATOM's Corporate Academy provided training totalling 890,000 man-hours, including 839,000 man-hours in the distance learning format (94%). Twenty-five new learning formats were introduced.

The current portfolio of ROSATOM's Corporate Academy comprises more than 430 training programmes, including online and video courses, face-to-face and mixed programmes. In 2020, over 80 new programmes, 270 training podcasts and micro videos were introduced. As 120 face-to-face training programmes were promptly converted to the online format, none of the strategically important programmes were halted; RPS Leaders, globalisation participants, ESP members, developers of new products, digital leaders and participants of functional competence development schools completed training in full.

Projects were implemented to promote the employer's brand among schoolchildren and students, recruit talented graduates, develop the corporate culture and safety culture, as well as the competences of workers and engineers in accordance with WorldSkills standards, etc.

ROSATOM held a total of more than 3,500 online training events, with over 1.3 million views worldwide.

GRI 403-5

In 2020, ROSATOM's Technical Academy provided training totalling 1,590,920 man-hours, including 1,097,735 man-hours in online and distance learning formats (69%). The current catalogue of ROSATOM's Technical Academy comprises about 500 training courses, including courses aimed at developing vocational knowledge and skills and courses on occupational safety and health, civil defence, industrial, environmental and fire safety, information security and energy security. In 2020, ROSATOM's Technical Academy developed 116 new distance learning courses totalling 656 hours. The conversion of most training programmes to a distance learning format helped to prevent the risk of failure to obtain licences and work permits on time and ensured the continuity of production processes. ROSATOM's Technical Academy also provided compulsory training totalling 8,985 person-courses (measured as the number of participants multiplied by the number of completed courses), including 4,807 person-courses in a distance learning format (53.5% of the total amount of compulsory training).

Distance learning

Despite a challenging business environment during the COVID-19 pandemic, ROSATOM managed to extensively develop distance and online learning formats, which enabled the Corporation to create a fully-fledged digital training environment. 76% of face-to-face programmes were converted to a distance learning format.

The fact that ROSATOM was able to maintain the continuity of compulsory training was an important achievement of 2020. In 2020, 53.5% of compulsory training was provided remotely and online to the required standard. The share of distance learning stood at 48%.

51,159 employees signed up on the RECORD industry-wide mobile training platform. The users completed about 488,335 courses totalling 363,225 man-hours. The catalogue of the app contains 1,567 units of educational content. 36,329 users signed in on the platform completed at least one course, and about 25,000 employees are active users who completed five or more courses. 71% of employees are covered by distance learning programmes on the RECORD mobile training platform. The user satisfaction rating stands at 7.2 out of 10 points.

Within the shortest possible time, the Corporation developed 196 new online courses with a total duration of more than 800 hours. Open online training events available to all industry employees and their families were held on a regular basis, with more than 15,000 participants and another 15,000 people watching the recordings. Over 9,000 employees attended online conferences.

Educational projects

As part of a programme to develop scientific competences in the industry, ROSATOM continued to implement the following educational projects:

- Scientific School, a programme for young employees of research institutions in the industry;
- Science and Innovation Leaders, a programme aimed at developing a talent pool in key areas of scientific research;
- Science Communicators, a programme helping young scientists to prepare for participation in events as science speakers;
- PhD Candidates, a programme targeted at employees preparing for a thesis defence or planning to write a thesis (over 200 employees in the industry have already joined the programme).

In 2020, ROSATOM launched an Advanced Development Programme for Leaders of NPP Construction Projects in Russia and Abroad; the first batch of participants has already joined the programme. It helps to develop professional, managerial and international competences of the current project leaders and their successors. The key training tools are business cases and lessons learned.

In 2020, ROSATOM implemented the first part of its Executive E-School industry-wide programme aimed at providing high-quality training for executives and their successors. The first 40 lessons are already available on the RECORD mobile training platform. About 400 online courses are expected to be developed and uploaded to the platform for executives of three levels: junior, middle-level and top managers. The potential target audience numbers 60,000 executives and their successors in the industry.

In the reporting year, the Corporation successfully continued to provide training at functional schools: the Procurement, Logistics and Quality School, the Legal School, the HR School and the Project Management School. Over 2,000 people completed training at the functional schools.

For details on the Procurement, Logistics and Quality School, see the section 'Procurement Management' of the chapter 'Strategic Report'.

ROSATOM also focuses on developing a culture of safe behaviour and information security. In 2020, about 193,000 people underwent training in this area.

Training in digitisation

- In 2020, the amount of training as part of the Digital Competences and Culture programme exceeded 60,000 person-courses.
- More than 150 organisations in the nuclear industry prepared digital initiatives as part of the Digital Seasons club for digitisation leaders.
- 19,000 schoolchildren and students were covered by digitisation activities organised by the Corporation as part of federal and industry-wide projects.
- A diagnostic assessment of maturity of the digital culture was conducted. More than 1,000 employees in the nuclear industry were covered by the Customer Journey programme, My Best Mistake sessions, and the Digital Leader movement.
- The first industry-wide conference on digitisation was held in a hybrid format. It was attended by more than 700 employees from 85 organisations.

Building a continuous development ecosystem

The Corporation also continued to build an ecosystem for continuous development of engineering competences at each stage of the talent pipeline: AtomSkills Juniors for schoolchildren aged between 10 and 17, New Talents for students aged between 17 and 25, ROSATOM's Professionals for industry employees aged between 18 and 50, and Power of Generations for industry employees aged 50+.

In 2020, more than 1 million people, including schoolchildren and their parents, students, the Corporation's current employees, experts, representatives of municipal governments and universities, participated in events aimed at developing the ecosystem. AtomSkills Juniors events held online covered over 680,000 schoolchildren participating in project and engineering sessions and engineering laboratories. More than 100 employees of ROSATOM became expert mentors of the juniors, and 105 more teachers and engineers started training at the AtomSkills Juniors School of Mentors.

As part of the New Talents programme, over 40 experts of the Corporation organised and held mock exams in 15 competences at 16 colleges and universities. This enabled them to assess the level of knowledge and skills among 800 students across competences that are relevant to the Corporation. ROSATOM's engineers developed 37 programmes for working with trainees; six solutions for developing HR partnerships were adopted. ROSATOM's Professionals is the world's largest corporate community with over 7,000 members from the nuclear industry, including workers, engineers and experts.

In 2020, 17 leading experts and their deputies were selected on a competitive basis from among 1,500 employees of ROSATOM. They developed road maps for 11 competences. More than 150 workers and engineers upgraded their skills by completing courses for expert competence development and developed 15 training programmes for students and current employees. A total of 1,500 workers, line and production engineers took part in online Digital Workshops aimed at developing digital competences.

Training as part of the achievement of strategic goals

In 2020, 8,537 workers and engineers in the industry underwent training in production and technology development in 17 industry competence centres.

To achieve the strategic goals of reducing production costs and the lead time, the Corporation continues to provide training on the ROSATOM Production System (RPS), which helps to preserve and accumulate knowledge about lean manufacturing. In 2020, the scope of RPS training programmes exceeded 82,000 person-courses. The RPS training system will be rolled out across Russia (85 Russian regions and 850 enterprises).

To achieve the strategic goal of being the best in unlocking employees' potential, ROSATOM monitored the current level of development of ecosystems designed to unlock and utilise employees' potential in 41 organisations. Local road maps titled 'Mission: Talent' were developed for 7 Divisions, 21 organisations, and 18 nuclear towns and cities. The road maps include tools and solutions aimed at unlocking, developing and utilising the potential of schoolchildren, students, professionals and 'third age'[69] employees. All initiatives and projects under the road maps will be implemented in partnership with municipal administrations, regional ministries, basic and further education institutions.

To support the industry in the achievement of the strategic goal of increasing the international market share, ROSATOM implements programmes aimed at the development of employees involved in international industry-wide projects. For instance, in 2020 and 2021, 7,221 people participated in Global Professionals, a comprehensive programme for the development of leaders and globalisation participants, with 7,056 people receiving training remotely and 165 employees receiving training in a mixed format. In 2020, 5,512 industry employees completed English language courses.

[69] People aged 60+.

To achieve the strategic goal of developing new products for the Russian and international markets and to reduce the cost of design and technology solutions, the Corporation implemented a programme titled 'ROSATOM's New Products'. 104 people completed the training programme and presented 43 projects.

Development of the youth community in the nuclear industry

To promote youth initiatives, find and support young leaders and help specialists aged under 35 to achieve professional growth and self-fulfilment, in 2020, the Corporation held a marathon titled 'My ROSATOM', with over 1,500 young employees and line managers participating in the event. Following the marathon, ROSATOM identified key areas of development of the youth community in the industry: social activism and sustainable development in the regions, unlocking the potential, technological advancement of the core business, development of youth communities, new projects and businesses. The key youth community events included the Forum of Change Leaders (about 200 participants) and the 3rd Nuclear Industry Youth Congress (about 400 participants); these events resulted in the election of new members to the Industry Youth Council.

In March 2020, young delegates representing the nuclear industry took part in the International Youth Nuclear Congress (IYNC 2020) held in Sydney (Australia). IYNC 2020 concluded with the voting for the location for the next congress to be held in 2022, with applications submitted by Russia, Kenya, Ukraine and France. Following a lengthy discussion and voting by 50 IYNC Permanent Council members from 35 countries, it was announced that Russia would host the next IYNC in 2022.

In addition, in 2020, 78 young delegates from 15 Divisions of ROSATOM participated in the Forsazh Forum focused on the UN Sustainable Development Goals.

Another significant aspect of the support and development of the Corporation's youth community is the development of student construction teams (SCTs) in the nuclear industry. In 2020, over 20 student construction teams comprising 545 students from specialised educational institutions worked at five nuclear construction sites in Russia. After the work semesters of 2020, about 65 high-potential students were selected jointly with HR functions.

Projects aimed at improving the efficiency of horizontal interaction between employees

In order to speed up decision-making and implementation, the industry is actively working to improve the efficiency of horizontal interaction. In 2020, an online training marathon, ProPartnership, was launched, with more than 450 industry executives participating in the event. An online course was developed and was completed by more than 4,500 employees. The first corporate series on challenges related to interaction in the team and horizontal interaction tools that help to respond to them was filmed. It was viewed more than 69,000 times within less than a year. All episodes are based on real-life cases in the industry.

3.2.8. International cooperation in education

ROSATOM is actively promoting Russian engineering education abroad to popularise it and strengthen the Corporation's positions on the global nuclear technology market. ROSATOM is creating educational infrastructure required for personnel training in partner countries and is developing national nuclear education systems using Russian educational technology. Foreign students study nuclear disciplines at National Research Nuclear University MEPhI (NRNU MEPhI), as well as at ROSATOM's core universities and partner universities: Tomsk Polytechnic University (TPU), Saint Petersburg State University, St. Petersburg Polytechnic University, University of Chemical Technology of Russia, Moscow Power Engineering Institute, Far Eastern Federal University, 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 2020, more than 1,800 foreign students from 54 countries, including Armenia, Vietnam, Rwanda, Bolivia, Uzbekistan, Turkey, Bangladesh, Jordan, Egypt, Algeria, Nigeria, Kenya, Kazakhstan, Congo, Ethiopia, Hungary, Serbia, Bulgaria, South Africa, Ghana and other countries, studied at Russian universities. ROSATOM's core universities (NRNU MEPhI and TPU) continue to successfully implement joint educational programmes with foreign universities in partner countries: Egypt, Bolivia, Brazil, Ghana, Turkey, Armenia, Kazakhstan and Rwanda. As part of development of cooperation with NRNU MEPhI, in 2020, ten joint educational programmes were implemented with partner universities in Egypt, Kazakhstan, Rwanda, Brazil, Bolivia, Armenia and Turkey. 139 students completed these programmes.

In 2019, NRNU MEPhI opened its first overseas branch in the Republic of Uzbekistan. In 2020, the building of the Tashkent Branch was donated to NRNU MEPhI by the Uzatom Agency. The Branch obtained an extended licence for training and education in Ulugbek, where it operates, from the Federal Service for the Supervision of Education and Science (Rosobrnadzor). The Tashkent Branch successfully conducted the second enrolment campaign, with more than seven applicants competing for each place. Currently, 171 people study at the Branch.

3.2.9. Employees' participation in external and industry-wide professional competitions

Leaders of Russia

Employees of ROSATOM and its organisations actively participate in the Leaders of Russia national management competition. More than 1,000 industry employees participated in the third Leaders of Russia competition (2019/2020). Forty-six employees were invited to the semi-finals of the competition, with six people reaching the super final. Winners included two representatives of the Corporation.

WorldSkills and professional events

Employees in the nuclear industry achieved impressive results in professional events and competitions.

ROSATOM's team topped the medal table of the WorldSkills Hi-Tech National Competition of Cross-Industry Skilled Professions for Workers in High-Technology Industries held in accordance with the WorldSkills methodology for the sixth time.

In the WorldSkills Hi-Tech 2020 Competition, which featured a combination of remote and face-to-face formats, 100 representatives of nine Divisions of the Corporation competed in 18 of the 24 skills represented in the main competition and in nine skills in the 2nd Skills of the Wise National Competition.

The participants won a total of 25 awards: 13 golds, nine silvers and three bronzes, as well as two top prizes of the competition: Master of Industry Development certificates from the Industry Development Fund worth RUB 1 million (they were awarded to the winning team in the Life Cycle Management category and to the team of expert mentors who had trained the champions).

The AtomSkills industry-wide competition, which is the world's largest corporate professional skills competition held in accordance with WorldSkills standards, was held in an open format. More than 1,100 contestants from 48 regions of Russia took part in the competition, including 836 employees of ROSATOM, 59 specialists from third-party companies, and 226 college and university students.

The competition was held across 24 competences of the Corporation. Another ten competences, for which competitions were not held due to pandemic-related restrictions, were presented as part of the Technological Competence Development track of the business programme.

The business programme included more than 170 events (panel discussions, conferences, briefings, webinars, talk shows and workshops) broadcast online and grouped into two thematic tracks: 'Mission: Talent. Becoming the Best in Unlocking Potential' and 'Technological Competence Development'. About 5,000 participants, including more than 200 speakers from 35 regions of Russia, were involved in the online events. About 700,000 people watched over 300 hours of broadcasts.

Participation in competitions held in accordance with the WorldSkills methodology and awards received in 2020

Competitions	Competences represented	Total awards	Gold	Silver	Bronze
National competitions					
WorldSkills Hi-Tech 2020. Main age group	18	15	9	5	1
WorldSkills Hi-Tech Skills of the Wise 2020 (aged 50+)	9	10	4	4	2
	Total	**25**	**13**	**9**	**3**

ROSATOM's Person of the Year

A record number of applications were submitted as part of the industry-wide recognition programme, ROSATOM's Person of the Year, whereby the Corporation's top executives express their appreciation for the achievements of the best employees in the industry for the year. The programme includes more than 50 individual and team nominations in three areas: divisional professions, corporate professions and special nominations put forward by the Director General and the Chairman of the Supervisory Board of ROSATOM.

Key selection criteria include major work achievements, the ability to think out of the box, commitment to corporate values and professional qualities of the candidates. To support the launch of the industry-wide volunteer movement and the Corporation's initiatives contributing to achieving the UN Sustainable Development Goals and improving the

Activities of Change Support Teams (CSTs)

The Corporation has a tradition of supporting 'bottom-up' initiatives and thus enabling talented employees to fulfil their potential.

CSTs comprise proactive employees who implement projects to drive changes. Participation in the CSTs not only enables them to put their ideas into practice, but also provides an informal channel for prompt and direct communication with industry executives. In turn, this provides employees with new career opportunities and becomes an effective tool for developing future leaders at the local level. By the end of 2020, more than 140 change support teams had been formed, comprising about 1,500 employees from various organisations of the Corporation. It is encouraging that projects initiated by employees as part of this movement have produced impressive results at the industry level, with one of the projects reaching the finals of the Person of the Year industry-wide recognition programme and another reaching the finals of the #WeAreTogether federal competition. The engagement rate of CST members stood at 86%.

quality of people's life, a new special category, Sustainable Development, was introduced in 2019, with nominations put forward by the Director General. Another special category, Reliable Support, was introduced in 2020; it focuses on initiatives aimed at supporting businesses during the pandemic. Due to a challenging epidemiological situation in the country, the award ceremony will be held in 2021.

3.2.10. Employee engagement[70]

According to the findings of a survey among 56,035 employees in 70 of ROSATOM's organisations, in 2020, the employee engagement rate stood at 84%, on a par with the best employers in Russia. The target for the next three to five years is to maintain the average employee engagement rate on a par with global leaders in high-technology industries (at least 77%) and to achieve this rate in most organisations that participate in the survey.

Changes in employee engagement rate at ROSATOM and in its organisations

2015	2016	2017	2018	2019	2020
78%	77%	83%	80%	82%	84%

[70] Engagement is an emotional and intellectual state encouraging employees to do their job to the best of their abilities. Employee engagement surveys have been conducted in the Russian nuclear industry since 2011 under the international methodology with assistance from an independent expert organisation. The engagement rate is defined as the share of engaged employees as a percentage of the total number of respondents.

3.3 Occupational Safety and Health; Human Rights

3.3.1. Occupational safety and health

Occupational safety and health management system

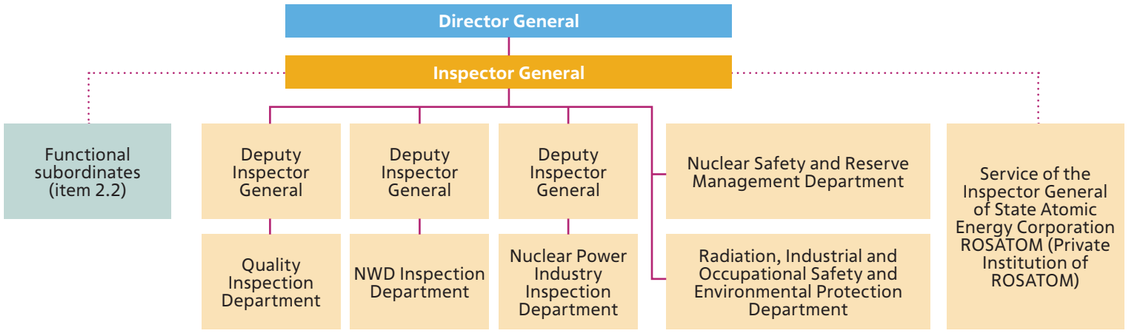
GRI 103-1
GRI 102-11
GRI 102-12

ROSATOM and its organisations are fully aware of their responsibility for the safety of production processes, occupational safety and health, given that the rapid development of the nuclear power industry makes it crucially important to guarantee compliance with fundamental principles whereby priority is given to protecting employees' life and health and enhancing the protection of people and the environment against radiation exposure.

Since 2019, ROSATOM has been involved in the Vision Zero international campaign and seeks to achieve a zero injury rate in nuclear organisations.

GRI 103-2

ROSATOM's Inspector General is in charge of safety[71] and control of the use of nuclear energy for civilian and defence purposes by the Corporation's organisations.



[71] Safety means nuclear, radiation, industrial and fire safety, the safety of hydraulic structures, occupational safety and health and environmental protection.

The key functions of the Inspector General include the following:

- Timely and full detection of non-compliance with Russian laws and the Corporation's local regulations on occupational safety and health;
- Responsibility for the exercise of powers and performance of functions related to nuclear and radiation safety by the Corporation as a government regulator controlling the use of nuclear energy, as well as the functions of a regulator in the sphere of industrial and fire safety, the safety of hydraulic structures, occupational safety and health and environmental protection in ROSATOM's organisations;
- Ensuring that the Corporation has in place the relevant methodological framework which is complete and of appropriate quality and is aligned with Russian occupational safety laws.

GRI 103-3

The Inspector General's performance is assessed annually based on indicators specified in the approved KPI map. Key indicators include the reduction in the severity of injuries at facilities of the Corporation's organisations, including contractors (average, against the previous three years as a baseline period).

GRI 103-2
GRI 403-1

The Corporation has adopted 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 safety and health management systems used by ROSATOM's organisations.

The key principles underlying occupational safety initiatives of ROSATOM and its organisations include the following:

Uniform Industry-Wide Policy on Occupational Safety and Health of ROSATOM and Its Organisations

- Giving priority to employees' lives and health over performance;
- Continuously improving operations and enhancing employees' safety competences;
- Planning and implementing measures aimed at reducing injury and occupational disease rates;
- Systematically providing employees with state-of-the-art personal protective equipment to protect them against occupational hazards;
- Availability of material information on occupational safety and health initiatives;
- Setting uniform occupational safety and health requirements aligned with Russian laws and global expertise in ROSATOM and its organisations;
- Seeking to ensure that all employees of ROSATOM and its organisations are aware that compliance with occupational safety requirements is an integral part of their work.

GRI 403-2

In 2020, the Uniform Industry-Wide Guidelines for Occupational Risk Management in ROSATOM's Organisations were put into effect as part of the industry-wide occupational health and safety management system. This document is aimed at identifying workplace hazards, assessing occupational risk levels and developing corrective measures to reduce occupational risks.

GRI 403-4

To create a system encouraging each employee to consciously behave in a safe way, and to prevent fatalities and serious injuries in nuclear organisations, ROSATOM formed the industry-wide Council for a Culture of Safe Behaviour chaired by the Director General, and launched a project titled 'Development of a Culture of Safe Behaviour at ROSATOM'. Nine organisations, including representatives of the Nuclear Weapons, Mechanical Engineering and Fuel Divisions, joined the project.

ROSATOM's safety culture

In terms of a safety culture, ROSATOM and its organisations focus on shaping and developing those characteristics of their operations and individual employee behaviour that help to maintain an acceptable safety level, protect people and the environment against the negative impacts of their operations and ensure that employees of the Corporation and its organisations are committed to safety as the main goal and fundamental safety principles.

To create and develop the safety culture, the Corporation takes the following steps:

- Incorporating all principles of the safety culture policy into the work of employees and executives of the organisations as part of production planning and control in the nuclear industry;
- Rigorously selecting employees, ensuring that they have a high level of professional qualifications and professional reliability, encouraging employee training and upskilling;
- Taking into account past experience, searching for and adopting best safety practices;
- Full regulation of all operations;
- Self-assessment and independent assessment of the safety management system and safety culture to enable continuous improvements;
- Creating an atmosphere of trust, openness and cooperation with support from executives at all levels; creating and maintaining an environment enabling timely detection and open discussion of safety concerns;
- Shaping of shared goals, values and behaviours appropriate to a high level of safety culture by executives;
- Executives at all levels demonstrating commitment to safety and strict compliance with safety requirements;
- Executives using expertise available in the organisation and leveraging external expertise to make informed decisions;
- Ensuring that each employee is aware of the impact that their actions might have on safety and of potential consequences of non-compliance with safety requirements;
- Encouraging employees to think critically and monitor their own actions that might have an impact on safety;
- Ensuring that each executive and employee realises that it is unacceptable to conceal their mistakes and that the causes of such mistakes need to be determined and addressed;

- Engaging with external contractor organisations on matters related to safety culture, safe operations and working conditions;
- Strict discipline and clear delineation of safety-related powers and personal responsibilities of executives and contractors.

Every year, ROSATOM's Technical Academy hosts the International Safety Culture School. ROSATOM's Corporate Academy is implementing a project to promote a culture of safe behaviour in nuclear organisations. The Corporation also holds annual Safety Days involving discussions of the status and development of its safety culture.

Occupational safety and health performance

One of the occupational safety objectives of ROSATOM's organisations is to ensure occupational safety and provide safe working conditions for employees operating buildings, structures and equipment and working with radioactive materials, flammable and explosive substances.

GRI 403-9

In 2020, the Corporation's organisations continued to improve their workplace safety culture, which enabled them to reduce the total number of accidents by 19%. The number of serious injuries and fatalities also decreased by 37%. There were a total of five fatalities (all men).

50 people were injured in 2020, including 39 men and 11 women. Out of the total number of the injured, seven people suffered serious injuries, and there were five fatalities.

The fatalities were caused by the following injury factors: falling from a height (2 people), electric shock (1 person); fall of an object on the victim (1 person); the impact of moving or scattering parts, machines or equipment (1 person).

ROSATOM works continuously to ensure compliance with safety instructions issued by the Director General to prevent any injuries; in addition, the following measures were implemented:

- A plan of additional measures to ensure safety and prevent injuries in the course of construction, repairs, renovation and modernisation of nuclear facilities;
- An action plan to prevent injuries among employees in contractor organisations during construction and installation works at the sites of ROSATOM's organisations.

Injury rates

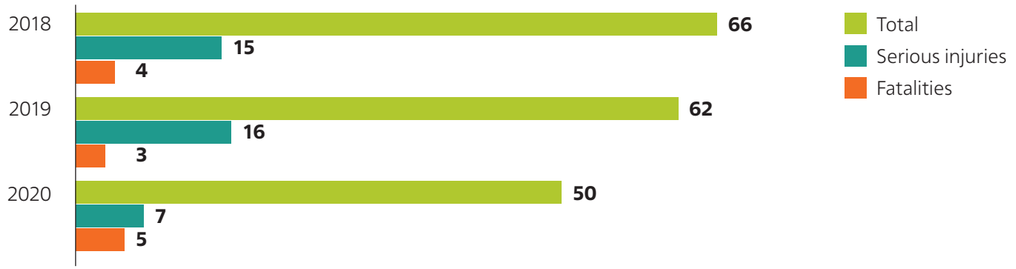
Indicator	2018	2019	2020
Number of people injured in accidents	66	62	50
Number of fatalities	4	3	5
Injury frequency rate (FR)	0.25	0.22	0.18
LTIFR[72]	0.12	0.10	0.09
Number of people newly diagnosed with an occupational disease	10	12	10

A total of 10 people were newly diagnosed with an occupational disease in 2020, including: GRI 403-10

- Nine people in JSC Atomredmetzoloto (PJSC PIMCU);
- One person in JSC TVEL (PJSC MSZ Machinery Manufacturing Plant).

The occupational disease risk remains high in PJSC PIMCU.

Changes in the number of injured persons



[72] Lost Time Injury Frequency Rate (LTIFR) = number of lost time injuries × 1 million man-hours / man-hours worked.

Accidents, by injury factors

Injury factors	Number of injured persons		
	2018	2019	2020
Falling from a height	3	6	8
Electric shock	2	0	3
Falling on the premises (on the surface of the same level, with a difference in heights, etc.)	29	16	16
Road accident	6	13	3
Impact of moving or scattering objects, structures or parts	11	9	9
Fall of an object on the victim	8	9	2
Burns (thermal, etc.)	4	3	6
Other (unclassified factors)	3	4	1
Sports-related injury	0	1	2
Animal bite	0	1	0
Total	**66**	**62**	**50**

All the fatally injured between 2018 and 2020 were men, from the following regions:

2018	2019	2020
Zabaykalsky Territory	Ulyanovsk Region	Primorsky Territory
Krasnoyarsk Territory	Zabaykalsky Territory	Chelyabinsk Region
Smolensk Region	Kursk Region	Saratov Region
Leningrad Region	-	Kursk Region
-	-	Moscow Region

The risk of injuries remains high for employees involved in the operation and maintenance of equipment, and for those employees who do not follow safety precautions when moving around the premises of an organisation.

In 2020, the injury frequency rate stood at 0.18 (1.2 across Russia).

Comparative data on industrial injuries in Russia and in ROSATOM's organisations, injury frequency rate (FR)

In addition to the injury frequency rate, the Corporation also uses the lost time injury frequency rate (LTIFR), which enables it to benchmark the injury rate against that of other companies and countries. The LTIFR has been included in the KPI maps of all Division executives. Individual values not exceeding the baseline values have been accepted as LTIFR targets for the Divisions, units and holding companies within ROSATOM.

The reference value of the LTIFR for ROSATOM's Divisions, units, holding companies and the Corporation as a whole has been set at 0.5. The target for ROSATOM as a whole has been set at 0.4, which is better than the reference value.

LTIFR values (three-year average) reached in Divisions, units and holding companies within ROSATOM have been accepted as baseline (initial, to be improved) values for those Divisions, units and holding companies.

In 2020, the LTIFR across ROSATOM averaged 0.09, against a target of 0.2.

LTIFR* in 2020

Division/complex/unit	2018	2019	2020
Mining Division	0.22	0.22	0
Fuel Division	0.08	0.02	0.02
Mechanical Engineering Division	0.11	0.14	0.07
Engineering Division	0.05	0.06	0.02
Power Engineering Division	0.08	0.04	0.03
Environmental Solutions	0.20	0.13	0.30
Nuclear Weapons Division	0.16	0.13	0.16
Innovation Management Unit	0	0	0.07
Total across the Corporation	0.12	0.10	0.09

* The LTIFR calculation does not include employees injured in traffic accidents caused by third parties, those whose health suddenly deteriorated due to an illness and those who suffered a sports-related injury (six people).

The LTIFR recorded in 2020 reflects a decrease in injury frequency rates in ROSATOM.

A further decrease in injury frequency rates in the Corporation's organisations will be achieved through process improvement, the introduction of a safety culture and the enhancement of controls.

Occupational safety indicators in ROSATOM's organisations and JSC Atomenergoprom

Indicator	ROSATOM	JSC Atomenergoprom
Number of people injured in accidents	50	15
Number of man-hours worked	500,719,370	228,321,096*
Number of fatalities	5	0
Number of serious injuries	7	5
Number of people newly diagnosed with an occupational disease	10	10
Fatality rate (per 1 million hours)	0.01	0
Fatality rate (per 200,000 hours)	0.002	0
Serious injury rate (per 1 million hours)	0.01	0.02
Serious injury rate (per 200,000 hours)	0.003	0.004
Occupational disease rate (per 1 million hours)	0.02	0.03
Occupational disease rate (per 200,000 hours)	0.004	0.006
Number of people injured in accidents in contractor organisations**	10	6

* Excluding man-hours in 50 organisations due to lack of data.

** There are no data on man-hours worked and newly diagnosed occupational diseases.

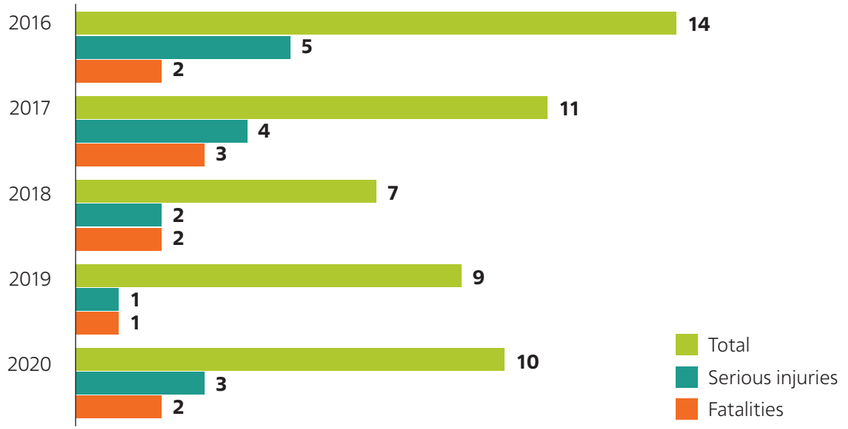
Occupational safety and health in contractor organisations

GRI 403-7

In recent years, there has seen a consistent downward trend in injury rates in contractor organisations. In 2020, the total number of injured people slightly increased, but the average number of fatalities remained at the same level.

Low injury rates in contractor organisations are determined not only by cooperation between the occupational safety functions of customer organisations and contractors but also by stricter safety requirements for contractors performing work at the production sites in the industry.

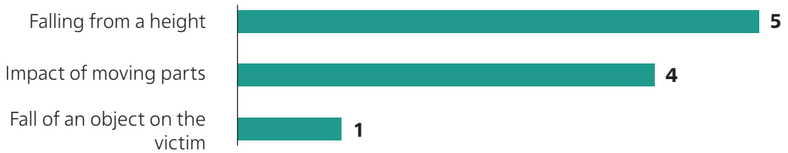
Number of injured persons in contractor organisations



Main causes of industrial injuries in contractor organisations in 2020

Inadequate work organisation	50%
Violation of safety requirements and occupational safety instructions	40%
Negligence on the part of the injured	10%

Injury factors, by the number of injured persons



Analysis of accident investigation records showed that the main causes of accidents included inadequate work organisation and violation of safety requirements and occupational safety instructions by the victims. This was due to shortcomings in the work of the management team during the preparatory phase of the work:

- Poor quality of designs and technical documentation (lack of a sufficient list of health and safety requirements);
- Poor preparation of workplaces;
- Failure to comply with operational procedures;
- Shift assignments being issued without due regard to all safety requirements;
- Lack of executive supervision of work;
- Inadequate personnel training.

GRI 103-1
GRI 103-2

3.3.2. Human rights

ROSATOM actively supports and complies with employment standards pursuant to the legislation of the Russian Federation, industry-wide and internal regulations, and the Industry-Wide Agreement on Nuclear Power, Industry and Science.

The Industry-Wide Agreement on Nuclear Power, Industry and Science and the Corporation'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[73] are aligned with regulations ratified by the Russian Federation, the Constitution of the Russian Federation, UN conventions, including those on human rights and anti-corruption. 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 Corporation confirms its commitment to the principles of respect for human rights stipulated in the Universal Declaration of Human Rights[74] and other UN documents, the Guiding Principles on Business and Human Rights[75] and the OECD Guidelines for Multinational Enterprises[76].

Commitment to ethical principles underlies ROSATOM's corporate culture and covers all aspects, including:

- Respect for human rights (including labour rights, the rights of local communities and indigenous minorities, freedom of association and trade unions);
- Zero tolerance to and combating corruption and fraud;
- Commitment to fair competition rules;
- Legal compliance.

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 of ROSATOM;
- The Uniform Industry-Wide HR Policy;
- The Uniform Industry-Wide Guidelines on the Movement of Employees of ROSATOM and Its Organisations in Russia;
- The Uniform Industry-Wide Procedure for the Investigation of Reports on Corruption and Other Offences Received via the Hotline or Other Channels;
- The Uniform Industry-Wide Anti-Corruption Policy of ROSATOM and Its Organisations;
- The Industry-Wide Agreement on Nuclear Power, Industry and Science;
- Agreements with the trade union;
- ROSATOM's Order on the Approval of the Uniform Industry-Wide Procedure for the Contract Activity Process, which governs the execution of all international contracts.

[73] Full name: Code of Ethics and Professional Conduct for Employees of ROSATOM.
[74] Adopted by the UN General Assembly on 10 October 1948.
[75] https://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_ru.pdf
[76] https://www.oecdwatch.org/oecd-ncps/the-oecd-guidelines-for-mnes/

ROSATOM has established an Ethics Board, which is tasked with assessing compliance of actions taken by employees of the Corporation and its organisations with the Code of Ethics. Any employee in the industry may submit reports or enquiries to the Ethics Board.

The Corporation's Ethics Board is chaired by the First Deputy Director General for the Nuclear Power Industry, who is responsible for coordinating the Corporation's activities across all aspects of compliance with ethical norms. The Deputy Chairman of the Ethics Board is ROSATOM's Deputy Director General for HR, who is in charge of coordinating the organisation's human rights activities.

Employees are informed about an industry-wide hotline which can be used for submitting reports, including complaints and enquiries from individuals and organisations, to safeguard their right to apply in person and to submit individual and group enquiries to protect the rights and legitimate interests of the company, its organisations and their employees.

Complaints and enquiries can also be sent by mail or email to executives of the Corporation's organisations, including the Director General. The complaints and enquiries are recorded on the day of receipt and reviewed within the time frame prescribed by Russian laws; investigations are conducted if necessary. A dedicated system is being developed to monitor the handling of enquiries/complaints and replies to them.

Complaints/enquiries related to social and labour relations, including complaints/enquiries related to human rights, are reviewed jointly with a representative body acting on behalf of employees. At the highest level (that of the industry), complaints/enquiries are reviewed by the Industry-Wide Commission for Social and Labour Relations; at the Division level, they are handled by commissions for social and labour relations established in the Divisions; at the level of organisations, this function is performed by commissions for social and labour relations and collective bargaining agreements in the organisations.

GRI 406-1

In the reporting year, there were no allegations of labour rights violations.

In 2020, the Corporation started to develop the following human rights training programmes for employees:

- Practice of Application of Labour Laws and Potential Violations by the Parties;
- Work Management and Standardisation in the Nuclear Industry;
- Special Inspection of Working Conditions;
- Managing Emotions and Stress;
- Association for Anti-COVID-19 Cognitive Behavioural Therapy;
- Safe Behaviour: Employees, Culture and Me.

Key principles of the HR policy adopted in the industry include fairness, transparency and focus on results. Candidates are hired through a competitive process that includes interviews and tests. All employees complete special onboarding programmes. Employees are provided with opportunities for professional development and career advancement, participation in training and professional development programmes and training courses aimed at developing corporate competences throughout their employment.

The Corporation's top priorities in the sphere of employment rights and human rights are to provide a workplace environment that poses no risks to employees' lives or health, to prevent all forms of abuse and violation of human dignity, and to promote a responsible approach to occupational health and safety at all management levels.

For more details on collective bargaining agreements, see the section 'Social Partnership in the Nuclear Industry'.

3.4 Social Policy

3.4.1. Social policy approaches and principles

ROSATOM's social policy is designed to:

- Make ROSATOM more attractive as an employer;
- Engage and integrate young professionals and highly skilled specialists;
- Improve employee loyalty;
- Improve the efficiency of social expenditure.

Uniform Industry-Wide Social Policy of ROSATOM and Its Organisations

3.4.2. Social programmes

GRI 403-6

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 people working in conditions that deviate from the standard conditions (which is why the bulk 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;
- Government policy focused on promoting the development of mass sports, providing additional pensions, and supporting families with children, young professionals and people in need.

GRI 401-2

Compensation and benefits under corporate social programmes implemented by the Corporation are provided to full-time employees.

In 2020, expenditure on programmes aimed at maintaining employees' health and promoting a healthy lifestyle accounted for 49% of total expenditure on social programmes.

Expenditure on corporate social programmes at ROSATOM and its organisations, RUB billion[77]

GRI 403-3
GRI 403-6

Corporate social programmes	2018	2019	2020
Voluntary health insurance and personal insurance against accidents and illness	2.0	2.4	2.9
Health resort treatment and recreation for employees and their children, including:	1.2	1.1	0.5
health resort and rehabilitation treatment for employees	*0.8*	*0.8*	*0.4*
health resort treatment and recreation for children	*0.3*	*0.3*	*0.1*
Provision of housing for employees	0.8	0.8	0.9
Private pension plans	0.9	0.6	0.7
Support for retirees	1.3	1.3	1.2
Sporting and cultural events	1.5	1.7	1.5
Assistance to employees	1.2	1.7	1.6
Other	0.3	0.2	0.7
Total	**9.2**	**9.8**	**10.0**

[77] Compensation and benefits under corporate social programmes implemented by the Corporation are provided to full-time employees.

GRI 403-3
GRI 403-6

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 2020, more than 82% of employees in the industry (226,800 people) had quick access to medical care covered by voluntary health insurance. Almost 65% of employees in the industry (146,100 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 2020, 48.9% 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. The small share of employees provided with the vouchers was due to COVID-19 restrictions.

Due to the epidemiological situation, in the reporting year, many events were held online. These included online workouts and warm-up exercises, two online chess championships, online checkers competitions, an online Ready for Labour and Defence Qualifying Standards Event, the #FeelingGoodAtHome contest for employees, the #AtomKids contest for children, the Champions' League battle, #RosatomQuiz, esports (FIFA, HearthStone), webinars on healthy eating and sleep, and healthy lifestyle tips from champions. More than 10,000 people joined the events, including over 4,500 members of employees' families and residents of nuclear towns and cities.

The biggest sporting event of 2020 was the Online Running Race of Nuclear Towns and Cities; its participants included over 7,000 employees and members of their families from 38 towns and cities where nuclear organisations operate. They ran a total of 14,783 kilometres. The event was recognised as one of the best projects in the Sports and Healthy Lifestyle Support category of the 2020/2021 Best Social Projects in Russia National Programme.

The Corporation's team took part in international 113-kilometre and sprint triathlon races for the first time.

In 2020, the Corporation launched ROSATOM's Healthy Lifestyle Ambassador, its new sports project; its outcomes will be reviewed in July 2021.

In 2020, ROSATOM continued to implement measures forming part of its programme developed in 2019 to support soon-to-retire employees of the Corporation and its organisations. As part of the programme:

- 1,143 soon-to-retire employees underwent health screenings;
- 352 employees were given vouchers for health resort treatment;
- 314 employees switched over to flexible working hours;
- 800 employees were appointed to higher positions as part of job rotation.

3.4.3. Support for industry veterans

Nuclear enterprises continue to pay great attention to veterans and retirees who worked in the industry for more than 20 years (over 120,000 people). This care became especially relevant in 2020, as the past year marked the 75th anniversary of the Victory Day and the 75th anniversary of the nuclear industry, as well as during the pandemic: 3,680 war veterans received payments totalling more than RUB 40 million on Victory Day, and 20,000 industry veterans received payments exceeding RUB 65 million on the Nuclear Industry Worker's Day.

The Interregional Social Movement of Veterans of Nuclear Power and Industry (ISMV NPI) comprises 131 veteran organisations in Russia with a total of 284,000 members.

In 2020, at the request of ISMV NPI:

- 147 veterans were presented with the Veteran of Nuclear Power and Industry badge;
- 37 veterans were awarded ROSATOM's badges;
- 32 veterans were awarded certificates of appreciation and letters of acknowledgment from ROSATOM;
- 1,668 veterans were awarded medals commemorating the 75th anniversary of the Russian nuclear industry.

As part of a special industry-wide wellness programme for veterans, in the reporting year, over 11,000 veterans in the nuclear industry were provided with subsidised vouchers for treatment at health resorts of the Russian Federal Biomedical Agency (FMBA) and the Russian Trade Union of Nuclear Power and Industry Workers (RTUNPIW).

3.4.4. Social partnership in the nuclear industry

ROSATOM and its organisations adhere to the Industry-Wide Agreement on Nuclear Power, Industry and Science for 2018–2020 (the Agreement). The Agreement is based on the established practice of social partnership in the nuclear industry and is aimed at implementing the Integrated Standardised Remuneration System in ROSATOM's organisations, the Uniform Industry-Wide Social Policy of ROSATOM and Its Organisations and the Occupational Safety and Health Management System.

The Agreement has been developed and is being implemented jointly with RTUNPIW. The union has 131,557 members in the Corporation's organisations where RTUNPIW operates, accounting for 47.7% of the total headcount in the industry.

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 based on records of periodic medical examinations and sick leave, and develop a comprehensive health improvement programme titled Health. The Agreement incorporates the opportunities provided by legislation on the special inspection of working conditions (SIWC) and stipulates an additional mechanism for cooperating with the trade union in conducting an SIWC and analysing inspection findings.

GRI 102-41

The Agreement underlies collective bargaining agreements 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 more than 80% of employees in ROSATOM's organisations.

The Industry-Wide Agreement reflects the employer's obligations related to salary indexation and social benefits. The Agreement has also provided the industry-wide trade union, local trade union cells and trade union committees with a more important role in maintaining social stability among the workforce in ROSATOM's organisations. In 2020, RTUNPIW focused mainly on ensuring compliance with the current Agreement, assisting local trade union cells in drafting and signing collective bargaining agreements, and actively participating in the work of the Russian Trilateral Commission on the Regulation of Social and Labour Relations.

For details on the implementation of the occupational safety and health policy, see the section 'Occupational Safety and Health; Human Rights'.

3.4.5. Cooperation with universities and recruitment of young professionals

GRI 103-2

Specialised educational organisations training specialists for the nuclear industry form part of the Consortium of Core Universities of ROSATOM (18 universities specialising in disciplines relevant to the nuclear industry). National Research Nuclear University MEPhI (NRNU MEPhI) is the central university for the nuclear industry. Its alumni include six Nobel Prize winners.

In order to develop NRNU MEPhI as the key nuclear university, ROSATOM continued to implement a project titled 'Development of the National Research Nuclear University between 2018 and 2022', with funding provided annually by the Corporation's organisations totalling RUB 720 million. The aim of the project is to make the training of high-skilled professionals in nuclear and related industries more efficient and strengthen the positions of the Corporation and NRNU MEPhI on the global nuclear technology market, including in countries where ROSATOM operates.

In 2020, the key focus areas of the project included developing the university's infrastructure and facilities, career guidance, developing a talent pipeline for the civilian sector of the nuclear industry and the NWD, developing the university's corporate culture, improving the employee training system to align it with the needs of a digital economy, promoting NRNU MEPhI's educational products abroad, creating an environment for efficient training, social and cultural adaptation of foreign students, creating an English-speaking environment at the university, etc.

In March 2020, an official ceremony was held at NRNU MEPhI to mark the unveiling of a monument 'To the Creators of the Russian Nuclear Project' commemorating the 75th anniversary of the Russian nuclear industry. The sculpture became one of the key and most distinctive ensembles of the Avenue of Nobel Prize Winners, a complex of monuments at the university campus. The composition is centred around an atom, which serves as a conceptual and sculptural focus of a group comprising the figures of three great scientists (Igor Kurchatov, Yakov Zeldovich and Yuliy Khariton).

As part of the project, in 2020, ROSATOM started to build a new NRNU MEPhI dormitory in Moscow and repair a dormitory of Snezhinsk Physics and Technology Institute of NRNU MEPhI in Snezhinsk. The Corporation also organised training and internship for foreign citizens from the Corporation's partner countries in various formats, received professional and public accreditation for educational programmes that are in demand in the nuclear industry, etc.

In 2020, a total of 1,358 students attended universities under arrangements with nuclear organisations.

3,740 university students undertook internships in nuclear organisations. 243 people were subsequently hired by the organisations.

Overall, more than 1,780 university graduates were hired, with about 70% of them graduating from core universities (including branches of NRNU MEPhI). ROSATOM attracts the best students: in 2020, the grade point average of university graduates hired by the Corporation totalled 4.45 points. One in every three young employees hired by ROSATOM had graduated with honours.

ROSATOM has prepared a forecast until 2030 for the industry's demand for specialists who have received university education or secondary vocational education. Organisations in the industry are expected to hire around 1,700 graduates of core universities per year on average, including around 800 graduates of NRNU MEPhI and its branches.

Career events involving representatives of nuclear organisations are a traditional tool for promoting ROSATOM's employer brand at core universities. In 2020, ROSATOM's Career Days were held online for students with the relevant specialisms across Russia; in addition, career fairs were held in Saint Petersburg, Moscow, Tomsk, Nizhny Novgorod and Ivanovo. The total number of participants exceeded 15,000. More than 48 organisations were presented at these events and offered over 600 vacancies to students and graduates.

TEMP Tournament

ROSATOM attaches special importance to attracting and selecting promising graduates and offering them employment in nuclear organisations.

The TEMP Tournament for Young Professionals is a major competition in the nuclear industry. In 2020, over 2,500 graduates and students from 300 specialised and core universities participated in the Tournament. Over 50 experts from 36 nuclear organisations worked with the participants, who presented 84 ideas for innovative project solutions. 147 participants working in teams on 18 projects for nuclear organisations advanced to the finals. Eleven projects that reached the finals were approved by the organisations for further implementation.

Public Lectures and AtomTalks

In 2020, Public Lectures and AtomTalks were held to popularise the nuclear industry among young people, provide early career guidance and enable informed career choices. The events were focused on jobs in the nuclear industry and covered various topics, such as Nuclear Engineers, Nuclear Science, Digital Technologies in Nuclear Reality, Nuclear Industry Beyond an Atom, and Competences of the Future. Forty-eight nuclear experts participated in the events, which garnered over 300,000 views.

I'm a Professional Olympiad

In the 2019/2020 season, ROSATOM was a partner of the I'm a Professional All-Russian Student Olympiad. The Corporation supported seven thematic tracks jointly with NRNU MEPhI, Moscow Institute of Physics and Technology and St. Petersburg Polytechnic University, as well as three Winter Educational Schools.

Over 35,000 students from Russian universities competed in the tracks supported by the Corporation. Thirty-three finalists completed internships and work placements, and three candidates were hired by nuclear organisations.

CASE-IN International Engineering Competition

For the second year in a row, ROSATOM was a strategic partner of the student league in the Digital Atom section of the CASE-IN International Engineering Competition. 57 teams comprising 215 students with a specialism in digital technology competed in regional rounds, with 11 teams from nine universities emerging as winners.

ProeKTOriA All-Russian Forum

The ProeKTOriA All-Russian Forum has become a major career guidance event for schoolchildren. ROSATOM was a partner of the Forum and suggested cases for its Digitisation section.

In 2020, the event was held in a hybrid format and was viewed by over 1 million users online.

Internships 2.0 Project

ROSATOM was involved in the Internships 2.0 project. Twenty-five nuclear organisations prepared 48 cases for students. Between 1 January and 30 June 2020, 34 participants solved the Corporation's cases. Ten candidates were selected from among the participants and were offered internships and work placements in nuclear organisations.

Golden Internship Competition

As part of the Golden Internship Competition run by the Career Time project, 153 participants applied to solve cases prepared by the Corporation's organisations: JSC Science and Innovation and JSC Greenatom. Nine people were selected by the Corporation's experts for internships and work placements in nuclear organisations.

Big Break

In 2020, ROSATOM was a partner of the Big Break All-Russian Competition for Schoolchildren, with over 1 million participants (school students in grades 8 to 10). As part of the competition coverage, a month-long thematic event was launched on the Big Break community page on VKontakte to mark the 75th anniversary of the nuclear industry, with over 40 online activities and more than 4 million views.

Cooperation with the Talent and Success Foundation

ROSATOM continued to implement a road map for cooperation with the Talent and Success Foundation. During the year, the Corporation's experts delivered more than 35 lectures and workshops. ROSATOM also participated in the development of six project tasks as part of a national programme titled 'Sirius. Summer: Launch Your Project' involving about 4,000 schoolchildren and 1,000 students and implemented an educational programme focused on promising areas of engineering technology development for 217 foreign and Russian schoolchildren and students.

ROSATOM became a strategic partner of the Modern Energy section of the Big Challenges science and technology project session involving about 4,000 schoolchildren and 1,000 students.

Corporate Volunteering

3.5.1. ROSATOM's approaches and principles of volunteering

GRI 103-1
GRI 103-2

In 2018, ROSATOM made an official decision to launch a corporate volunteering programme and develop an integrated system for planning and implementing volunteer initiatives.

The volunteering management system involves the development of projects simultaneously:

- Along the functional hierarchy: each Division and key nuclear organisations have a supervisor responsible for coordinating volunteer initiatives, while the overall strategy is developed by ROSATOM;
- As part of horizontal interaction between leaders of the volunteer movement at the local level and the sharing of experience between Divisions.

This system is based on the following principles:

- Alignment of projects with the needs of the region based on the level of its social and economic development;
- Alignment with the Sustainable Development Goals prioritised by the organisation;
- Alignment with national development goals and regional practices;
- Alignment of initiatives with the mission and values of the organisation and expectations of key stakeholders;
- The focus of projects on providing long-term benefits to the region as a whole and improving the standard of living of a specific group of beneficiaries. These benefits must be clear and measurable.

3.5.2. Prioritised areas of volunteer activity

As part of vertical management, a pool of industry-wide projects and standardised campaigns was formed, and general guidelines were prepared for all organisations in the nuclear industry.

These projects are grouped into **five main areas** of volunteer activity:

- Environmental conservation;
- Supporting socially disadvantaged groups and veterans;
- Promoting a healthy lifestyle;
- Social integration and mentoring;
- Intellectual volunteering (leveraging employees' professional skills in the regions of operation).

GRI 103-3

As part of the efforts to promote and launch initiatives across the five prioritised areas, in 2020, a number of major projects were launched or actively developed.

As part of assistance to socially disadvantaged groups, retirees and veterans, a visiting care service, We Are Responsible, was launched in the industry as an extension of the #WeAreTogether campaign; it involves volunteers providing ongoing targeted assistance to retirees and veterans and participating in initiatives that contribute to the socialisation of the older generation.

In 2020, **about 300 volunteer campaigns** were conducted in the nuclear industry.

The total number of volunteers at ROSATOM **exceeds 5,000 people**.

As part of environmental initiatives, most organisations in the industry arranged centralised collection of solid domestic waste and launched awareness-raising campaigns to promote environmental culture, distribute information materials on responsible consumption practices among industry employees, their families and residents of regions where ROSATOM operates. Volunteers conduct environmental campaigns on a regular basis.

Over three years of the paper and cardboard collection programme, employees of Rostov NPP sent 90 tonnes of waste paper and cardboard for recycling.

As part of the Ecocity project run by Leningrad NPP, in 2020, over a tonne of plastic waste was sent for recycling in the town of Sosnovy Bor.

The topic of resource conservation is also covered in educational events for residents of nuclear towns and cities; some towns and cities have implemented a comprehensive programme on energy conservation for schoolchildren and students, which includes lectures, virtual tours, educational games and programmes for the Quantorium children's science park.

Social integration and mentoring initiatives include not only engagement with schoolchildren and students at core universities, but also thematic workshops and meetings with representatives of disadvantaged groups, such as children from orphanages, persons undergoing long-term medical treatment or homeless people. Training is also provided for non-profit organisations and small businesses to enable them to find new solutions for optimising processes and expanding their target audiences.

As part of intellectual volunteering, employees implement pro-bono projects aimed at developing infrastructure in nuclear towns and cities. These include solutions to optimise transport routes, pass systems, urban navigation and the development of convenient creative spaces. These projects are informed by an analysis of the needs of local residents.

Dedicated communication channels were set up in the Corporation; these include thematic corporate mailing lists and accounts on social media, to which a total of more than 14,000 users are subscribed.

Employees are free to choose volunteer initiatives, including outside the areas prioritised by ROSATOM. The Corporation supports all initiatives that are of interest and importance to the beneficiaries. The engagement rate among participants in the volunteer movement stood at 86% (compared to 84% across the industry).

In the closed administrative and territorial formation of Snezhinsk, a project was implemented to introduce pedestrian crossings with flexible traffic speed control.

In Zelenogorsk, employees of JSC Electrochemical Plant piloted the Business Technology in Education project to optimise administrative processes in the town's schools; they also provided training to the teaching staff. In addition, volunteers implemented a project titled 'Convenient Routes for a Smart City', which addressed the logistical problem of determining a convenient location of stops and routes through the development of a software program for creating a digital copy of the town, analysing data and displaying the results.

For details on the Corporation's volunteering activity and its results in 2020, see the brochure 'Energy of Kindness. ROSATOM's Volunteers': https://drive.google.com/file/d/1BUqsyKXXJWZakaACk3mwEjgNJhMD-auS/view?usp=drivesdk.

3.5.3. Volunteer training

To improve the quality of corporate volunteering projects, ROSATOM provides regular training for employees responsible for the development of this area. The Corporation also holds thematic workshops for volunteers and leaders of the volunteer movement and conducts communication campaigns to stimulate employees' interest in specific areas of corporate volunteering and environmental culture.

In 2020, a comprehensive educational programme for volunteers was developed; it includes a total of more than 30 training and team-building events involving market experts, such as representatives of non-profit organisations and public figures.

In order to review best practices, share experience and formulate requests from businesses to various government, non-governmental, commercial and non-profit organisations that have a direct or indirect impact on the development of corporate volunteering, since 2020, the Corporation has been actively participating in the activities of the Russian volunteer community.

GRI 102-13

ROSATOM headed the Council for Sustainable Business Development, Corporate Social Responsibility and Volunteering of the Russian Chamber of Commerce and Industry, joined the Coordination Council for the Development of Volunteerism and the Coordination Council for the Development of Communities of Young Professionals under the Civic Chamber of the Russian Federation, as well as the Expert Council for Sustainable Development of Russia's Ministry of Economic Development.

Online project: ROSATOM's Volunteer School

Over four months in 2020, more than 500 people from 40 nuclear towns and cities attended training events involving the heads of key Russian non-profit organisations.

Families of the participants were also involved in the activities. The youngest student at the School was 15 years old, and the oldest was 73 years old.

Volunteers integrate the knowledge acquired during the training sessions into existing volunteer programmes in the industry and leverage this knowledge to develop new volunteer projects.

For details on volunteer campaigns run during the COVID-19 pandemic, see the section 'Response to the Pandemic'.

3.5.4. Anatoly Alexandrov Corporate Social Responsibility and Volunteering Competition

In order to promote the development of the volunteer movement and generate new initiatives, it was decided to hold the annual Anatoly Alexandrov Corporate Social Responsibility and Volunteering Competition[78].

The competition is held in order to identify best practices, develop the system for managing social projects and volunteering, communicate the Sustainable Development Goals to employees, establish criteria for evaluating the effectiveness of social projects and proceed to form cross-divisional teams focused on specific thematic areas.

A total of 204 applications were submitted for the competition from all Divisions of ROSATOM and numerous organisations outside the scope of the Divisions. The total number of participants and their team members exceeded 800 people. Prize winners included the following projects:

Places	Best Volunteer Project	Best CSR Project	Best Idea for a Social or Environmental Project
1	Smart Routes for a Smart City	Social Entrepreneurship Development Programme	New Carbon Footprint
2	Safety Academy	Shaping a Culture of Energy Consumption among Young People	Closed Waste Loop
3	Business Technology in Education	Education and Production: Energy of the Future	Ecocity, Organising a System for Solid Domestic Waste Sorting

The winners were awarded prizes by Alexey Likhachev, ROSATOM's Director General, at the award ceremony of the 2020 Person of the Year industry-wide recognition programme in Sochi. The Director General personally praised the most proactive employees who have been engaged in civic activities and have been making a major contribution to positive changes in society for years. Nine employees of nuclear organisations were awarded certificates for the implementation of important social projects.

[78] Regulations on the competition were approved by Order No. 1-1/399-R of ROSATOM dated 8 July 2020.

3.6 Long-Term Projects in the Sphere of HR and Social Policy

Improvement of employee engagement in the Corporation and its organisations and development of internal corporate communications

In addition to an employee engagement survey, in 2020, ROSATOM conducted four pulse surveys (in April, June, August and November) to assess employees' emotional state and the level of their satisfaction with pandemic-related measures taken in individual organisations and across the industry as a whole.

According to the November pulse survey, 82% of employees in the industry confirmed that the actions taken by senior executives had given them confidence that the Corporation would continue to operate effectively after the COVID-19 crisis, and 85% of the employees said that they received the support needed to accomplish their work-related tasks in the current situation from their managers.

Pulse surveys demonstrated their effectiveness as they enabled the Corporation to monitor employees' emotional state and satisfaction with pandemic-related measures in a timely manner. It took only three to four weeks for enterprises to take practical steps after receiving feedback.

This practice was one of the major factors that enabled ROSATOM not only to maintain the employee engagement rate in the industry in 2020 but even to achieve an increase by two percentage points to 84%.

Accordingly, ROSATOM decided to continue to use and develop the pulse survey practice in 2021 and to conduct surveys in June, August and November.

Development and implementation of the employer brand promotion programme

In 2020, ROSATOM developed a new employer brand identity and approved the Uniform Guidelines for Shaping and Developing the Employer Brand of ROSATOM and Its Organisations to engage with the target audience.

In addition, in the reporting year, ROSATOM implemented the following measures in this area:

- More than 300 employees of the Corporation's HR function received training in employer brand promotion;
- The Employer Brand training section was created on the HR School online portal;
- A project titled 'ROSATOM's Employer Brand Ambassadors' was launched: participants (111 people) representing key areas of the Corporation's business were selected and underwent training; a photo catalogue of the ambassadors was created;
- Steps were taken to promote ROSATOM's employer brand online (ROSATOM's career community pages on VKontakte and Instagram have 9,900 followers and 4,600 followers respectively);
- A strategy for the promotion of the digital employer brand was developed;
- Industry-wide recruitment events were held to attract students and graduates;
- The development of an industry-wide career portal was initiated.

Development of digital services for employees

To speed up business processes and reduce costs, all core HR processes in the civilian sector of the industry were standardised and automated.

As at 31 December 2020, 156 organisations (including nuclear power plants) employing a total of 179,500 people were using the industry-wide HR IT system based on SAP HCM. Transactional operations have been transferred to the HR Service Centre (HR SC).

As at the end of the reporting year, the HR SC serviced 127 organisations employing a total of 178,900 people. All transactional processes have been automated using the Robotic Process Automation (RPA) technology: 86 robots cover 57% of HR transactions. In 2020, the number of completed HR activities reached 7,881,874, with the quality score at 99.97%.

Talent pool development processes have been automated in the RECORD industry-wide IT system[79] (based on ETWeb Lumesse): setting of annual targets and assessment of their achievement, annual assessment, career and succession, training and development, recruitment and onboarding. A total of 146,200 users (active accounts) from 102 organisations use the RECORD system.

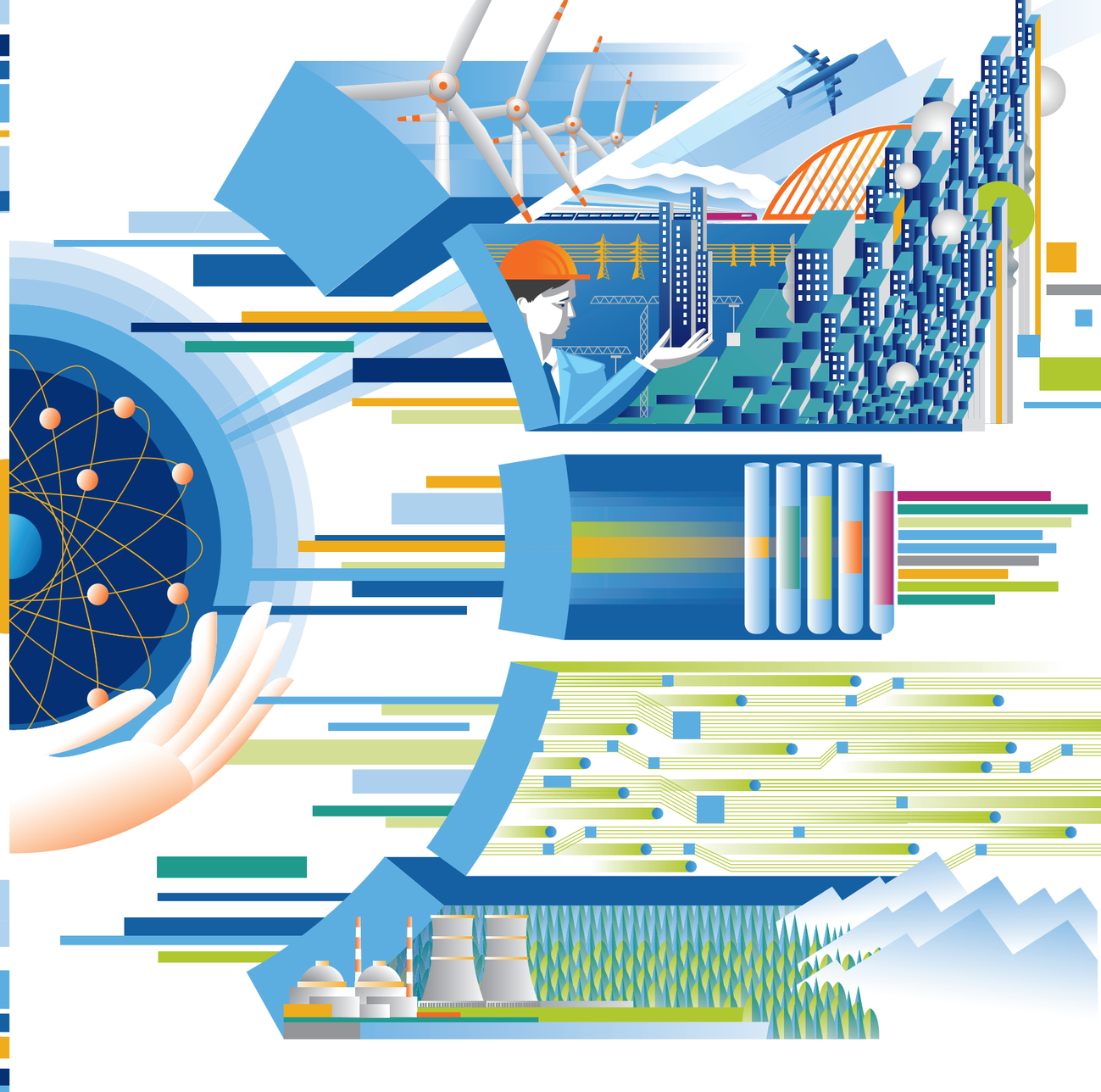
In 2020, ROSATOM started to implement user-friendly digital services for employees. A new service, the Employee's Personal Account, was made available to 50,000 employees, enabling them to arrange a business trip or vacation fully online with no need for a personal visit to the HR department and without any paperwork. The service comprises a total of 20 functions, including bulk functions, such as leave, business trips, certificates, transfers and 'my income.' The user rating stands at 4.7 out of 5.0.

Employees of six pilot organisations became users of the first version of the Digital Assistant. This is a chatbot that helps generate an online request and get a prompt response on popular services (remaining leave, a leave application or a business trip request, requests for certificates and copies of documents, technical support, account password recovery).

[79] RECORD is a service for administering and monitoring processes related to talent pool development (setting of annual targets and assessment of their achievement, performance management and annual assessment, career and succession, training and development, recruitment and onboarding, 360-degree assessment, etc.).

CHAPTER 4

REPORT ON THE DEVELOPMENT OF NUCLEAR TOWNS AND CITIES



GRI 102-14

Statement by Andrey Polosin

Dear colleagues,

I would like to present the Report reflecting the outcomes of ROSATOM's efforts aimed at developing nuclear towns and cities. 2020 turned out to be a test of resilience for us and for nuclear towns and cities. The main achievement is that we managed not only to mobilise our resources and respond to the pandemic, but also to proceed with projects that are important for these towns and cities.

As soon as the lockdown was imposed, we took immediate steps, set up crisis centres across all regions and, above all, took measures to prevent the infection from entering the towns and cities and from spreading within them.

During the very first days of the emergency, we started to provide medical units of the FMBA of Russia in our host towns and cities with required personal protective equipment (PPE) and devices. We purchased medical equipment (first and foremost, ventilators, bedside monitors, pulse oximeters and various other devices) and PPE worth a total of over RUB 2 billion and delivered it to the towns and cities.

In addition, we adopted a hands-on approach to establishing cooperation between healthcare professionals, towns and cities, volunteers and our organisations; this involved arranging transportation for doctors and medical staff visiting patients, delivering food, monitoring the availability of drugs in pharmacies, monitoring and providing assistance on the most challenging issues. We monitored the situation on a daily basis and held online meetings to share best practices.

Andrey Polosin
Head of Department for Liaison with Regions of ROSATOM

Undoubtedly one of the most important areas of development of our host towns and cities is urban redevelopment, and we have achieved significant progress in this area. The data provided by the Russian Ministry of Construction, Housing and Utilities show that the urban environment in nuclear towns and cities improved in 2020. While the national average urban environment index increased from 166 to 177 points during the year, in nuclear towns and cities this metric had already been high and grew even further, from 184 to 188 points. Moreover, in 2020, improvements were achieved in 22 nuclear towns and cities. Of course, it was not just the result of our efforts in 2020, but the outcome of years-long collaboration, which involves analysing people's needs, studying modern approaches to public space design and engaging professional expert teams in project development. In spite of the pandemic, which lasted throughout the construction period, we managed to complete all scheduled redevelopment projects in full and to initiate the discussion and design of new projects.

The Corporation traditionally takes part in the implementation of national projects of the Russian Federation. All national project goals set in Decree No. 474 of the Russian President are aimed at improving the standard of living.

ROSATOM's projects, such as the Territory of Culture, ROSATOM's School, the Citizen of ROSATOM's Country, etc., are aimed at improving the standard of living; in 2020, they went online. This helped to increase the participation of local residents in all events, which even exceeded the forecast. It was also true for all educational projects and work with children and teachers.

To make the participation of our municipalities in the implementation of national projects more effective, we arrange professional development programmes for municipal officials; this contributes directly to management quality and the achievement of national goals.

In 2020, we continued to work with towns and cities under a methodology developed specifically for our host towns and cities to make their participation in national projects more effective. We piloted this methodology in towns and cities in the Sverdlovsk and Chelyabinsk Regions and in the town of Usolye-Sibirskoye in the Irkutsk Region and provided methodological support for them.

In 2020, nuclear towns and cities implemented measures forming part of eight national projects worth a total of RUB 2.25 billion. This included participation in such national projects as Housing and Urban Environment, Demographic Situation, Education and Ecology.

The Corporation attaches great importance to the development of PSEDAs. In spite of an economic downturn, in 2020, the resident status was given to 43 organisations. As part of their investment programmes, these organisations will invest RUB 7.2 billion in the economy of nuclear towns and cities and create over 1,900 new jobs. A priority development area (PDA) is being actively developed in Seversk and Novouralsk: these towns have the largest number of resident companies at the moment. Manufacturing companies operate across a wide variety of business areas ranging from traditional production (manufacture of cable products, aluminium extrusions and wall panels) to unique operations. For example, in 2020, Tefra, a subsidiary of JSC RIR, entered into an agreement to create a manufacturing facility in the PDA in Seversk using an innovative technology for the processing of ash generated by coal-fired thermal power plants.

In recent years, we started to align our activities with sustainable development principles. This is absolutely natural for us. The nuclear industry has traditionally supported towns and cities and helped to ensure their sustainability. The planning horizon in our industry is very long, up to 50 years, and our participation and adoption of the Sustainable Development Goals is a natural extension of activities conducted by the Corporation, which celebrated the 75th anniversary of its establishment in 2020. The industry maintains high standards of professionalism, and it matters a lot to us what the next generation will be like and how our host towns and cities will develop in the future. ROSATOM works with all its host towns and cities, with all its Divisions, but there are regions where we have only recently launched our projects and are still developing a system for managing work aimed at improving the standard of living, for example, in Usolye-Sibirskoye in the Irkutsk Region.

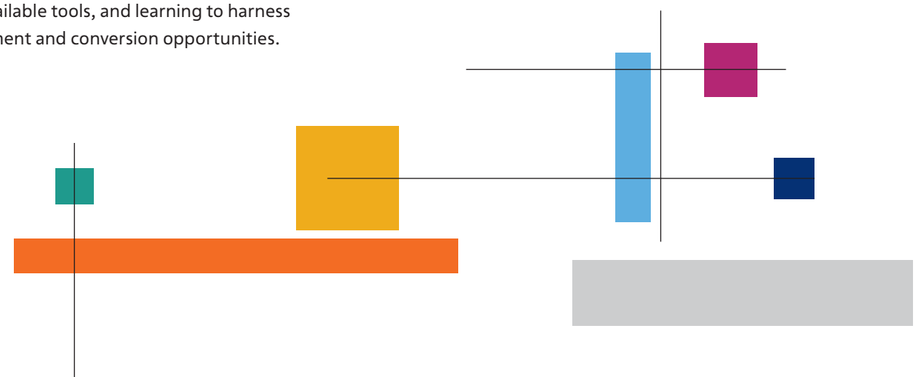
We have a proprietary model that we adopted three years ago to describe processes aimed at developing towns and cities. It includes the management quality, infrastructure and local social processes.

The most important prerequisite for achieving the Sustainable Development Goals is informed management of these factors and resources, well-thought-out and accurate use of available tools, and learning to harness resource management and conversion opportunities.

Towns and cities that have research and production capabilities required for development (and these include all of ROSATOM's host towns and cities), as well as numerous other towns and cities all over Russia should acquire a status corresponding to the goals that they set and supporting their development.

We seek to initiate the adoption of a resolution to support such towns and cities at the federal level. We believe that the regional policy aimed at stimulating agglomeration processes and preserving rural areas needs to be supplemented with another priority: a policy with regard to research and technology development areas.

We have a range of tools for working in these areas, such as an educational programme for our executive succession pool run by a department of MEPhI; we regularly hold workshops and strategic sessions in the relevant regions, and they are all incorporated into our model aligned with the ESG approach. We recognise that we can expand our management capabilities and thus enhance the role of social and infrastructure factors in regional development.



Key Results in 2020

Nuclear towns and cities

To date, 25 municipalities have been established in 17 regions of the Russian Federation, including 10 CATFs and 10 towns and cities where NPPs are located. The population involved totals 2.1 million, including:

- Employees (272,000 people);
- Their family members (1 million people);
- Residents of municipalities (1 million people).

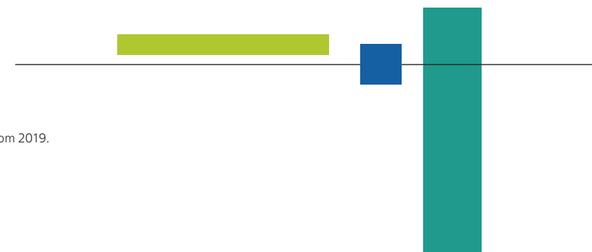
ROSATOM's impact on regions where nuclear facilities are located

	2018	2019	2020
Tax payments to budgets of all levels in the Russian Federation, RUB billion	188.2	207.4	249.9
Nuclear power generation at ROSATOM, billion kWh	204.274	208.785	215.745
Share of nuclear power generation, %	18.7	19.0	20.3
Financing of national projects, RUB million	–[80]	2,746.87	6,090.03

Performance in PSEDAs

	2018	2019	2020
Number of PSEDAs established in nuclear CATFs	5	8	8
Number of resident companies in PSEDAs	2	20	43
Investments by resident companies, RUB billion	0.07	3.01	7.20
Number of jobs created	117	870	1,948

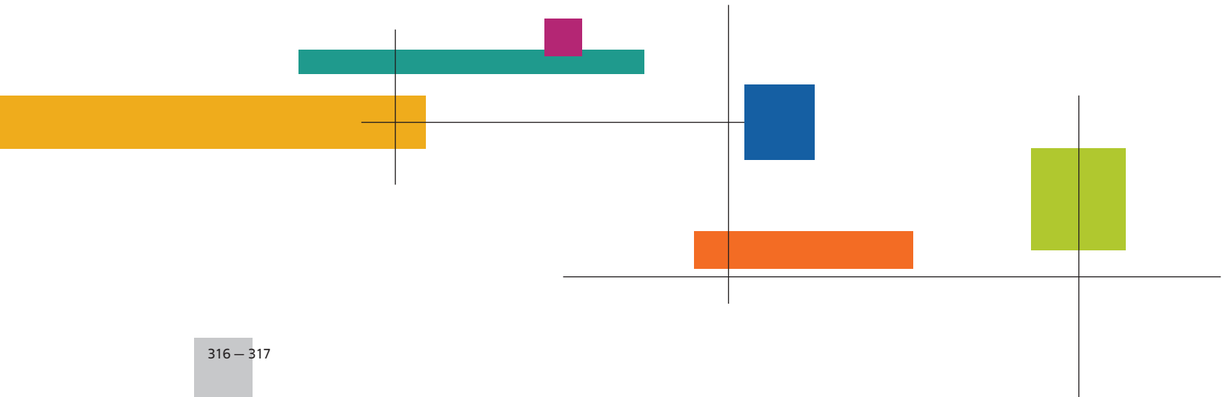
[80] In 2018, national entities were preparing applications for participation in national projects starting from 2019.



GRI 203-2

Key Events in 2020

- The management company, JSC ATOM-TOR, signed agreements on operations in priority social and economic development areas with 23 resident companies.
- An agreement was signed with the government of the Smolensk Region; under current agreements with federal subjects of Russia, ROSATOM signed a supplementary agreement with the government of the Sverdlovsk Region, as well as protocols on the implementation of agreements with the governments of the Kaluga, Murmansk, Rostov, Sverdlovsk, Voronezh and Kursk Regions.
- The Smart City platform for urban management was introduced in 17 towns and cities where ROSATOM's nuclear facilities are located.
- A comprehensive modernisation programme was developed for healthcare institutions affiliated with the FMBA of Russia in CATFs and other nuclear towns and cities.
- Community liaison offices of ROSATOM's Public Council were opened in eight towns and cities: Zarechny (Sverdlovsk Region), Udomlya, Novovoronezh, Balakovo, Polyarnye Zori, Desnogorsk, Kurchatov and Bilibino.
- The 13th Regional Public Dialogue Forum titled 'Environmental Solutions and Society' was held.
- The Environmental Commission of ROSATOM's Public Council, together with the Bellona Foundation, published a report on the situation around DUHF in Russia in order to raise public awareness of DUHF management.
- A practice-oriented module was developed jointly with NRNU MEPhI to expand the coverage of towns and cities and increase their involvement in the efforts aimed at achieving the national goals.
- A training programme titled 'School for Leaders' was developed to help senior officials of nuclear towns and cities improve their management skills.
- ROSATOM launched the AtomLike competition, which involves creating video and audio content focused on culture, art, creativity and arts education and posting it online.



Response to the Pandemic: Supporting Urban Residents

GRI 103-1
GRI 103-2

2020 saw an outbreak of a novel coronavirus infection (COVID-19) around the world. In March, the World Health Organisation declared the COVID-19 outbreak a pandemic; accordingly, the Government of the Russian Federation imposed restrictions in the country.

ROSATOM implemented the necessary measures to prevent the spread of the pandemic; this included supporting nuclear towns and cities.

Equipping local healthcare institutions

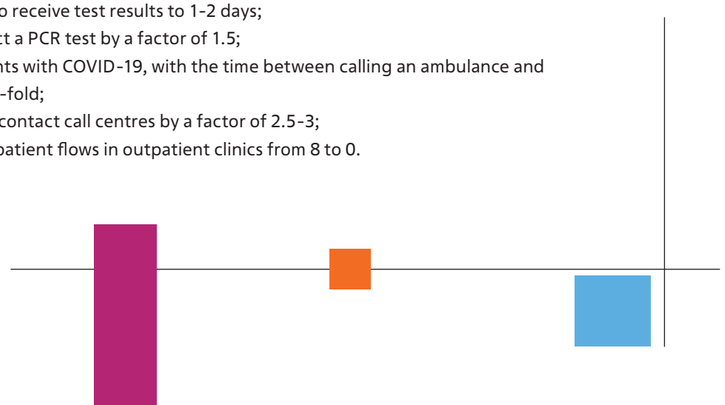
ROSATOM's organisations assisted in opening 20 PCR testing laboratories and improving 3 laboratories in nuclear towns and cities, which helped to speed up testing and improve its availability.

ROSATOM supported healthcare institutions affiliated with the FMBA of Russia by providing additional ventilators, CT scanners, X-ray machines, high-flow oxygen therapy devices, pulse oximeters, thermal cyclers, ultraviolet germicidal irradiation air purifiers and PPE worth a total of over RUB 2 billion.

Contribution of RPS projects

Implementation of the ROSATOM Production System projects made it possible to:

- Reduce the average amount of time required to receive test results to 1-2 days;
- Reduce the amount of time required to conduct a PCR test by a factor of 1.5;
- Speed up the hospitalisation process for patients with COVID-19, with the time between calling an ambulance and admission to an in-patient facility reduced five-fold;
- Increase the share of people who were able to contact call centres by a factor of 2.5-3;
- Reduce the number of intersections between patient flows in outpatient clinics from 8 to 0.



Assistance to businesses

To inform and support small and medium-sized enterprises (SMEs), ROSATOM arranged a course of 23 webinars for entrepreneurs and their employees titled ‘What to Do in Times of Crisis’. The webinars explained topical issues of SME operations in the context of remote work, changes in tax and employment legislation, steps takes to support SMEs in the current situation and other issues.

In addition, a series of online events titled ‘Crisis. Leading Figures on Air’ was organised and held. Their participants discussed changes caused by anti-COVID-19 measures, including administrative assistance to entrepreneurs, COVID passes, support of healthcare, measures to improve the openness of local governments, as well as proposals for specific regions. The series featured senior officials of nuclear towns and cities, entrepreneurs, young activists and volunteers.

ROSATOM also arranged and held a series of live broadcasts titled ‘New Reality of Nuclear Towns and Cities: Projects and Solutions’, which featured the Head of ROSATOM’s Department for Liaison with Regions, the head of ROSATOM’s Territory of Culture project and an advisor from ROSATOM’s Department for Liaison with Regions, who discussed matters related to support for nuclear towns and cities, as well as industry-wide social initiatives.

Hotline for entrepreneurs

Between 7 April and 15 May 2020, a hotline was operated for entrepreneurs doing business in nuclear towns and cities.

The hotline was run with assistance from seven specialists in various areas: lawyers, financial experts, project advisors and specialists in labour relations.

Entrepreneurs working in various business areas submitted a total of 1,186 enquiries and requests via the hotline. Some requests were reviewed jointly with local government officials and specialists. Urgent measures were taken, with 14 written requests submitted to business rights commissioners regarding matters within the competence of regional governments.

Information support for local residents

To provide psychological support to people living in nuclear towns and cities amid the lockdown, ROSATOM prepared and held a series of webinars and video podcasts:

- How the Coronavirus Has Impacted Our Life. Techniques for Dealing with Anxiety, Fear and Nervousness. Recommendations for Maintaining One’s Inner Resources;
- How the Coronavirus Has Impacted Our Life. Virus, Crisis, Emotions... How We Create Our Reality;
- How to Exit Self-Isolation in a Sustainable Manner;
- How the Coronavirus Has Impacted Our Life. Life amid Uncertainty. How to Achieve Stability;
- A Basic Video Course on Managing Emotions.

For details on pandemic response measures taken by ROSATOM, see the section ‘Response to the Pandemic’ in the chapter ‘Social Report’.

4.1 Development Priorities

GRI 103-1

Operations of ROSATOM’s largest organisations determine the social and economic climate in towns and cities where NPPs are located, closed administrative and territorial formations (CATFs) and priority social and economic development areas (PSEDAs). Therefore, the Corporation attaches great importance to improving the quality of life in nuclear towns and cities, promoting effective communication and cooperation with governments of various levels and with local communities, maintaining the talent pipeline and encouraging investments.

Given the scale of its operations in Russia and abroad, the Corporation recognises its responsibility towards a wide range of stakeholders for protecting the environment, ensuring industrial and radiation safety, ensuring the safety and protecting the health of employees in the nuclear industry, contractors and the general public and for operating in a manner promoting long-term sustainable development in its regions of operation.

One of the main sustainable development objectives for ROSATOM and its organisations is to drive systematic improvement in the standard of living by promoting social and economic development in the regions where nuclear facilities are located.

The people-centric approach as one of the key principles of ROSATOM's Unified Industry Policy on Sustainable Development involves working towards long-term sustainable development goals in regions, implementing humanitarian cooperation projects, social projects and volunteer programmes and gaining public acceptance for nuclear technology.

GRI 103-2

These initiatives are implemented by ROSATOM's Department for Liaison with Regions (hereinafter referred as the Department).

Unified Industry Policy on Sustainable Development of ROSATOM and Its Organisations

Key objectives of the Department are:

- To coordinate the activities and enable effective cooperation between the Department and non-governmental organisations and government bodies in nuclear towns and cities;
- To involve non-governmental organisations and local governments in joint initiatives aimed at creating a favourable social and economic climate in the regions where nuclear facilities are located, matching the new stage in the development of the nuclear industry; to switch from a policy of control to cooperation.

GRI 103-3

Performance of the Department is assessed annually on the basis of KPI targets. The assessment is conducted by ROSATOM's Director General. In 2020, all KPI targets were achieved.

4.2 Contribution to the Implementation of National Projects

Methodology for improving the efficiency of participation of the regions where nuclear facilities are located in national projects

In 2020, ROSATOM continued to support the participation of nuclear towns and cities in the implementation of national and federal projects[81].

GRI 103-2

Activities supporting the implementation of national and federal projects in the regions where nuclear facilities are located are carried out by the Department for Liaison with Regions (hereinafter referred to as the Department) with assistance from working groups. In the reporting year, the Department expanded the scope of practical measures supporting the implementation of national and federal projects at the municipal level.

[81] Pursuant to Presidential Decree No. 204 dated 7 May 2018 on National Goals and Strategic Objectives of the Russian Federation, as well as Presidential Decree No. 474 dated 21 July 2020 on the National Development Goals of the Russian Federation until 2030.

In 2019, the Department developed a methodology for improving the efficiency of participation of towns and cities in the implementation of national projects and piloted it in towns and cities of the Chelyabinsk Region. The use of this methodology helped to increase the participation of the towns and cities in national projects and enabled a 221% rise in the amount of financing raised for the projects.

In the reporting year, active steps were taken to introduce this methodology in six nuclear towns:

- The CATF of Lesnoy;
- The CATF of Novouralsk;
- The CATF of Zelenogorsk;
- The municipality of Zarechny;
- The town of Kurchatov;
- The town of Usolye-Sibirskoye.

Specialists from the Department supervised the use of the methodology by taking part in activities of dedicated working groups. To improve performance, representatives of federal subjects of Russia were involved in the process.

Special focus was given and substantial assistance in adopting the methodology was provided to nuclear towns and cities by the Sverdlovsk Region. The application of the methodology enabled the selection of the most relevant activities for both the city and the region, which may contribute to the achievement of national targets in the future. Special emphasis is placed on providing integrated solutions to problems and designing projects taking into account synergy between individual activities.

In 2020, financing of national projects in ROSATOM's host towns and cities more than doubled compared to 2019 and totalled RUB 6,090.03 million.

Financing of national projects in nuclear towns and cities, RUB million

	2019	2020
Total financing	2,746.87	6,090.03
Capital investments	900.00	3,152.00

In the reporting year, 18 towns and cities increased the amount of financing. The most significant growth in the amount of financing was recorded in Obninsk and the CATFs of Sarov and Zarechny.

Status of participation of nuclear towns and cities in national projects in 2020

Since 2018, ROSATOM has been supporting the participation of its host towns and cities in the implementation of national projects that:

- Enable the towns and cities to make a greater contribution to the achievement of national goals;
- Are focused on providing comprehensive solutions to urban problems;
- Enable the towns and cities to their focus on strategic development priorities.

90% of measures announced by the towns and cities in 2019 were approved and implemented in 2020.

The towns and cities have implemented measures worth a total of RUB 6.09 billion.

Financing of national projects

National project	Number of towns and cities	Financing, RUB million
Housing and Urban Environment	24	2,538.73
Education	18	1,309.26
Ecology	5	718.10
Demographic Situation	16	988.54
Culture	13	23.06
Small and Medium-Sized Businesses	8	28.07
Road Safety	9	484.20
Digital Economy	12	0.06

Educational programme of National Research Nuclear University MEPhI

In the reporting year, a practice-oriented module was included in the educational programme run by a department of National Research Nuclear University MEPhI (hereinafter referred to as NRNU MEPhI) in order to expand the coverage of towns and cities and increase their involvement in the efforts aimed at achieving national goals. The key objective of the module is to familiarise representatives of municipalities with ROSATOM's methodology for the participation of towns and cities in the achievement of national goals and to help them hone the relevant practical skills.

More than 30 people from 7 towns and cities, including Balakovo, Obninsk, Elektrostal, Usolye-Sibirskoye, Pevek, Krasnokamensk and Bilibino, completed training as part of this module.

Module experts from the Institute for Urban Economics presented the logic underlying the methodology. The course participants practiced in the use of the methodology, including the algorithm of sequential analysis of indicators and trends; their underlying causes; selection and assessment of projects enabling a tangible improvement of indicators.

The course participants also analysed their projects in terms of their contribution to the achievement of national goals.

In 2020, ROSATOM also continued to run educational programmes focused on national projects; these programmes are targeted at the towns and cities and were launched at 2018.

Management Models and Techniques for the Implementation of National Projects

On 26-28 February 2020, as part of the 4th Forum of Nuclear Towns and Cities, ROSATOM arranged a track titled 'Management Models and Techniques for the Implementation of National Projects'. The event was attended by representatives of towns and cities, federal subjects of Russia and the federal government and involved a discussion of the following significant matters:

- The possibility of participation of towns and cities in the implementation of national projects in the absence of rules and guidelines provided by the federal centre;
- Cooperation between governments of various levels when determining the scope of measures to be implemented in towns and cities where nuclear facilities are located.

In addition, the 4th Forum of Nuclear Towns and Cities included piloting a game designed to improve skills required for urban development management and participation of municipalities in the implementation of national projects. The game had been created at the request of ROSATOM's Department for Liaison with Regions.

The game reflects how local governments make decisions on the selection of facilities and/or initiatives for participation in the implementation of national projects to maximise the overall contribution to the achievement of national goals.

Following the conclusion of the event, positive feedback was received from the participants.

Monitoring the achievement of targets set for the Culture National Project in 2020

In 2020, ROSATOM monitored the achievement of targets set for the Culture National Project and federal projects such as Cultural Environment, Digital Culture and Creative People. The findings of the monitoring revealed that:

- The target for an increase in attendance at cultural institutions in the nuclear industry as part of the national project was exceeded by 7.4% at year-end 2019;
- 22 projects were implemented in 2019: a model library (2 units), provision of equipment for children's art schools (15 units), cinemas (2 units), virtual concert halls (2 units); major repairs (1 unit);
- 15 projects are scheduled for implementation between 2020 and 2022.

Based on the findings of the monitoring, it was concluded that it was necessary to design a strategy for the development of online spaces for cultural institutions in nuclear towns and cities and for the development of their employees' competences pertaining to the digital environment.

Greater Sarov project

Since 2018, ROSATOM's Department for Liaison with Regions, FSUE RFNC VNIIEF, the administration of the CATF of Sarov, the government of the Nizhny Novgorod Region and other stakeholders have been discussing the issue of developing the town of Sarov as a modern research and technology centre designing and developing a wide range of technologies based on fundamental research, including with the use of IT.

In order to successfully accomplish the objectives of diversification and increasing the share of civilian products, as well as designing new civilian products based on dual-use technologies, the stakeholders considered establishing an educational centre based on existing science schools.

The Department coordinated the drafting of an analytical paper containing the analysis of potential areas for transformation, the target vision of development of Sarov until 2050 and specific project proposals. The outcomes of this work underpin the Greater Sarov concept presented to the President of the Russian Federation.

In 2020, the Department also supported the drafting of the Presidential Decree on expansion of the CATF of Sarov.

In addition to the focus on technological development of Sarov, special emphasis is placed on developing the town's social and cultural environment, including its participation in the implementation of a wide range of national projects and creation of a spiritual centre and a spiritual and tourism cluster. To support the development of these projects, the possibility of giving preferential treatment to pilgrims and VIP tourists at the Sarov airfield was also considered.

Social and economic development of Usolye-Sibirskoye

ROSATOM is implementing a comprehensive programme to ensure safety and promote social and economic development of Usolye-Sibirskoye under orders from the government[82].

One of the main objectives in the town's development is to improve the efficiency of participation of the municipality in the implementation of national projects. The working group launched an initiative to improve the efficiency of participation of the municipality in national projects, which involved benchmarking the town's development indicators for the last 10 years and identifying key areas of concern.

In order to determine key areas of the town's development, a strategic project session was held on 8 October 2020 to revise prioritised development areas and generate the relevant project ideas. Participants of the session included representatives of:

- The government of the Irkutsk Region;
- Senior officials of towns and districts of the Irkutsk urban area;
- ROSATOM;
- The Monotowns Development Fund;
- The DOM.RF Fund;
- The business community of the Irkutsk Region and Usolye-Sibirskoye.

Following the strategic session, an action plan for the development of Usolye-Sibirskoye was prepared. It involves working in the following areas until 2024 and beyond (until 2030):

- Creating an economic core of the town;
- Infrastructure development;
- Social and humanitarian projects.

As part of development of the town's economic core, it was decided to form the core area of specialisation of the town's economy by stimulating cluster development.

The plan also involves implementing major projects within the Irkutsk urban area to attract additional resources, as well as formulating a single meaningful concept to integrate ROSATOM's assets in the region: an environmental technology park in Usolye-Sibirskoye, an industrial park in Angarsk, a site in the village of Nikola, a site in the Kabansky District on Lake Baikal, as well as the cancer centre in Irkutsk (currently at the design stage).

[82] Pursuant to Order No. 189-rp of the President of the Russian Federation dated 30 July 2020 and list No. MM-P11-9036 of instructions from the Chairman of the Russian Government dated 8 August 2020 on the need to prevent and clean up environmental pollution in the urban district of Usolye-Sibirskoye, Irkutsk Region.

Prioritised areas of development of social and utility infrastructure in Usolye-Sibirskoye

Area	Activities
Modernising the water supply and sewerage system	Measures aimed at preventing the adverse impact on a water pipeline running across a contaminated industrial site. Major repairs of the water pipeline are scheduled for 2021. An interdepartmental working group chaired by Viktoria Abramchenko, Deputy Prime Minister of the Russian Federation, adopted a resolution on the need to build a new water conduit and wastewater treatment facilities for the town.
Developing the healthcare system, including implementing a project to improve the availability of primary healthcare through PPPs and lean techniques	Establishing a centre for monitoring and studying the impact of adverse environmental conditions on human health. Repairing and equipping the town's healthcare facilities (the Usolye municipal hospital, including the emergency ward, the anatomical pathology department, the children's inpatient care ward, the outpatient clinic, the dental clinic and the cancer detection centre). Building houses for healthcare professionals. Building and repairing the buildings of neuropsychiatric institutions (the Usolye branch of the Irkutsk regional neuropsychiatric clinic, general psychiatric department No. 1, inpatient and outpatient psychiatric facilities). Expanding the facilities of the Usolye resort and the area of its specialisation to include cancer diagnostics and treatment. Establishing and operating institutions for inpatient treatment of elderly people.
Developing the town's educational infrastructure	Involving students and specialists from Usolye-Sibirskoye in educational programmes implemented by the Advanced EcoTechnologies Consortium. Developing a platform for further education in industrial ecology at Irkutsk National Research Technical University. Early specialisation in the Mendeleyev Class in Lyceum No. 1. Developing specialist training programmes for enterprises and further education centres for retraining. Building a school for 825 students. Acquiring a kindergarten for 140 children. Establishing a municipal technology park and four school laboratories. Developing a model of values and competences for schoolchildren and students.

In order to find sources of financing for these areas, ROSATOM is taking steps to raise funds, including those to be allocated as part of national projects.

A working group established together with the state development corporation is discussing the implementation of urban development projects.

In order to involve people living in Usolye-Sibirskoye in the urban agenda, shape a positive public opinion on development processes and stimulate the activity of local residents, ROSATOM is implementing a package of social and humanitarian projects.

ROSATOM's social and cultural initiatives in Usolye-Sibirskoye

Project	Activities
ROSATOM's School	Organising a 'nuclear class' in School No. 12. Organising the Snowy Cartoons industry-wide festival of children's animation and the industry-wide festival of parents' initiatives titled 'For Our Children'.
ROSATOM's Territory of Culture	A series of educational webinars for directors and employees of cultural and recreational institutions, parks, museums, libraries and further education institutions in the field of culture. A series of online training events on developing and promoting cultural digital products on social media for IT specialists, employees of libraries, cultural and recreational institutions, parks, museums, theatres, further education institutions in the field of culture and non-profit organisations. Online tours and panel discussions for directors of cultural institutions (cultural and recreational institutions, parks, museums, theatres and libraries), further education institutions in the field of culture and section supervisors.

In addition, the town council is involved in activities aimed at supporting the administrations of nuclear towns and cities. In the reporting year, ROSATOM launched a training programme for the town's team at the Department of Management of Science-Intensive Sectoral and Regional Projects of NRNU MEPhI.

4.3 Contribution to the Economy

4.3.1. Improving the management of nuclear towns and cities

Agreements on the development of towns, cities and regions

GRI 413-1

The Corporation enters into cooperation agreements with federal subjects of Russia to support their participation in the development of nuclear towns and cities and implementation of investment programmes and projects.

In 2020, under existing agreements, ROSATOM signed:

- A supplementary agreement with the government of the Sverdlovsk Region;
- A new agreement with the Smolensk Region;
- Protocols on the implementation of agreements with the governments of the Kaluga, Murmansk, Rostov, Sverdlovsk, Voronezh and Kursk Regions.

Smart City platform

GRI 413-1

ROSATOM is implementing a project to introduce the Smart City platform in nuclear towns and cities. The project forms part of the Housing and Urban Environment National Project and the Digital Economy National Programme. It is aimed at making Russian towns and cities more competitive, developing an effective urban management system and creating safe and comfortable living conditions for local residents.

Progress made by Russia in the implementation of smart city technologies is recognised globally. The first national voluntary review of Russia's progress towards achieving the Sustainable Development Goals has been published on the UN website. Among other things, the review contains information on ROSATOM's contribution to the development of the urban environment, with the Lean Smart City, a set of state-of-the-art technological solutions implemented by JSC RIR, cited as one of the best practices.

In spite of the absence of financing from the federal and regional budgets, in 2020, the Smart City platform was launched in 17 nuclear towns and cities, with organisational support provided by the Department for Liaison with Regions and JSC RIR; the platform is now operational in 29 towns and cities. In September 2020, Smart City services also became operational in Usolye-Sibirskoye.

The population of 'smart' towns and cities totals about 1.5 million.

At the first stage, the platform is launched in the testing and monitoring mode, and later becomes a useful tool for improving the efficiency of urban management, obtaining feedback from urban residents and developing competences needed for the active use of new technologies.

In 2020, ROSATOM reviewed options for considering and launching the Smart City platform in municipalities of the Tomsk and Chelyabinsk Regions. Together with JSC Smart City Digital Platforms and Solutions, the Corporation is considering the introduction of the Smart City solution in the Samara and Yaroslavl Regions.

Introduction of the Smart City technologies provides environmental benefits in the sphere of water supply and wastewater disposal, with specific power consumption by water utilities reduced by 5%.

ROSATOM offers its solutions not only to towns and cities, but also to regions. The Corporation is currently cooperating on digitisation initiatives with the Nizhny Novgorod, Tomsk and Murmansk Regions and the Stavropol Territory. The Our North portal, a digital solution with a range of functions similar to those of the Active Citizen platform, has been developed and implemented in the Murmansk Region within the shortest possible time frame.

Introduction of the Smart City technologies provides considerable benefits to municipalities:

- A threefold acceleration of processes (on average); some processes may be accelerated up to tenfold;
- Overall municipal budget savings after the implementation of Lean Smart City activities of up to 7% per year;
- A 5% increase in the overall level of satisfaction of local residents.

In December 2020, the Russian Ministry of Construction, Housing and Utilities compiled the Urban IQ index of digitisation of municipal services for 2019. Zheleznovodsk, where an integrated project to introduce the Smart City digital platform and an integrated information system for tourists was implemented, ranked seventh among towns with a population of less than 100,000. The index has been developed as part of the Smart City departmental project, which forms part of the Housing and Urban Environment and Digital Economy National Projects. The index comprises 47 indicators and is calculated for ten areas: urban management, smart utilities, innovations for the urban environment, smart urban transport, smart systems for social security and environmental safety, tourism and services, smart systems for social services, economic health and the investment climate, and telecommunications infrastructure.

The Smart City platform is being developed by JSC RIR in accordance with the strategic programme.

School for Leaders programme

In 2020, ROSATOM launched a training programme titled 'School for Leaders'. The key objectives of the programme are to:

- Structure the existing knowledge and expertise and improve key management competences;
- Enhance skills required for engaging with urban residents taking into account the social, economic and political situation;
- Complete a programme focused on public speaking and skills required for communicating with the audience;
- Develop skills related to psychological aspects of management.

The target audience of the training programme consists of representatives of the nuclear industry, senior officials of towns and cities, and representatives of local governments.

Training website of the School for Leaders programme

GRI 413-1

In the reporting year, ROSATOM developed guidance materials to support professional development, develop new competences and improve the efficiency of initiatives implemented by representatives of the nuclear industry and local governments. The Corporation also developed and recorded a set of training videos for senior officials of towns and cities where ROSATOM's nuclear facilities are located.

100 City Leaders programme

100 City Leaders is a joint programme of ROSATOM and the Agency for Strategic Initiatives aimed at developing urban communities and actively involving them in improvement processes.

The key goals of the programme are to:

- Prepare and implement urban projects at the local level;
- Form sustainable urban practitioner communities;
- Acquire and consolidate theoretical and practical knowledge in the field of project management in the context of urban economy;
- Develop models of urban transformation.

The programme involves studying the organisation and management of urban projects, trends in the development of urban economy, the organisation of sustainable urban communities supporting urban projects, financial and economic project analysis, marketing and promotion of urban projects.

Status of programme implementation in 2020

Stage	Outcome
Engagement with communities and project stakeholders	Development of the urban product (project)
Preparation of project business plans and business models	Financial and legal model of the project
Individual support of project teams	Enhanced project team competences and project MVP
Project packaging and presentation	Road show, investment pitching

In spite of restrictions related to the spread of the novel coronavirus infection, the programme remained highly effective, with 27 out of 31 teams reaching the final presentation. Some teams managed to get tangible support from investors and major stakeholders, and most finalists have concepts of their projects at the investment readiness level.

In 2020, applications for participation were filed from 647 towns and cities with a total population of 58.5 million (40% of the total population of Russia) in almost all federal districts.

In 2020, the programme was converted to the online format, which made it possible to increase the number of regions covered by the programme, engage required experts, including foreign ones, and increase the number of participants of educational modules and working sessions without incurring any additional costs.

The acceleration programme was implemented using unique formats of work with projects and target regions. These included an urban transformation marathon titled 'Urban Sprint', architectural camps, crowdsourced research projects on the 100 Cities platform, the Creative Thursday online marathon of creative industries, the Standard of Civic Participation, etc. All these activities considerably raised the visibility of projects in the accelerator.

Website of the 100 City Leaders programme

Management training in nuclear towns and cities

In order to provide an educational platform for managerial teams from nuclear towns and cities, Department of Management of Science-Intensive Sectoral and Regional Projects No. 95 was established at NRNU MEPhI in 2018.

The Department is chaired by Andrey Polosin, Director of ROSATOM's Department for Liaison with Regions, professor of Department No. 95 at NRNU MEPhI, Doctor of Political Science.

Within two years, the Department built a unique interdisciplinary team of researchers and experts and formed a community of methodologists and practitioners in the field of political management, spatial development, social psychology, aesthetics and urban studies, and project management.

The Department runs further education programmes.

Between November 2019 and August 2020, training under a retraining programme titled 'Management in the Context of Digital Economy' was provided to representatives of administrations of towns and cities where nuclear power plants are located: Volgodonsk, Desnogorsk, Zarechny (Sverdlovsk Region), Kurchatov, Novovoronezh, Polyarnye Zori, Sosnovy Bor and the Udomlya Urban District. Training was provided to a total of 32 people, and 8 retraining diplomas were awarded.

As part of the final module of the programme, the Department, together with the Civic Chamber of the Russian Federation and other partners, organised and held an applied research conference titled 'Towns and Cities as Development Centres'. The conference was held on 21 August 2020 at Obninsk Institute for Nuclear Power Engineering of NRNU MEPhI.

The conference participants discussed the social and economic situation in industrial hubs after the pandemic, municipal practices aimed at overcoming the crisis, as well as proposals from the municipal community for updating national projects and programmes.

The conference was attended by representatives of some nuclear and single-industry towns and cities such as Lesnoy, Zarechny, Ozersk, Desnogorsk, etc. The participants listened to lectures, took part in discussions and breakout sessions and, of course, visited the world's first NPP. Their key objective during the conference was to develop a programme aimed at enhancing the role of nuclear towns and cities in Russia.

In September 2020, the second cohort of participants of the Management in the Context of Digital Economy retraining programme started their training. They included 85 representatives of administrations and institutions from nuclear towns and cities, including CATFs: Balakovo, Bilibino, Krasnokamensk, Obninsk, Pevek, Usolye-Sibirskoe, Elektrostal, Zheleznogorsk, Zarechny, Zelenogorsk, Lesnoy, Novouralsk, Ozersk, Seversk, Snezhinsk, Tryokhgorny and Glazov.
In 2020, training was provided online, via Zoom.

In August 2020, the Department ran a professional development programme titled 'Radiation around Us'. The training programme was designed to provide basic knowledge and skills in the field of nuclear physics and technology in order to hold the Atomic Lesson as part of the celebration of the 75th anniversary of the nuclear industry. A total of 92 professional development certificates were awarded. Participants of the programme included teachers of the relevant disciplines from 85 Russian regions recommended by head teachers of their schools.

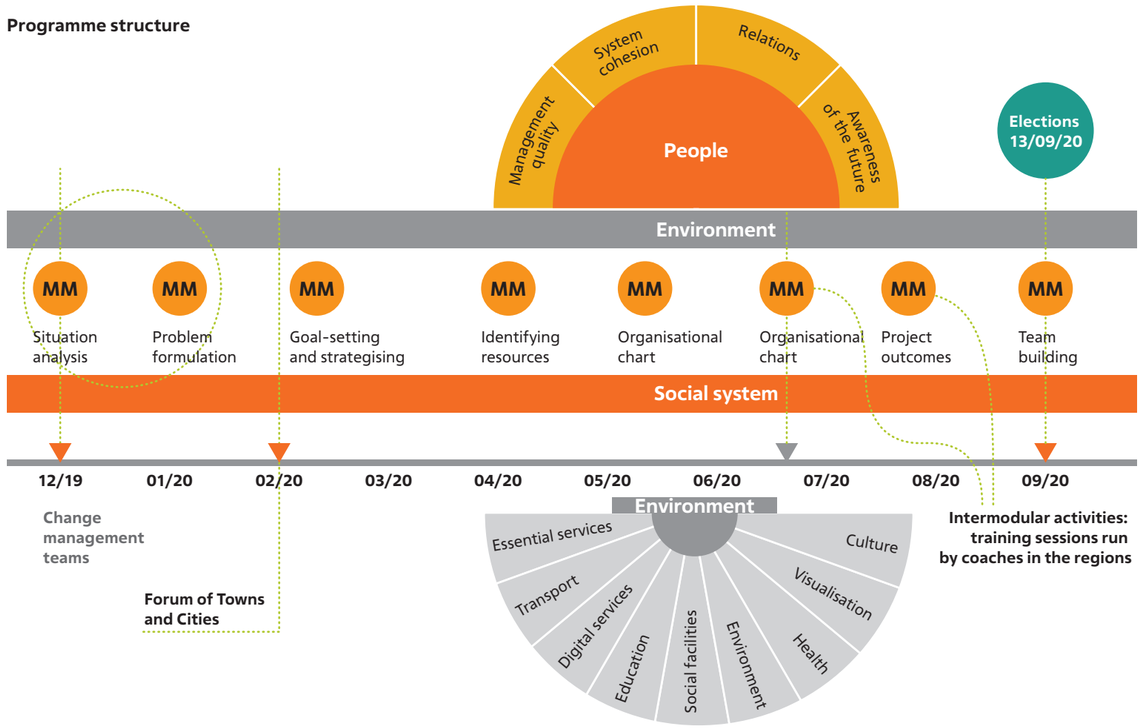
In November and December 2019, two professional development programmes titled 'Basics of Management in the Context of Digital Economy' were implemented for deputy mayors and heads of administrations of nuclear towns and cities. This programme is the first module of the Management in the Context of Digital Economy retraining programme implemented in 2020. The programme consists of 8 training modules, with training provided between November 2019 and August 2020.

Between 26 August and 11 September 2020, the Department ran professional development courses for teachers from schools in the town of Kurchatov under programmes titled '3D Modelling. Using KOMPAS-3D Software' and 'Combinatorics and Probability Theory. Problems with an Economic Focus. Stereometric Problems'. Teachers who successfully completed the programmes were awarded standard certificates. A total of 10 and 17 certificates respectively were awarded.

Between 27 April and 21 September 2020, the Department jointly with the Agency for Strategic Initiatives provided training under a retraining programme titled 'Urban Economy' for participants of the 100 City Leaders acceleration programme implemented by ROSATOM and the Centre for Urban Competences of the Agency for Strategic Initiatives.
A total of 113 retraining diplomas were awarded to those participants who successfully completed the programme.

In 2020, 506 standard professional development certificates and 121 retraining diplomas were awarded.

Programme structure



4.3.2. PSEDA development in CATFs in the nuclear industry

GRI 103-2

PSEDAs are created to preserve the competences of nuclear towns and cities and maintain a high level of social and economic development.

JSC ATOM-TOR is a management company tasked with managing PSEDAs in CATFs where ROSATOM's nuclear facilities are located[83].

[83] Pursuant to Federal Law No. 473-FZ of 29 December 2014 on Priority Social and Economic Development Areas in the Russian Federation.

Website of JSC ATOM-TOR

JSC ATOM-TOR also provides comprehensive information support to resident companies and investors. It has published over 100 items about resident companies, their projects and potential investors in regional, industry-wide and corporate media.

Social and economic development of CATFs is also promoted by the CATF Association. It comprises ten CATFs in the nuclear industry where large innovative facilities of the Russian nuclear weapons complex and nuclear reprocessing organisations are located. The Association closely cooperates with federal executive and legislative bodies and government agencies to determine development priorities for each area.

Website of the CATF Association

The goals of the Association are to:

- Coordinate the activities of the Association's members aimed at developing the legal, financial and economic framework for local governance in CATFs;
- Improve legislation regulating the operation of CATFs;
- Assist in improving the standard of living in CATFs;
- Promote sustainable and safe operation of nuclear organisations around which the CATFs have been created.

In 2019, the management company, JSC ATOM-TOR, in cooperation with the governments of the Tomsk and Penza Regions and the administrations of the CATFs of Zarechny and Seversk, established subsidiaries, LLC ATOM-TOR-Zarechny and LLC ATOM-TOR-Seversk.

Certain functions of the management company have been delegated to the subsidiaries, which enables them to provide quick and efficient assistance in addressing issues facing resident companies and cooperate with local governments.

The subsidiaries also coordinate the work aimed at creating and modernising infrastructure of investment sites in PSEDAs, which helps to unlock the potential of resident companies more efficiently in the context of a favourable economic environment in PSEDAs and to support the implementation of their projects.

In 2021, the management company will continue to establish subsidiaries in other PSEDAs.

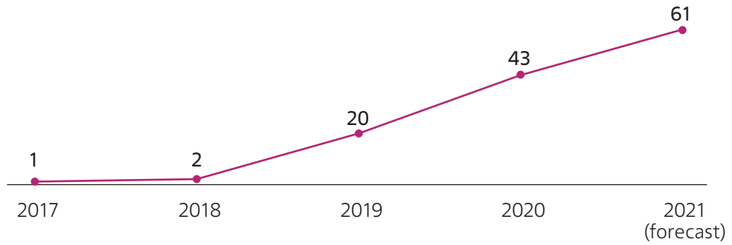
PSEDA status in 2020

Pursuant to resolutions of the Russian Government, PSEDAs have been established in the following eight CATFs:

- Sarov;
- Zarechny;
- Seversk;
- Novouralsk;
- Zheleznogorsk;
- Snezhinsk;
- Ozersk;
- Lesnoy.

In 2020, there were 43 resident companies in PSEDAs; during the year, the management company, JSC ATOM-TOR, signed agreements with 23 of them.

Number of PSEDA residents registered by JSC ATOM-TOR



According to the business plans of resident companies registered in PSEDAs in 2020, they intend to raise investments totalling RUB 7,172.4 million (including capital investments) and create 1,912 new jobs.

Status of project implementation in PSEDAs

GRI 203-2

PSEDA geography	**Investments, RUB million**	Number of jobs to be created	PSEDA residents	Projects to be implemented
PSEDA in Sarov (Nizhny Novgorod Region)	115.31	162	5	*Products*: concrete and concrete products. *New resident:* *LLC Pervaya Sarovskaya Kompaniya (First Sarov Company)* plans to manufacture polyethylene water bottles. Project investments will total RUB 79.68 million; 30 new jobs will be created.

PSEDA geography	**Investments, RUB million**	Number of jobs to be created	PSEDA residents	Projects to be implemented
PSEDA in Zarechny (Penza Region)	446.8	282	5	*Products*: spare parts for diesel locomotives, building materials and plastic products. *New resident:* *LLC Eko Shlyuz (Eco Gate)* will implement a project to develop disinfection systems for the spraying of people passing through a gate frame with special disinfectants. The gate frames are intended to be used to prevent the spread of the novel coronavirus infection. Implementation of the project will require RUB 20.4 million in investment and will create 18 new jobs.
PSEDA in Seversk (Tomsk Region)	1,837.947	429	12	*Products*: titanium dioxide pigment produced using fluoride technology; mechanical engineering. *New residents:* *LLC Tomsk-Azot* has started commercial operation of innovative equipment for the granulation of nitrogenous fertilisers (ammonium nitrate) for agriculture and the manufacture of explosives. The full cost of the project is estimated at RUB 198.6 million, including RUB 13.4 million to be invested by an investor as a PSEDA resident. 14 new jobs will be created. *LLC TEFRA* has launched a project to set up an enterprise that will process ash and slag waste from CHPP No. 21 in Seversk into components of building materials (mixtures). The project involves investments totalling RUB 431.65 million and the creation of 55 new jobs. *Preparation for the submission of documents in order to obtain the resident status* is underway for five more projects with investments totalling RUB 7.8 billion and over 372 new jobs to be created, including two industry-wide waste processing projects whose implementation will necessitate expanding the PSEDA.
PSEDA in Novouralsk (Sverdlovsk Region)	3,756.2	781	10	*Products*: short-radius steel elbows, pipe assemblies; repairs of machine tools and industrial equipment, development of technology and manufacture of cordierite-based ceramic substrate. *Preparation for the submission of documents in order to obtain the resident status* is underway for six more projects with total investments exceeding RUB 11.1 billion and over 611 new jobs to be created, as well as three industry-wide projects.
PSEDA in Zheleznogorsk (Krasnoyarsk Territory)	57	44	3	*Products*: braiding machines; development and manufacture of custom modular equipment packages. *Preparation for the submission of documents in order to obtain the resident status* is underway for six more projects with investments totalling RUB 0.8 billion and 161 new jobs to be created.
PSEDA in Snezhinsk (Chelyabinsk Region)	575,7	60	2	*Products*: braiding machines, harrow disks, burners, modular equipment. Two resident companies with projects to develop and manufacture custom modular equipment packages for oil and gas enterprises, with investments totalling RUB 48.7 million and 30 new jobs to be created. A project to manufacture braiding machines, with investments totalling RUB 527 million and 30 new jobs to be created. Two projects are scheduled for implementation, with total investments exceeding RUB 1.5 billion and 40 new jobs to be created. Seven projects with investments totalling RUB 3 billion and 422 new jobs to be created will necessitate expanding the PSEDA.
PSEDA in Ozersk (Chelyabinsk Region)	366	167	5	*Products*: polymers and polymer materials, non-ferrous metals, adaptive suspension modules for vehicles; modernisation of drilling equipment. Four projects are nearing completion, with investments totalling RUB 2.7 billion and over 246 new jobs to be created.
PSEDA in Lesnoy (Sverdlovsk Region)	18	13	1	It is planned to implement a project that will result in the creation of 27 new jobs, with investments exceeding RUB 300 million.

Development prospects

To communicate and cooperate in the raising of investments for projects to be implemented in priority development areas in the regions where ROSATOM's nuclear facilities are located, the management company, JSC ATOM-TOR, is taking steps to improve the business environment in the priority development areas and has signed agreements with:

- The Investment Promotion Agency of the Sverdlovsk Region;
- The Central Siberian Chamber of Commerce and Industry;
- The Yenisey Siberia Development Corporation;
- The Business Development Agency and Microcredit Company;
- The Association of Clusters and Technology Parks.

Negotiations are underway to sign cooperation agreements with:

- The National Association of Investment and Development Agents;
- The Nizhny Novgorod Region Development Corporation;
- The Development Corporation of the Sverdlovsk Region;
- The Penza Region Development Corporation, etc.

4.3.3. ROSATOM's impact on other areas of development in nuclear towns and cities

ROSATOM's organisations have a significant impact on budget revenue in nuclear towns and cities.

The Corporation is one of the largest taxpayers in Russia. In 2020, it paid RUB 249.9 billion to budgets at all levels.

Additional tax payments to the budgets of federal subjects of Russia with which cooperation agreements have been signed, RUB million

2018	2019	2020
30,222	27,854	45,822

Generating employment through NPP construction

GRI 203-2

The construction and commissioning of nuclear facilities, including NPP power units, creates new jobs, as enterprises often hire employees from the local community. For example, as construction work progressed at Rooppur NPP, about 16,600 local residents were employed in 2020.

The construction of the Belarusian NPP has become a major infrastructure project providing employment to thousands of people both at the plant itself and in organisations that are servicing it. In 2020, more than 22 local building contractors were involved in the construction of the NPP.

Employment in key NPP construction projects in 2020

NPP	Actual headcount, including contractors	Including employees recruited from local communities[84]
Kursk NPP-2 (Russia)	7,372	6,677
Belarusian NPP	5,909	3,250
Rooppur NPP (Bangladesh)	19,667	16,642

Contribution to urban infrastructure development

In 2020, RUB 2,712.9 million was allocated from the budgets of federal subjects of Russia for social and economic development of nuclear towns and cities. By the end of the reporting year, RUB 1,224.3 million had been spent by municipalities (45% of the total amount of allocated funds). Permanent construction work started in 2020 will be continued in 2021 and 2022.

Implementation of agreements and financing of activities by area of expenditure

Areas	2020, RUB million	Share in total funding, %	
		2020	2013–2020
Construction/renovation of permanent structures	1,702.5	62.7	37.1
Major repairs of infrastructure facilities (housing and utilities)	18.9	0.7	6.6
Urban improvement	189.1	7.0	19.8

[84] Employees who are nationals of the countries where the NPPs are being built.

Areas	2020, RUB million	Share in total funding, %	
		2020	2013–2020
Major repairs of residential buildings and buildings of state-funded organisations	232.9	8.6	16.1
Support for educational, cultural, sports and healthcare programmes	99.4	3.6	6.8
Support for small and medium-sized businesses	36.8	1.4	5.0
Subsidies to the local budget	433.3	16.0	8.6
Total	2,712.9	100.0	100.0

Best Municipal Practices project

The key event of the Best Municipal Practices project is the Competition of Best Municipal Practices and Social and Economic Development Initiatives in Municipalities in Regions Where ROSATOM's Nuclear Facilities Are Located.

The project goals include:

- Identifying the most efficient process-based methods for addressing issues facing local governments;
- Providing incentives for local governments to encourage more active participation of local residents in addressing local issues;
- Involving the non-profit sector in addressing urgent issues facing local governments;
- Identifying socially important and promising civic initiatives related to the development of municipalities.

In 2020, 79 applications were submitted for the competition. Winners chosen by the competition panel were awarded diplomas and money prizes. Other participants were awarded certificates confirming their participation in the competition.

Winners of the 2020 competition

New Year's Present for the Zheleznogorsk Hospice (Zheleznogorsk)
School of Responsible Owners (Sarov)
My Choice: volunteer career guidance internship for teenagers aged 15 to 17 (Lesnoy)
Involvement of Urban Residents in Addressing Issues Related to the Development of Urban Environment (Krasnokamensk)
Competition of Reading Families: Reading that Brings Everyone Together (Udomlya)

A number of online training activities focused on the best municipal practices were also held during the year:

- Video podcasts titled 'Typical Mistakes When Filing Applications for the Competition of Best Municipal Practices and Social and Economic Development Initiatives in Municipalities in Regions Where ROSATOM's Nuclear Facilities Are Located';
- A Review of Practices Shortlisted for the Competition of Best Municipal Practices and Social and Economic Development Initiatives in Municipalities in Regions Where ROSATOM's Nuclear Facilities Are Located, etc.

The project website contains the Register of Best Municipal Practices and Social and Economic Development Initiatives in Municipalities in Regions Where ROSATOM's Nuclear Facilities Are Located and the Database of Leaders in Best Municipal Practices.

In addition, special publications about the best municipal practices were posted on VKontakte, Facebook and Odnoklassniki on pages covering events in nuclear towns and cities.

An electronic brochure titled *Best Municipal Practices and Social and Economic Development Initiatives in Municipalities in Regions Where ROSATOM's Nuclear Facilities Are Located* was prepared in the reporting year and circulated to local governments of nuclear towns and cities. A collection of publications titled *Best Practices of the Novouralsk Urban District in the Implementation of National Projects* was compiled and published in cooperation with the Administration of the Novouralsk Urban District.

Website of the Best Municipal Practices project

4.4 Social Development

Improving the standard of living in towns and cities is one of the top priorities of ROSATOM's strategic agenda.

Since 2018, ROSATOM's social projects in nuclear towns and cities have been integrated into a single large-scale project, #ROSATOMVMESTE ('ROSATOM Together').

GRI 203-2

Official website of the #ROSATOMVMESTE project

#ROSATOMVMESTE competition of social projects

In 2020, the Corporation held the third industry-wide competition of social projects titled #ROSATOMVMESTE.

The goal of the competition is to involve employees of ROSATOM's organisations and residents of nuclear towns and cities in the development of key areas of operations in the nuclear industry, to develop the corporate culture and to form an efficient integrated environment for communication between employees of ROSATOM's organisations and urban residents.

In the reporting year, the competition was held in 21 nuclear towns and cities and covered over 80% of their residents. The competition included four categories:

- A competition for social project coordinators, Urban Nuclear Team 2020;
- ROSATOM's Best Month;
- A Quiz of Nuclear Towns and Cities;
- The Day of Nuclear Towns and Cities.

10 teams participated in the competition, with the CATF of Zarechny emerging as winner. The town was awarded a prize of RUB 10 million.

ROSATOM's School project

The project titled 'ROSATOM's School' is aimed at providing children with first-class education regardless of where they live, while preserving and developing the unique character of municipal education systems. The project is being implemented in 21 nuclear towns and cities and covers over 400 kindergartens and almost 250 schools with a total of over 200,000 preschoolers and schoolchildren.

In the reporting year, ROSATOM's School built a system for supporting initiatives from participating towns and cities that had been approved as part of the 2019 Educational Forum. Due to the COVID-19 pandemic, all activities throughout the year were held online.

ROSATOM's School activities in 2020

Programme/ project/competition	Date	Goals	Results	
			Quantitative	Qualitative
Atom Classes project	January – May 2020	■ Raising the educational aspirations of students in 'nuclear classes'; ■ Building a system for cooperation and technology exchange between schools forming part of the Atom Class Network of ROSATOM's School.	■ 51 schools (32% of schools taking part in the project); ■ 34 online events (over 200 hours of online broadcasts); ■ Over 3,500 students and 120 teachers; ■ Over 90,000 views of content on the Internet; ■ Over 100 publications about the series of events on the website of ROSATOM's School and on social media.	■ Schools mastered methods for organising online activities for children; ■ Mechanisms for remote communication between students and teachers were mastered; ■ The most effective remote communication practices in schools forming part of the Atom Class Network of ROSATOM's School were identified; ■ The culture of online activities is developing.
#VseySemyeyso-ShkoloyRosatoma ('The Whole Family with ROSATOM's School') competition	March/ April 2020	■ Psychological support for families living in towns and cities taking part in the project during the lockdown; ■ Raising educational aspirations in the families living in towns and cities taking part in the project.	■ Three competitions: for preschoolers, elementary school students and teenagers, along with their families; ■ Over 300 hours of video content; ■ Over 1,200 families from 17 towns and cities taking part in the project; ■ A total of over 200,000 views on the Internet.	■ Leisure activities for families with children were developed for the lockdown period; ■ Successful cases of family support for children's activities were presented; ■ Traditional family values were promoted.
ShkolaRosatoma-EtoMy ('We Are ROSATOM's School') competition programme	April/May 2020	Supporting teachers and helping them to master current technologies for effective online communication with preschoolers and schoolchildren.	■ Over 500 teachers and 1,000 students; ■ 23 internship programmes for teachers; ■ Over 30 formats of innovative learning activities titled 'NON-school NOT-lessons': over 90 broadcasts, over 45 hours of video broadcasts.	■ Effective distance learning formats were designed and presented; ■ Professional teams were formed and started to promote the effective distance learning formats in educational institutions of participating towns and cities.

Programme/ project/competition	Date	Goals	Results	
			Quantitative	Qualitative
Spring Methodological Marathon	May/June 2020	Presenting the experience of effective implementation of distance learning formats.	■ Over 100 online events; ■ Over 300,000 content views.	Enabling educational institutions to present various educational formats during live broadcasts.
International Smart Holidays	July/ August 2020	Presenting formats for remote communication with children during school holidays.	■ Over 250 hours of educational broadcasts; ■ Over 100 distance learning formats, with activities involving children from Russia and 16 foreign countries; ■ Over 100 Instagram TV shorts; ■ A short film titled Coin was shot and edited; ■ 63 live broadcasts of International Smart Holidays events; ■ Over 100,000 viewers of broadcasts; ■ Over 1 million views of short films.	■ Formats for effective communication with children during school holidays were presented; ■ Cases of interactive events that can be organised for children both in class and as extracurricular activities were presented.

In addition, the following 12 events were held on the initiative of participating towns and cities between September and December 2020:

- The First Family Skills Competition of Family Teams (Zarechny, Penza Region);
- The Festival of Quest Initiatives (Development of Parent Volunteering) (Tryokhgorny, Chelyabinsk Region);
- The Project School (Zheleznogorsk, Krasnoyarsk Territory);
- The Atom Media Festival (Zarechny, Penza Region);
- A competition and festival titled ‘Rosatom’s COOL: Promotion’ (Lesnoy, Sverdlovsk Region);
- An engineering event titled ‘Engineering and Economic Game’ (Novouralsk, Sverdlovsk Region);
- An artistic and aesthetic event titled ‘Olympus Theatre Art Festival of ROSATOM’s School’ (Novouralsk, Sverdlovsk Region);
- #ZazhigayAtom (‘Turn the Atom On’): volunteer career guidance internship for teenagers aged 15 to 17 (Lesnoy, Sverdlovsk Region);
- Snowy Cartoons (Snezhinsk, Chelyabinsk Region);
- A professional skills festival titled ‘Competition of Teacher Teams’ (Zarechny, Penza Region);
- The Step to the Future Competence Centre (Zelenogorsk, Krasnoyarsk Territory);
- A Metadisciplinary Academic Competition of ROSATOM’s School (Novouralsk, Sverdlovsk Region).

A total of over 800 teachers and over 3,000 students from schools located in participating towns and cities took part in ROSATOM’s School events in the reporting year.

School: Youth and Digitisation

The project titled ‘School: Youth and Digitisation’ is aimed at involving young people in business, searching for and preparing digital projects and supporting young talents.

The project is targeted at current and aspiring entrepreneurs, as well as young people who want to start their own business, including graduates.

In 2020, training was mainly provided online by the Ural Academy of Modern Information Technology and was structured into modules, enabling attendees with different levels of training to study on a step-by-step basis. In the course of project implementation, the ways and sequence of information presentation were tailored to specific situations and participants’ interests.

498 people from 14 nuclear towns and cities participated in the project; they developed and successfully presented 13 IT projects.

The training programme enabled the students to acquire in-demand qualifications in IT project management. Those participants who got a sufficient score were awarded certificates of professional development in the government-approved format.

Following the completion of the ‘School: Youth and Digitisation’ project, a hackathon[85] was held on 24-26 September 2020. Its participants underwent training in team formation, generation of ideas, leadership, team roles, etc. Then the participants formed teams to select and explore business ideas. At the end of the second day, the teams presented their business projects to the panel. All the teams were given valuable prizes.

Participants of the event included 19 people from 8 towns and cities where ROSATOM’s nuclear facilities are located: Tryokhgorny, Zarechny (Sverdlovsk Region), Zarechny (Penza Region), Novouralsk, Lesnoy, Zheleznogorsk, Zelenogorsk and Krasnokamensk.

[85] A hackathon is a brainstorming event designed to stimulate new ideas in a selected subject area and help them reach the implementation stage.

School: Third Age – the Whole World Ahead

The project titled ‘School: Third Age – the Whole World Ahead’ is aimed at:

- Encouraging elderly people to be socially active in order to implement social projects, have an opportunity to acquire new knowledge, skills and employment ideas and develop creative abilities;
- Organising activities for attendees as part of an educational programme structured into modules and aimed at satisfying a wide range of intellectual needs of senior citizens.

The project is targeted at elderly and disabled people.

In 2020, due to the pandemic, it was decided to implement the ‘School: Third Age – the Whole World Ahead’ project online.

10 video lessons were developed and recorded; they were subsequently presented to the project participants in electronic form on tablet computers purchased by the Nuclear Towns and Cities Information Alliance. Furthermore, additional video materials were also recorded on memory cards compatible with these tablet computers.

The tablet computers and memory cards were donated to the project participants.

The project involved preparing a video workshop about the active social life of elderly people and running the Good Meetings hobby club for senior citizens. The workshop was broadcast on TV channels of nuclear towns and cities.

More than 200 people from 15 nuclear towns and cities participated in the project.

‘Glory to Creators!’ National Creativity Competition

The ‘Glory to Creators!’ National Creativity Competition is a communication project involving both elderly and young people.

The goal of the competition is to preserve the memory of residents of ROSATOM’s nuclear towns and cities who have contributed to the development of the Russian nuclear industry and to maintain generational continuity.

The competition is focused on schoolchildren, who are the authors of the works submitted for the competition, and veterans who have made a contribution to the development of the nuclear industry and establishment of ROSATOM’s nuclear towns and cities. One of the most important goals of the competition is to maintain continuity between different generations.

In 2020, the competition was held online in two categories: ‘How the Creator Has Inspired Me’ and ‘Just like the Creator’.

The first category included short video presentations on how the person chosen by the author as their subject inspired them. In the second category, an author was required to choose an archive photo of the person in question and take their own photo in a similar style (in the same place, wearing similar clothes, posing in the same way, etc.).

A total of 1,155 applications were submitted for the competition, with 776 photos and 379 videos entered in the competition.

The expert panel selected 15 winners in each category.

Between 1 August and 30 September 2020, an online flash mob titled ‘Say Thanks to the Nuclear Industry’ was held on Instagram[86] as a part of the competition to celebrate the 75th anniversary of the nuclear industry.

The flash mob was open to anyone who lives in the towns and cities where ROSATOM’s nuclear facilities are located. There were no age limits. The flash mob participants submitted a total of 741 videos.

Some senior officials of nuclear towns and cities and representatives of ROSATOM also participated in the online flash mob, including:

- Andrey Polosin, Director of ROSATOM’s Department for Liaison with Regions;
- Natalia Shurochkova, head of ROSATOM’s School;
- Oksana Konysheva, head of ROSATOM’s Territory of Culture;
- Mikhail Pokhlebayev, Director General of FSUE Mayak Production Association;
- Evgeny Shcherbakov, mayor of the Ozersk Urban District;
- Oleg Klimanov, mayor of the CATF of Zarechny, Penza Region;
- Evgeny Sychev, mayor of Tryokhgorny;
- Sergey Konovalov, mayor of Glazov.

Website of the competition

[86] Accounts on social media: @ slava_sozidatelyam (Instagram); Слава Созидателям! (YouTube).

Social Entrepreneurship. Accelerator of Social Projects

The project titled ‘Social Entrepreneurship. Accelerator of Social Projects’ is aimed at:

- Enabling entrepreneurs designing, managing and developing social projects to acquire knowledge and practical skills;
- Selecting and presenting the best social projects.

The project is targeted at:

- Active social entrepreneurs seeking to develop new products;
- Newly registered social entrepreneurs;
- Citizens planning to set up their own social enterprise.

Due to COVID-related restrictions, the project was largely implemented online.

Project participants received training in social entrepreneurship, including the following topics:

- Distinguishing features of social projects, their prospects;
- Establishing a social enterprise (idea, business model, generating demand);
- Promotion of an entrepreneur’s product, competitive advantages, advertising;
- The marketing strategy of social entrepreneurs;
- The financial plan of business operations;
- The business plan of a social enterprise, presentation of projects.

In 2020, the project was implemented in 14 nuclear towns and cities, with orientation, intensive and pitch sessions, as well as project presentations held in each town and city.

345 people participated in the project; they prepared and presented 111 social projects. 35 best social projects received support, including financial assistance in the form of grants (for 33 projects).

ROSATOM’s Territory of Culture programme

The programme titled ‘ROSATOM’s Territory of Culture’ is aimed at finding and supporting creative talents in nuclear towns and cities, improving the performance of cultural institutions and introducing residents of Russian nuclear towns and cities to the highlights of performing, figurative and dramatic arts.

In 2020, the programme was implemented in six key areas:

- Engaging the professional community in nuclear towns and cities through conferences, workshops, training programmes and meetings. 50 events with a total audience of 5,000 people were held;
- Creating projects for the general public in the towns and cities by arranging tours, concerts and creative competitions, searching for and supporting talents and ‘people’s projects’. A total of 25 towns and cities participated in the initiative; 20 competitions were held with 1 million participants;
- Launching initiatives to develop the volunteer movement in the field of culture. A total of 25 regions were involved, and over 100 events involving volunteers were held;
- Measuring the performance and auditing digital resources of cultural institutions in order to introduce new technologies and improve performance. 25 towns and cities were covered by the survey and were issued checklists for modernisation. At year-end 2021, follow-up monitoring will be conducted based on these checklists;
- Implementing reputational and GR projects at the federal level: holding major national theatrical, cultural, creative and newsworthy events involving prominent figures in the sphere of art and culture at key venues in Russia;
- Celebrating the 75th anniversary of the nuclear industry. The programme of celebrations was launched in nuclear towns and cities on 20 August and concluded with a roll call of nuclear towns and cities broadcast on TV on 28 September 2020.

ROSATOM’s Territory of Culture: online events in 2020

Event	Description
Adaptation of Cultural Institutions to Operating during the Pandemic. Opportunities for Expansion of Their Online Presence	The event was held twice. The first event was attended by regional ministers of culture, heads of departments of culture from nuclear towns and cities, experts from RANEPA and MEPhI, specialists from ROSATOM and ROSATOM’s Territory of Culture programme. They shared positive experience and worked towards formulating a strategy for developing art and culture amid a large-scale transition to online mode. The second event was attended by heads of cultural institutions: theatres, museums, community centres and libraries in nuclear towns and cities. They shared their best practices and tried to predict how the nationwide lockdown could impact art, culture and arts education. Overall, the conference was attended by more than 250 people.
Nuclear Industry in Museums; Stories, People, Events	The conference was dedicated to the 75th anniversary of the nuclear industry. It was attended by about 30 directors and employees of museums and exhibition venues in nuclear towns and cities: Dimitrovgrad, Zheleznogorsk, Zelenogorsk, Zarechny, Novouralsk, Sarov and Seversk. Museum directors proposed projects and initiatives to mark the anniversary.
Nationwide online meeting of head teachers of further education schools in the field of culture	The meeting was attended by 50 head teachers of children’s art and music schools from Angarsk, Balakovo, Volgodonsk, Glazov, Dimitrovgrad, Zheleznogorsk, Zarechny, Kurchatov, Lesnoy, Novouralsk, Obninsk and ROSATOM’s other host towns and cities. One of the key topics was management and adaptation of further education institutions in the context of restrictions.

Event	Description
ROSATOM's Best Library Practices 2020	The conference was attended by more than 80 representatives of the library community from nuclear towns and cities: Dimitrovgrad, Balakovo, Seversk, Sarov, Volgodonsk, Zheleznogorsk, Zelenogorsk, Ozersk, Bilibino, Obninsk, Lesnoy, Glazov, Kurchatov, Tryokhgorny, Udomlya, Novouralsk, Sosnovy Bor and Polyarnye Zori. The conference consisted of four thematic units where specialists shared their experience of adapting conventional work formats to online mode and creating their own original digital projects.
Museum Reactor (project workshop)	As part of the workshop held via Zoom, specialists shared their success stories, discussed the design of exhibitions, current concepts of the diversity of museum and education formats, etc.
ROSATOM's Rare Books Club	The meeting was attended by employees of 12 library organisations from nuclear towns and cities. ROSATOM's Rare Books Club is an innovative project aimed at familiarising specialists from public libraries and CATF residents with the history of development of Russian culture and strengthening ties between libraries operating in the regions where ROSATOM's nuclear facilities are located. It is expected that the project will involve making documentaries about books held by participating libraries and will help to strengthen partnerships and business ties with libraries operating in participating towns and cities.
Hybrid Formats of Work in Cultural Institutions in the Nuclear Industry: Financing, Volunteer Movement, Transparency. Work Experience	The online event was attended by more than 170 people: leaders of the cultural sector from nuclear towns and cities, directors and employees of cultural institutions, experts from leading research institutions and federal cultural institutions. In addition to a review of performance of the institutions in a new context amid the pandemic, the participants were presented an expert report on the findings of digital monitoring.
Let's Call Each Other at the Weekend	The project presenters Oksana Konysheva and Olga Galaktionova called film and theatre actors, who answered questions from the presenters and the online audience during a live broadcast on YouTube.

AtomLike competition

In 2020, as part of ROSATOM's Territory of Culture programme, the Corporation held the AtomLike competition of cultural digital products among employees of cultural and further education institutions and non-profit organisations (NPOs) in nuclear towns and cities. The competition was arranged by Territory of Culture, an autonomous non-profit organisation implementing projects in the field of art and culture.

The aim of the competition was to identify and support original and promising projects that involve creating video and audio content focused on culture, art, creativity and arts education and posting it online. The competition included four categories: Video, Audio, Live Format, Concepts and Scripts of Cultural Digital Projects.

A total of 82 applications were submitted for the competition by cultural institutions and NPOs from 21 towns and cities. The competition panel included independent experts: a YouTube marketing expert, a journalist, a digital promotion specialist, makers of audio and visual web content. They rated projects according to the following criteria: the originality of the idea, a creative approach to putting it into practice, the artistic level and quality of implementation, alignment with current Internet trends, potential for prolongation and the prospects of demand from the audience.

Prize winners included representatives of Balakovo, Volgodonsk, Dimitrovgrad, Lesnoy, Novouralsk, Obninsk, Sarov, Seversk and Sosnovy Bor. Creative teams from organisations whose projects were recognised as the best ones secured targeted financing to purchase equipment needed for further work and to reward employees involved in project implementation.

The winning projects became the latest addition to the range of competitive original cultural digital products; they helped to support the development of popular forms of digital communication with the audience and raise the profile of cultural institutions and NPOs in nuclear towns and cities, positioning them as up-to-date, relevant and fully integrated into the digital space. At present, active cooperation on projects with prize winners is underway and will be continued next year. Preliminary results, as well as news on the implementation of the projects can be found on the pages of winning institutions on social media.

The AtomLike competition was a highlight in the cultural life of nuclear towns and cities; it generated considerable interest and encouraged proactive and creative employees of cultural institutions and NPOs to create their own cultural products in the audio and video format to be posted and distributed on the Internet. AtomLike 2.0 is scheduled to be held in 2021.

Culture volunteers' project

The culture volunteers' project is being implemented as part of ROSATOM's Territory of Culture programme and is aimed at establishing the Single Coordination Centre for Culture Volunteers from ROSATOM's Nuclear Towns and Cities in at least 13 Russian regions.

The Single Coordination Centre for Culture Volunteers from ROSATOM's Nuclear Towns and Cities will help to remove obstacles to the development of volunteering in the field of art and culture in ROSATOM's nuclear towns and cities and to secure resources needed for development. The Centre will promote communication and partnerships between different sectors in the regions by encouraging dialogue between the volunteer community and the government, businesses and society; it will launch large-scale volunteer projects and programmes involving young people in federal and international cultural events, provide advice, training and administrative support for volunteers and their associations, arrange the sharing of positive experience between regions and the roll-out of best practices in the field of art and culture.

Events scheduled to be held as part of the project include a forum titled 'Culture – ROSATOM – I – Volunteer!', a school for culture volunteers from ROSATOM's nuclear towns and cities, the ROSATOM 2.0 Best Volunteer Project competition, an acceleration programme for the best volunteer projects in the field of art and culture in nuclear towns and cities, making a documentary titled *ROSATOM's Culture Volunteers: New Generation 2.0*, establishing the Single Coordination Centre for Culture Volunteers from ROSATOM's Nuclear Towns and Cities (a new efficient state-of-the-art Internet portal for coordination, registration, training, communication and coverage of culture volunteers' activities) to communicate the positive project experience, present the project's outcomes and successful practices in order to replicate them in the regions.

For details on corporate volunteering, see the section 'Corporate Volunteering' in the chapter 'Social Report'.

Improving the quality of healthcare services

Right to Health project

In 2020, the Healthcare Commission of ROSATOM's Public Council, with assistance from Russian patient organisations, proactive representatives of ROSATOM's host regions and community liaison offices of ROSATOM's Public Council, continued to implement a socially important project titled 'Right to Health' in nuclear towns and cities.

The goal of the project is to facilitate constructive communication between patients, healthcare professionals and members of the public in the field of management and provision of healthcare services.

The Commission involves 190 experts working in nuclear towns and cities. The community liaison offices of ROSATOM's Public Council actively participate in the work of the Healthcare Commission through its working groups. Their members discuss outstanding issues related to local healthcare services with the general public and communicate their opinions and recommendations to local, federal and regional authorities. In order to work effectively, it is very important to have a clear insight into the situation, the prevailing public sentiment and existing issues.

In the course of the first stage of the project titled 'Right to Health. Basics of Conflict-Free Communication between Patients and Doctors in Towns and Cities in CATFs', almost 100 healthcare professionals received training in conflict-free communication techniques; over 2,000 patients from six towns (Novouralsk, Lesnoy, Ozersk, Snezhinsk, Tryokhgorny and Zarechny, Sverdlovsk Region) improved their legal knowledge; an interregional group of public experts on patient rights was established. A system was set up whereby patients can receive legal advice using a free legal hotline. 36 patients' schools are developing.

Organisers received numerous requests from healthcare professionals, experts, municipal and regional governments to continue the project. At the new stage of the project, the pool of participating towns and cities was expanded to 12 'nuclear' regions. In 2020 and 2021, thematic events aimed at improving communications between patients and healthcare professionals, public officials and community activists will be held in Volgodonsk, Zheleznogorsk, Zarechny (Sverdlovsk Region), Zelenogorsk, Lesnoy, Novouralsk, Ozersk, Sarov, Seversk, Snezhinsk, Sosnovy Bor and Tryokhgorny.

In November 2020, organisers of the 11th National Congress of Patients titled 'Development Trajectory: Patient-Oriented Healthcare' held an online round-table conference titled 'Healthcare Issues in Towns and Cities in CATFs', which was attended by members of the Healthcare Commission of ROSATOM's Public Council, representatives of the FMBA of Russia and heads of community liaison offices of ROSATOM's Public Council.

Following the conclusion of the round-table conference, it was decided that in 2021, representatives of community liaison offices of ROSATOM's Public Council and working groups of the Healthcare Commission of ROSATOM's Public Council should jointly analyse best practices and experience of creating an environment for constructive communication between three parties: patients, healthcare professionals and government representatives in order to improve the efficiency of healthcare services in nuclear towns and cities, develop an effective mechanism of public oversight in the field of healthcare and roll out successful communication models in other regions.

Lean Polyclinic project

ROSATOM, together with the Russian Ministry of Health, is taking part in the Lean Polyclinic Federal Project, which is aimed at improving the performance of healthcare facilities and the overall availability of healthcare services across Russian regions.

The project is being implemented in 25 healthcare institutions in CATFs and other nuclear towns and cities in 20 federal subjects of Russia.

In the reporting year, about 200 RPS projects aimed at improving access to healthcare services were launched. The following areas were prioritised:

- The reception desk as an information centre of an outpatient clinic;
- Improving the efficiency of preventive medical examination;
- Improving the performance of occupational healthcare departments;
- Upgrading the 'doctor – nurse' work process;
- Setting up laboratory units.

Projects implemented during the year resulted in:

- A two- to four-fold reduction in the amount of time spent by patients at the reception desk;
- A three- to seven-fold reduction of queuing time for patients waiting to be seen by a doctor;
- A two- to three-fold reduction in the number of visits to outpatient clinics for medical examinations;
- A reduction in the waiting time for blood tests by a factor of 1.5-2.

Healthcare workers also note a reduction in paperwork, computerisation of workplaces and assistance in terms of provision of modern medical equipment.

The Healthcare Commission of ROSATOM's Public Council serves as the basis for a system of public oversight of the implementation of the Lean Polyclinic project.

Cooperation with the Federal Biomedical Agency

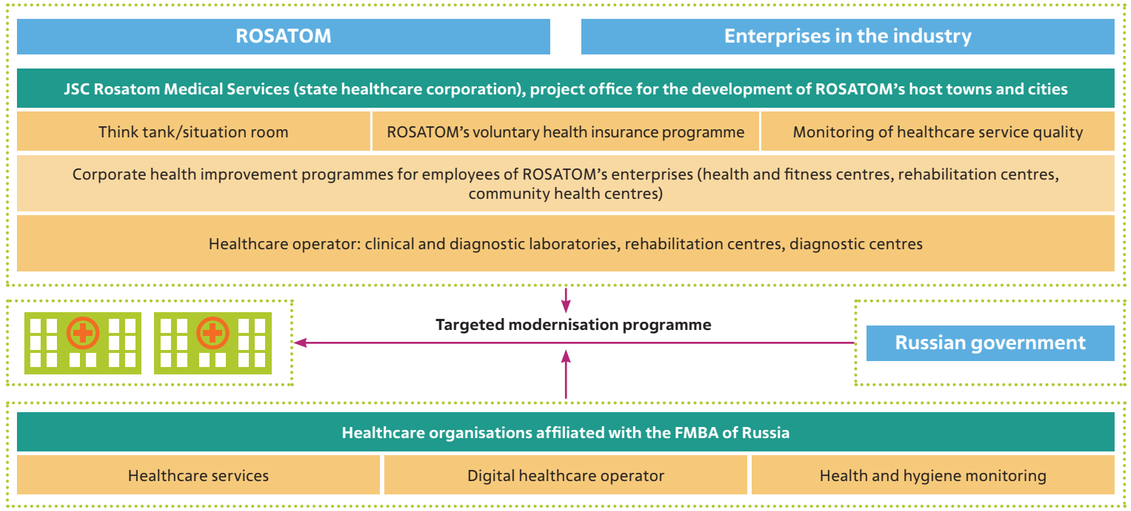
Since 2019, ROSATOM and the Federal Biomedical Agency (FMBA of Russia) have been implementing an agreement on cooperation in the following four areas:

- Healthcare quality control and implementation of the Lean Polyclinic project;
- Upgrading the capabilities of healthcare organisations affiliated with the FMBA of Russia;
- Creating nuclear medicine centres and providing them with equipment;
- Production of radiopharmaceuticals.

The model of provision of healthcare services by FMBA organisations includes public-private partnerships, digital technology and telemedicine mechanisms.

In the reporting year, the relevant agencies also started to develop a separate Federal Target Programme to improve the healthcare system in CATFs and in the regions where nuclear facilities are located.

Project model



Comprehensive modernisation programme for healthcare organisations affiliated with the FMBA of Russia in CATFs and other nuclear towns and cities

Since 2017, ROSATOM has been implementing the Lean Polyclinic project in institutions affiliated with the FMBA of Russia in CATFs.

In 2020, ROSATOM and the FMBA of Russia developed a comprehensive modernisation programme for healthcare organisations affiliated with the FMBA of Russia in CATFs and other nuclear towns and cities.

The programme is aimed at ensuring sustainable natural population growth in CATFs and nuclear towns and cities and extending life expectancy to 78 years by 2025 and to 80 years by 2030.

The programme consists of the following six projects to be implemented by 2025:

- Development of the Primary Healthcare System;
- Combating Cardiovascular Diseases;
- Combating Cancer;
- Development of Children's Healthcare, including Building Modern Infrastructure for the Provision of Healthcare Services to Children;
- Provision of Healthcare Organisations with Skilled Personnel;
- Creation of a Single Digital Environment in Healthcare Organisations Affiliated with the FMBA of Russia in CATFs and Other Towns and Cities Based on the Integrated National Healthcare Information System.

In 2021, the programme was launched in three nuclear towns and cities.

Environmental education and awareness

Activities in the sphere of environmental education and awareness included a series of thematic webinars.

Participants of the webinars included representatives of local governments, educational institutions, further education institutions, non-profit organisations and other stakeholders, with a total of 1,025 participants. The webinar materials were viewed by 1,853 Internet users.

Webinar	Description
Environmental Education in Russia	Getting acquainted with key trends, issues and objectives of environmental education development and best practices in the Russian Federation.
Post-Pandemic World: New Environmental Challenges and Solutions	Raising awareness of current challenges on the global environmental agenda and focus areas of sustainable development, new formats of environmental volunteering and best practices for addressing environmental problems.
Digital Technologies in Environmental Protection	Raising awareness of key trends in the digitisation of the environmental sector in the Russian Federation, as well as best practices in the application of digital technologies for waste disposal, environmental monitoring and protection, modernisation of utility infrastructure, etc.

Following the webinars, ROSATOM prepared thematic electronic guides and started to publish a periodic (weekly) environmental news digest.

The webinar materials and information on other projects in the sphere of environmental education and awareness are available at: http://eco.atomgoroda.ru/.

For details on environmental protection and ROSATOM's environmental impacts, see the chapter 'Safety Report'.

Work of ROSATOM's Public Council and Community Relations

GRI 103-1
GRI 103-2
GRI 103-3
GRI 102-43

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.

The Public Council includes representatives of the Corporation, the scientific community, non-governmental and environmental organisations. The Council members work on a pro bono basis. The Public Council is chaired by the Director General of ROSATOM.

The work of the Public Council is governed by the Regulations on ROSATOM's Public Council, as well as by the Constitution of the Russian Federation, universally recognised principles and norms of international law, federal laws and other regulations of the Russian Federation.

Key areas of work of the Public Council include:

- Organising annual meetings of ROSATOM's representatives with government bodies and the general public represented by international and Russian civic organisations;
- Implementing socially important projects in nuclear towns and cities;
- Publishing and circulating research and popular science publications on peaceful use of nuclear energy;
- Arranging visits to Russian and overseas nuclear facilities in order to study experience in the field of nuclear and radiation safety, environmental protection, engagement with regional and local governments and community relations.

In 2020, as part of its work plan, ROSATOM's Public Council held two in-person and four virtual meetings.

Official website of ROSATOM's Public Council

Community liaison offices of ROSATOM's Public Council

GRI 413-1

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.

GRI 103-1

The community liaison offices are tasked with:

- Organising a discussion platform and setting up communications;
- Working with governing bodies in towns, cities, organisations and regions;
- Stakeholder engagement and crisis management;
- Monitoring public sentiment;
- Shaping media coverage and engaging with the media;
- Performing the function of a civic watchdog;
- Taking part in projects developed by working committees of the Public Council;
- Arranging socially important events focused on the development of ROSATOM's host towns and cities and the Corporation's projects.

Community liaison offices of ROSATOM's Public Council operate in 14 nuclear towns and cities in 12 federal subjects of Russia, with eight offices opened in 2020 in Zarechny (Sverdlovsk Region), Udomlya, Novovoronezh, Balakovo, Polyarnye Zori, Desnogorsk, Kurchatov and Bilibino.

In the reporting year, the number of requests and enquiries submitted by citizens to the community liaison offices exceeded 1,000; in 95% of cases, a positive resolution was achieved.

13th Regional Public Dialogue Forum ‘Environmental Solutions and Society’

ROSATOM’s Public Council holds annual public dialogue forums, which serve as the key platform for discussions and the sharing of experience in the field of safe development of nuclear technologies between nuclear industry professionals, government bodies, experts, environmentalists and the general public.

In December 2020, the 13th Regional Public Dialogue Forum titled ‘Environmental Solutions and Society’ was held in Moscow. The event was attended by over 550 participants (including those participating online) from 17 federal subjects of Russia: representatives of regional and local governments, specialists from nuclear organisations, representatives of the scientific community, environmental and civic organisations (representatives of the All-Russian Society of Nature Protection, the Bellona Foundation, the Russian Social Ecological Union), journalists and bloggers.

The forum participants discussed the structure and practice of public oversight; sustainable development and environmental safety of nuclear technologies; the mechanisms and practice of arranging a dialogue between specialists and the general public, as well as new forms of public consultations as part of the licensing procedure.

As part of this event, ROSATOM’s Public Council and the All-Russian Society of Nature Protection agreed to sign a cooperation agreement. The joint work of the Ministry of Natural Resources and Environment of the Russian Federation and ROSATOM to develop the institution of public inspectors in order to introduce public environmental oversight in the nuclear industry will be continued in 2021.

GRI 413-2

Response to the situation around DUHF

Since November 2019, issues of safe treatment of depleted uranium hexafluoride (DUHF) in Russia have been under close public scrutiny.

In the reporting year, the Bellona Foundation, together with the Environmental Commission of ROSATOM’s Public Council, prepared a report on the situation around DUHF in Russia in order to raise public awareness about DUHF treatment.

This report was prepared by a team of authors representing independent non-governmental associations and scientists. The independent experts confirmed that DUHF is not radioactive waste. Accordingly, DUHF import into Russia for reprocessing does not violate Russian laws. Safety requirements are met during DUHF transportation, transshipment, enrichment, storage and processing, which has been confirmed through public oversight.

In addition, ROSATOM has approved the industry-wide Programme for Safe Treatment of DUHF. All industrial sites of JSC TVEL have the capabilities required for monitoring and managing all detected negative environmental impacts of uranium enrichment operations.

Pursuant to instructions to monitor and support the implementation of ROSATOM’s programme for safe treatment of DUHF and at the request of the Legislative Assembly and the Government of the Leningrad Region, ROSATOM’s Public Council, the Department for Liaison with Regions, JSC TENEX and JSC TVEL held a working meeting on 17 March 2020, where they reported to members of the Legislative Assembly and representatives of the Government of Leningrad Region on the Programme for Safe Treatment of DUHF and on safety measures during transshipment and transportation of containers with DUHF in the port of Ust-Luga (Leningrad Region).

In March 2020, members of the Legislative Assembly and representatives of the Government of Leningrad Region visited the port of Ust-Luga, met its executives and watched a demonstration of transshipment of containers from the Mikhail Dudin vessel and the work of the radiation monitoring team in the course of transshipment operations. Following these activities, the participants gave positive feedback and approved the performed work.

ROSATOM’s organisations store DUHF in thick-walled steel containers with walls that are 16 mm thick. The containers are also tested to assess their strength and resilience against thermal and other impacts.

For details on the safe DUHF treatment programme, see the Appendix to the Report on the performance of Fuel Division in 2020.

Community relations

Stakeholder engagement also involves raising awareness, providing training and communicating with local residents and governments in nuclear towns and cities. The key engagement tool is a project titled ‘Citizen of ROSATOM’s Country’.

Citizen of ROSATOM’s Country project

The Citizen of ROSATOM’s Country is a communication project that involves using information tools to mobilise the public. The aim of the project is to enable effective communication between governments and the public to promote the development of nuclear towns and cities.

The project is being implemented in 27 nuclear towns and cities. Due to a challenging epidemiological situation, in the reporting year, activities forming the part of the project were conducted online.

Since 2019, the key project platform is a mobile app, Grazhdanin Strany ROSATOM (‘Citizen of ROSATOM’s Country’; GSR). The service involves targeting users based on their gender, age and preferences according to the data entered during registration, including via social media.

Official website of the Citizen of ROSATOM's Country project

Key services available via the app include:

- Surveys and feedback collection;
- A discussion platform (users can propose topics for discussions on their own, with assistance from moderators);
- A system of bonuses for active survey respondents, who can then use bonus points when ordering paid services via the mobile app (a partner programme run in cooperation with municipal organisations and businesses);
- Prompt provision of information to residents (municipal and federal-level news, information about ROSATOM's projects);
- Access to background information about local enterprises and organisations;
- Online booking of tickets to cultural events, tables in cafes, etc.

GRI 103-3

In 2020, over 100 surveys and polls were conducted using the GSR app; they covered over 22,000 people.

In addition to the GSR app, a Telegram channel, Nuclear Towns and Cities, has been created and is maintained in order to consolidate the nuclear industry and raise awareness of current events in the regions where nuclear facilities are located. The channel enables users to provide feedback through email services and comments.

Nuclear Towns and Cities Telegram channel

Additional coverage of initiatives implemented by the community of active citizens participating in the Citizen of ROSATOM's Country project was provided on the Internet, including a dedicated website, accounts on social media (VKontakte, Odnoklassniki, Facebook, Instagram) and a YouTube channel, Nuclear Towns and Cities.

Activities of the community of active citizens participating in the Citizen of ROSATOM's Country project also included training webinars on mentoring:

- Mentoring. How to Hold an Effective Dialogue;
- Mentoring. How to Examine the Current Situation, Share Experience and Give Constructive Feedback.

In addition, publications in federal, regional and municipal media outlets, as well as on social media and Telegram channels were monitored on a weekly basis in order to provide representatives of the nuclear industry with updates on the current social, economic and political agenda.

Raising public awareness of the safety of nuclear facilities

In order to improve transparency, public oversight and public awareness of progress on work at the sites of JSC SCP and JSC VNIINM, ROSATOM arranged online technical tours. The online technical tour of the site of JSC SCP demonstrated to the public (through media representatives) all measures ensuring safe disposal of RAW (including liquid radioactive waste) at this facility. Its key objective is to ensure safe permanent isolation of radioactive waste and improve environmental conditions in the Tomsk Urban District. The online technical tour of the site of JSC VNIINM demonstrated to the public the commitment and responsible approach of the institute's representatives to the decommissioning of legacy sites causing environmental damage.

On 17 and 18 November 2020, ROSATOM held the 9th information workshop titled 'Outcomes of Implementation of the Federal Target Programme for Comprehensive Dismantling of Nuclear Submarines for the Period from 2010 through 2020 and Outcomes of International Cooperation Aimed at Improving Nuclear and Radiation Safety in the North-West of Russia'. The online workshop was attended by more than 70 participants from six countries and specialists from 34 organisations, including ROSATOM's representatives supervising the dismantling of nuclear submarines and site remediation, representatives of ROSATOM's organisations, the United Shipbuilding Corporation, the FMBA of Russia, ROSATOM's Public Council, as well as representatives of foreign agencies from countries and international organisations providing assistance in the dismantling of Russian nuclear submarines (Italy, Norway, France, the IAEA, the EBRD, the OECD NEA). The dismantling of 130 out of 199 dismantled nuclear submarines was financed by Russia, while the remaining submarines were dismantled with assistance from donor countries, whose participation enabled a three-fold reduction in the amount of time required for dismantling. Between 2004 and 2020, the total accumulated radioactivity in the Artic decreased from 11.1 million Ci to 5.09 million Ci, with 98.5% of SNF from reactors of nuclear submarines, 97% of SNF from storage areas of the Lepse floating maintenance base, 37% of SNF from storage areas in Andreyev Bay and 72% of SNF from storage areas at the Gremikha naval base removed for processing.

For details on radiation and nuclear safety, see the chapter 'Safety Report'.

Scientific and awareness-raising publications

During the year, the Public Council Library published the following scientific and awareness-raising publications:

- Closing the nuclear fuel cycle based on fast neutron reactors: advantages in radiological protection. Viktor Ivanov, Moscow, 2020.
- Depleted uranium hexafluoride (current situation, issues of safe treatment and prospects). Report by: Alexander Nikitin, Oleg Muratov, Ksenia Vakhrusheva, Moscow, 2020.

CHAPTER 5

SAFETY REPORT

GRI 102-14
GRI 103-3

Statement by Sergey Adamchik

Dear colleagues and friends,

I would like to present the Report on the Corporation's efforts aimed at ensuring nuclear and radiation safety and protecting the environment in 2020.

Safe use of nuclear energy is a priority and a necessary prerequisite for achieving ROSATOM's strategic goals and promoting sustainable development of the industry.

2020 marked the 75th anniversary of the nuclear industry. The Corporation celebrated it with major achievements both in traditional areas of the use of nuclear energy, where it recorded an increase in electricity generation and nuclear fuel fabrication and supply and contributed to the advancement of nuclear science, and in new domains, such as extensive exploration of the Arctic, development of nuclear medicine, digitisation and hazardous waste management.

The coronavirus pandemic made a certain negative impact on the pace of development of both traditional and new business areas. However, ROSATOM ensured the stability of its operations and met the deadlines for the construction and commissioning of nuclear infrastructure facilities.

NPPs, research nuclear facilities, the nuclear-powered icebreaker fleet and organisations involved in the nuclear fuel cycle were operating sustainably and safely in 2020, with no incidents rated 'above zero' on the INES scale detected at nuclear facilities.

Sergey Adamchik
Inspector General of ROSATOM

ROSATOM ensured radiation safety of its personnel operating its facilities posing nuclear and radiation hazards and radiation sources; limits on radiation exposure were not exceeded, and no instances of man-made contamination of sites or surrounding areas were recorded. Radionuclide content in various components of the environment (air, water, soil, vegetation, etc.) did not exceed reference levels.

Safety of hazardous industrial facilities is consistently maintained at an acceptable level (no accidents have happened over the past four years, and the number of operational incidents has decreased eight-fold since 2010, reaching its minimum in 2020, when only one incident occurred).

ROSATOM's large-scale approach to ensuring safety can be illustrated with the implementation of measures forming part of the Federal Target Programme on Nuclear and Radiation Safety for the period from 2016 through 2020 and until 2030. In 2020, ROSATOM successfully carried out a number of important safety initiatives: the mothballing of the B-1 and B-25 storage pools was completed at JSC Siberian Chemical Plant; radiation-contaminated sites with a total area of 41,900 m2 were rehabilitated; additional funds raised from extra-budgetary sources enabled ROSATOM to significantly exceed the target for SNF processing, as more than 99 tonnes of SNF were reprocessed. Progress in the achievement of the main goal of the FTP totalled 22.3% as against a target of 19.8%.

Matters related to environmental protection and sustainable use of natural resources have key importance for managerial decision-making on both day-to-day operations of ROSATOM's organisations and implementation of its large-scale projects. Expenditure on environmental protection in the industry increases every year. Practical outcomes of the implementation of the Plan of High-Priority Measures to Reduce the Negative Impact of ROSATOM's Organisations on the Environment enabled PJSC Machinery Manufacturing Plant to completely cease the use of river water and reduce wastewater discharge by 59%; PJSC PIMCU was able to ensure safe disposal of waste from its CHPP for 12 years; Kola NPP reduced ion-exchange resin waste generation by 20% and prevented the discharge of chlorine and the products of its transformation into the open drainage system; Balakovo NPP achieved a 25% reduction in the amount of waste sent for disposal.

Notable success in the field of nuclear and radiation safety and environmental protection was achieved as a result of large-scale concerted efforts of many thousands of industry professionals.

This report will provide our readers with reliable and well-balanced information on the entire range of issues related to the current safety performance, safety measures and their outcomes, and our approaches to addressing nuclear legacy issues. I hope that this information will serve as a convincing argument in favour of developing nuclear power as an environmentally friendly high-technology energy source.

Key Results in 2020

Environmental impacts

- Expenditure on environmental protection totalled RUB 26.89 billion.
- Gross greenhouse gas emissions in the Corporation's organisations totalled 6,108.34 tonnes.
- Pollutant emissions into the atmosphere in nuclear organisations totalled 38,000 tonnes.
- Water consumption totalled 6,059.2 million m^3.

Industry-specific impacts

- No events rated at level 1 or higher on the INES scale were detected.
- The injury frequency rate and the lost time injury frequency rate (LTIFR) stood at 0.18 and 0.09 respectively (*for details, see section 3.3.1*).
- Individual radiation risk was calculated for 65,018 people using the IRAW system.
- All annual targets of FTP NRS 2 were achieved; progress in the achievement of the Programme's main goal totalled 22.3% (as against a target of 19.8%).
- Nine facilities posing nuclear and radiation hazards were decommissioned.
- One nuclear submarine and one nuclear maintenance ship were dismantled.

Key Events in 2020

- The Uniform Industry-Wide Guidelines for Accounting for Greenhouse Gas Emissions were approved.
- Outcomes of implementation of the Plan of High-Priority Measures to Reduce the Negative Impact of ROSATOM's Organisations on the Environment until 2020 were evaluated.
- The Programme for Developing ROSATOM's Industry-Wide Radiation Monitoring System for the period from 2021 through 2030 was approved.
- A pilot project to create a site-level information system for decommissioning based on a prototype developed earlier by JSC NIKIET was completed; the implementation of the second similar pilot project continues at FSUE RADON.
- Licences were obtained from the Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) for the selection of locations and construction of disposal sites for class 3 and 4 RAW in the CATF of Seversk and the CATF of Ozersk; construction of a complex of buildings and structures, transportation and utility infrastructure was started.
- Construction of a facility with a capacity of 39,300 m3 under forms KS-11 and KS-14 (Certificates of Acceptance of a Completed Facility by the Acceptance Committee) was completed.
- Renovation of the near-surface disposal site for solid radioactive waste in Novouralsk was completed.
- ROSATOM's programme for safe treatment of DUHF was approved.

For details about the programme for safe treatment of DUHF, see the Appendix to the Report on the performance of the Fuel Division in 2020, as well as the section 'Work of ROSATOM's Public Council and Community Relations' in the chapter 'Report on the Development of Nuclear Towns and Cities'.

Nuclear and Radiation Safety

GRI 103-3

Key results in 2020:

- No events rated at level 1 or higher on the INES scale were detected.
- The injury frequency rate and the lost time injury frequency rate (LTIFR) stood at 0.18 and 0.09 respectively (for details, see section 3.3.1).
- Individual radiation risk was calculated for 65,018 people using the IRAW system.

5.1.1. Nuclear and radiation safety management system

GRI 103-1
GRI 103-2

ROSATOM focuses on the effective exercise of powers and performance of functions related to managing the use of nuclear energy, as determined by the laws of the Russian Federation, with safety and environmental protection as the top priority. This task is addressed by various divisions of ROSATOM and its organisations using all key government and non-governmental regulation mechanisms.

Nuclear and radiation safety management functions are performed by the following divisions of ROSATOM:

- The General Inspectorate participates in the preparation of proposals for shaping the government policy on nuclear and radiation safety, takes measures to ensure the safety of nuclear facilities and monitors safety in ROSATOM's organisations;
- The Nuclear and Radiation Safety, Licensing and Permitting Department ensures that personnel and equipment are ready to respond to emergencies at nuclear facilities and monitors the implementation of emergency prevention measures;
- The Directorate for Public Policy on Radioactive Waste, Spent Nuclear Fuel and Nuclear Decommissioning plays a leading role in the system for the management of government programmes aimed at addressing 'nuclear legacy' issues;
- The Technical Regulation Department updates the system of technical specifications for the safe use of nuclear energy.

5.1.2. Nuclear and radiation safety at nuclear facilities

GRI 103-3

In 2020, ROSATOM ensured safe and steady operation of nuclear organisations. There were no incidents involving radiation leaks. Limits on employee radiation exposure were not exceeded.

No licences were revoked in the nuclear industry.

The safety status of nuclear facilities is assessed based on the number and scale of recorded deviations in their operation, which are benchmarked against the IAEA International Nuclear and Radiological Event Scale (INES). Events on the scale are rated at seven levels: the upper levels (4–7) are termed 'accidents', while the lower levels are 'incidents' (2–3) and 'anomalies' (1). Events that have no safety significance are classified as below scale, at level 0. Events that have no safety relevance are classified as 'out of scale'.

Nuclear power plants

Over the years, no events rated at level 1 or higher on the international INES scale have been detected at Russian nuclear power plants[87].

24 deviations rated at level 0 were recorded in 2020. JSC Rosenergoatom performed a thorough analysis of all the deviations. Their causes were identified: most of the deviations were caused by failures of thermal and electrical equipment due to manufacturing defects that had not been detected during equipment installation and adjustment. In accordance with the INES Scale User's Manual, ROSATOM rated each event and developed corrective measures to prevent similar failures in the future. This approach helped to reduce the number of deviations in NPP operation in 2020.

[87] Deviations rated at level 1 and level 0 do not pose a risk to employees operating the facilities, local residents or the environment.

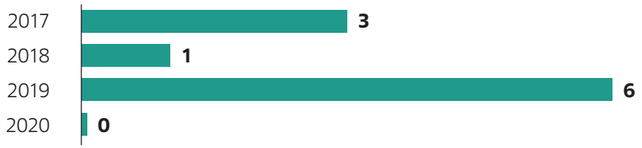
Changes in the number of deviations in NPP operation on the INES scale

	2017	2018	2019	2020
Total, including:	33	42	38	24
Level 0 and out of scale	33	40	38	24
Level 1	0	2	0	0

Research nuclear facilities

In 2020, there were no nuclear, radiation or technical accidents at research nuclear facilities in ROSATOM's organisations; no incidents rated higher than level 0 on the INES scale were detected.

Changes in the number of deviations in the operation of research nuclear facilities

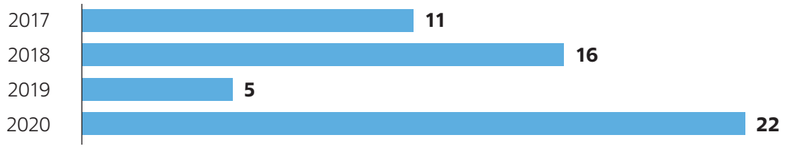


Marine nuclear propulsion units

There were no violations of safe operating limits or conditions for propulsion units of nuclear-powered vessels in 2020; the radiation level remained within permitted limits. No events rated higher than level 0 on the INES scale were detected.

Most deviations in the operation of marine nuclear propulsion units were due to leaks in the pipe systems of steam generators. The rise in the number of such violations in 2020 was caused by a more intensive operation of nuclear vessels. The recorded deviations did not affect the performance of voyage orders by the vessels.

Changes in the number of deviations in the operation of marine nuclear propulsion units



5.1.3. Physical protection of nuclear facilities

GRI 103-2

The security and physical protection of ROSATOM's facilities posing nuclear and radiation hazards and of nuclear and radioactive materials used and stored by ROSATOM, including during their transportation, complies with Russian legislation and the provisions of the Convention on the Physical Protection of Nuclear Material and is consistent with the recommendations of the International Atomic Energy Agency.

The main mechanisms for ensuring physical protection and anti-terrorism security of the Corporation's facilities are as follows:

- Monitoring of the physical protection and anti-terrorism security of the Corporation's facilities (premises) by the relevant departments;
- Ensuring the reliable operation of existing physical protection and security equipment at the facilities, as well as its scheduled modernisation and improvement;
- Strict compliance with the requirements of federal and industry-wide regulations.

For details on ROSATOM's participation in law-drafting activities aimed at ensuring physical protection and security (including anti-terrorism security) of nuclear facilities, see the section 'Law-Drafting' in the chapter 'Strategic Report'.

As part of departmental monitoring and in accordance with the Consolidated Plan of Inspection Activities, eight inspections of the physical protection of nuclear materials, nuclear facilities and nuclear material storage sites were conducted in 2020 in ROSATOM's organisations (JSC Ural Electromechanical Plant, FSUE Atomflot, JSC Production Association Electrochemical Plant, FSUE Integrated Plant Elektrokhimpribor, JSC Karpov Institute of Physical Chemistry, JSC Siberian Chemical Plant, FSUE Mayak Production Association and JSC N.A. Dollezhal Research and Development Institute of Power Engineering (NIKIET)), including inspections of their anti-terrorism security status.

In the context of measures taken to prevent the entry and spread of the new coronavirus infection (COVID-19), targeted inspections conducted as part of departmental monitoring in six nuclear organisations (JSC Production Association Electrochemical Plant, FSUE Integrated Plant Elektrokhimpribor, JSC Karpov Institute of Physical Chemistry, JSC Siberian Chemical Plant, FSUE Mayak Production Association and JSC N.A. Dollezhal Research and Development Institute of Power Engineering) did not involve site visits by the Corporation's employees; instead, they were conducted by security specialists of these organisations.

The findings of all inspections were documented in reports; progress on measures to eliminate the deficiencies identified and implement the recommendations from the commissions is being monitored.

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 2020, there were no violations of access control or internal security regulations at ROSATOM's facilities resulting in the theft of nuclear materials, terrorist acts or sabotage at nuclear facilities.

In the reporting year, ROSATOM continued to enhance the information system for monitoring the status of the system for physical protection of ROSATOM's facilities posing nuclear and radiation hazards. To date, nuclear organisations have been equipped about 160 automated workstations for security analysts, as well as 74 automated workstations for facility inspectors; these workstations form part of the information system at 42 industry facilities posing nuclear and radiation hazards and in ROSATOM's Physical Protection Department.

In addition, the following measures were implemented in 2020 to ensure the security of the facilities:

- Security equipment was upgraded or replaced along 23 kilometres of the perimeters of protected areas of facilities posing nuclear and radiation hazards, including 52 checkpoints for people and vehicles;
- Over 3,000 items of equipment were installed in protected areas as part of physical protection systems;
- Physical protection equipment was upgraded in 60 buildings;
- More than 7 kilometres of cable routes for physical protection systems were laid;
- 11 special armoured vehicles equipped with automated security systems for transportation (ASST) were manufactured;
- Maintenance of ASST systems installed in 80 special railway cars, 76 special vehicles and 2 control centres in organisations was carried out.

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 74.5% of all physical protection equipment at nuclear facilities.

In 2021, inspections of physical protection forming part of departmental monitoring are scheduled to be conducted at 12 nuclear facilities.

5.1.4. Emergency preparedness

GRI 103-1
GRI 103-2

In order to ensure the safe operation of the nuclear industry and protect employees, the local population and regions against the possible effects of accidents (emergencies), ROSATOM operates an emergency prevention and response system (EPRS), which is a functional subsystem forming part of the integrated state system for emergency prevention and response (ISSEPR).

As at 31 December 2020, 14 professional and 63 volunteer emergency response teams had undergone certification and were in a state of readiness in the Corporation. They comprise a total of 2,297 emergency response workers. 369 operational training exercises were conducted in 2020, including 8 command post exercises, 12 special tactical exercises, 7 tabletop exercises and 173 emergency drills.

In the reporting year, the needs of organisations in the industry for special cargo transportation were fully met. All shipments of nuclear materials fully complied with established requirements. An industry-wide automated system for safe transportation of radioactive substances (ASST-RS) was deployed. Work was continued to produce and upgrade special vehicles and equip them with modern automated security systems.

5.1.5. Industry-Wide Radiation Monitoring System

GRI 103-2

The Industry-Wide Radiation Monitoring System (IRMS)[88] is in operation in the Russian nuclear industry as a functional subsystem of the Integrated State Automated Radiation Monitoring System (ISARMS) in Russia.

In 2020, a Programme for Developing ROSATOM's Industry-Wide Radiation Monitoring System for the period from 2021 through 2030 (the Programme) was developed and approved. The Programme outlines areas for development and measures aimed at improving ROSATOM's IRMS; it includes 58 measures across eight areas:

- Improving existing and creating missing IRMS components (13 measures);
- Research and methodological support of the IRMS functioning (10 measures);
- Installing and replacing equipment in environmental radiation monitoring laboratories (14 measures);
- Establishing a core laboratory for developing hardware and the methodological framework for the IRMS (3 measures);
- Developing digital information infrastructure for the IRMS (systems for information storage, analysis and reporting) (6 measures);
- Ensuring the uniformity of measurements and monitoring the accuracy of data collected by local monitoring systems (7 measures);
- Personnel training (4 measures);
- Other measures (1 measure).

The implementation of the Programme will enable 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, software and hardware in order to take necessary measures to prevent or reduce the radiation impact on local residents and the environment.

The IRMS structure includes:

- The departmental information and analysis centre (DIAC) forming part of ROSATOM's departmental subsystem for radiation monitoring within the ISARMS, which integrates data from:
  — Local automated radiation monitoring systems;
  — The industry-wide automated radiation monitoring system (IARMS);
  — The on-site subsoil condition monitoring (OSCM) system;
- 29 local radiation monitoring systems operated by the following organisations of ROSATOM: FSUE Integrated Plant Elektrokhimpribor, FSUE Mayak Production Association, FSUE Russian Federal Nuclear Centre – E.I. Zababakhin All-Russia Research Institute of Technical Physics, FSUE Russian Federal Nuclear Centre All-Russian Research Institute of Experimental Physics, FSUE Instrumentation Factory, FSUE A.P. Alexandrov Research Institute of Technology; Balakovo, Beloyarsk, Bilibino, Kalinin, Kola, Kursk, Leningrad, Novovoronezh, Rostov and Smolensk NPPs (branches of JSC Rosenergoatom); JSC Karpov Institute of Physical Chemistry, JSC Research Institute of Nuclear Reactors, JSC Siberian Chemical Plant, Gremikha Division of the North-West Centre for Radioactive Waste Management (SevRAO), Guba Andreeva Division of SevRAO, Saida-Guba Division of SevRAO, Fokino Division of the Far Eastern Centre for Radioactive Waste Management (DalRAO), Leningrad Division of the North-West Region, Saratov Division of the Privolzhsky Region (branches of FSUE Federal Environmental Operator), FSUE Mining and Chemical Plant, FSUE Atomflot, FSUE Radon and the Zheleznogorsk branch of FSUE National Operator for Radioactive Waste Management.

[88] Pursuant to Article 20 of Federal Law No. 170-FZ on the Use of Nuclear Energy dated 21 November 1995, ROSATOM performs state radiation monitoring in the Russian Federation in the locations of nuclear facilities owned by operators with regard to which ROSATOM exercises government control over the use of nuclear energy.

Local radiation monitoring systems in ROSATOM's organisations are used for regular radiation monitoring in buffer areas and radiation control areas, including:

- Continuous ARMS monitoring of the gamma radiation dose rate;
- Periodic monitoring of the gamma radiation dose rate using portable and mobile equipment, dosimeters, radiometers and spectrometers, as well as on-site monitoring of the annual gamma radiation dose in buffer areas and radiation control areas using accumulating dosimeters;
- Periodic monitoring (using portable, mobile and fixed equipment) of radionuclide content in various components of the environment: in the lowest layer of the atmosphere, atmospheric precipitation, soil, surface water bodies into which liquid effluents are discharged and hydrologically connected water bodies, bottom sediments, aquatic organisms, groundwater, vegetation, as well as in locally produced food products and fodder.

In 2020, the IRMS included:

- 296 fixed on-site IARMS stations;
- 1,676 OSCM wells;
- 211 air quality monitoring stations;
- 175 atmospheric precipitation monitoring stations;
- 549 stations monitoring surface water bodies;
- 143 stations monitoring bottom sediments;
- 342 soil monitoring stations;
- 280 ground vegetation monitoring stations;
- 72 stations monitoring algae and aquatic organisms;
- 253 stations monitoring snow cover;
- 164 stations monitoring food products;
- 130 absorbed dose monitoring stations;
- 808 stations monitoring the gamma radiation exposure dose rate (EDR) that are not part of the IARMS;
- 110 stations monitoring surface contamination with alpha and beta particles;
- 118 monitoring routes where the EDR and contamination with alpha and beta particles are measured.

The DIAC and local radiation monitoring systems exchange information on a regular basis. ROSATOM's local regulations outline the requirements for information exchange as part of radiation monitoring (the scope, format and frequency of submission).

In 2020, local radiation monitoring systems performed 69,916 measurements (not including IARMS data received automatically); radionuclide content in various components of the environment in buffer areas and radiation control areas of ROSATOM's organisations did not exceed reference levels.

The results of processing and analysis of radiation monitoring findings suggest that normal operation of nuclear facilities has no significant impact on radiation levels.

In order to promptly respond to changes in radiation levels in the locations of nuclear facilities, automated radiation monitoring systems integrated into the IARMS are in operation.

The IARMS includes:

- An industry-wide crisis response centre (Private Institution Situation and Crisis Centre of ROSATOM), which receives real-time information (on the gamma radiation dose rate and meteorological parameters) from all automated IARMS stations;
- The central control station of the industry-wide subsystem for automated radiation monitoring at NPPs in the Crisis Centre of JSC Rosenergoatom;
- On-site ARMSs at ROSATOM's organisations.

The IARMS integrates on-site ARMSs of 31 facilities posing radiation hazards. In the location of a radioactive substance storage facility of FSUE Radon, the radiation level is monitored by Radon's on-site ARMS stations connected with the IARMS. The IARMS integrates a total of 427 stations located at industrial sites (105 stations), in buffer areas and radiation control areas (a total of 322 stations).

OSCM carried out by all environmentally relevant organisations of ROSATOM (55 organisations) provides information about the condition of the geological environment, making it possible to assess and forecast its changes taking into account protective properties of geological and engineered barriers. This information is used to provide a rationale for selecting design solutions, including those for the decommissioning of nuclear facilities, as well as to evaluate the effectiveness of rehabilitation measures. In 2020, the Regulations on On-Site Subsoil Condition Monitoring in ROSATOM's Organisations were updated; in the new version, information on the goal, objectives, the organisational structure, facilities and information support of on-site subsoil condition monitoring was revised.

Three nuclear organisations (FSUE Mayak Production Association, JSC Siberian Chemical Plant and PJSC Machinery Manufacturing Plant) operate an information and analysis system for radiation and environmental monitoring (IAS REM); the purpose of the system is to systematise and summarise the findings of ongoing monitoring of radionuclide content in discharges and emissions from organisations, in the natural environment (water, soil, vegetation, the atmosphere, atmospheric precipitation, bottom sediments, etc.) in buffer areas and radiation control areas. The IAS REM roll-out in other organisations in the industry will be continued in 2021.

In 2020, radiation levels at the locations of facilities operated by nuclear organisations were within the limits of natural background radiation.

Real-time data from automated radiation monitoring stations are available on the website at http://www.russianatom.ru.

5.1.6. Industrial safety

As at 31 December 2020, ROSATOM's organisations operated 712 hazardous industrial facilities.

Number of hazardous industrial facilities, units

Hazard class	2018	2019	2020
1	6	6	7
2	34	32	32
3	284	282	276
4	415	417	397
Total	739	737	712

All equipment used at the Corporation's hazardous industrial facilities undergoes timely technical inspection and industrial safety assessment. Pursuant to the law on compulsory third-party liability insurance for the owner of a hazardous facility for potential damage from an accident at a hazardous facility, ROSATOM arranges compulsory insurance.

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.

In 2020, ROSATOM continued to manage risks of accidents at hazardous industrial facilities controlled by the Corporation as part of the industrial safety management system in nuclear organisations. Calculations of metrics used to assess the probability of potential negative consequences of non-compliance with industrial safety requirements at hazardous industrial facilities controlled by the Corporation show that the level of risk of accidents is acceptable.

Positive outcomes of the implementation of measures aimed at ensuring industrial safety are reflected in a consistent absence of events classified as an 'accident at a hazardous industrial facility' at nuclear facilities operated by the Corporation. Over the past five years, the number of events classified as 'incidents' did not exceed one. One incident was recorded in 2020. The resulting economic damage amounted to RUB 135,844.93.

The safety status of hydraulic structures (their safety level) is assessed by the operator when preparing a safety declaration for the hydraulic structures. At present, ROSATOM's organisations operate 42 hydraulic structures, of which only one has a poor safety performance: the ash and slag dump of the CHPP of PJSC PIMCU (with an operating permit valid until 1 August 2021). A set of accident prevention measures was developed and is being implemented in order to ensure the safe operation of the said hydraulic structure of PJSC PIMCU.

In 2020, there were no hazardous situations leading to an emergency at hydraulic structures in the nuclear industry.

5.1.7. Fire safety

The fire situation at the Corporation's facilities is stable. Between 2015 and 2019, there were no fires at facilities under construction in the industry. In 2020, there was a fire at a facility under construction codenamed 'New Source' (in the Ozersk separate division of JSC FCS&HT SNPO Eleron): a fire broke out in a standalone modular building housing a canteen and spread across an area of 50 m2. The fire was caused by faulty electrical equipment posing a fire hazard. There were no injured persons. The cost of the damage totalled RUB 192,500.

In 2020, there were five fires at facilities operated by ROSATOM:

- At JSC Russian Research and Development Institute for Nuclear Power Plant Operation (VNIIAES), supplies and implements caught fire in the utility closet of the laboratory and engineering building; the fire spread across an area of 6 m^2. There were no injured persons or damage to property.
  Possible causes of the fire included a faulty electric lamp posing a fire hazard and non-compliance with fire safety rules when performing unauthorised hot work posing a fire hazard;
- At JSC Afrikantov OKBM, an electric switchboard caught fire in an industrial space in building 52; the fire spread across an area of 2 m^2. There were no injured persons; the cost of the damage totalled RUB 8,613.
  The fire was caused by faulty electric switchboard equipment posing a fire hazard;

- At FSUE Russian Federal Nuclear Centre – All-Russian Scientific Research Institute of Experimental Physics (VNIIEF), waterproofing material caught fire on the roof of a building; the fire spread across an area of 20 m². There were no injured persons or damage to property.
  The most likely cause of the fire was a violation of fire safety rules by employees of a contractor organisation performing hot work (arc welding) posing a fire hazard;
- At FSUE Mayak Production Association, inflammable materials in a metal container intended for the collection of industrial waste with low radioactivity (wiping cloth, etc.) caught fire in room 109 of building 101A at Plant 235; the fire spread across an area of 1.69 m². There were no injured persons or damage to property.
  The most likely cause of the fire was unsafe use of fire;
- At the Shumyach site of the Southern Division of the SmolenskAtomEnergoSbyt branch of JSC Atom Energy Trade, a fire broke out in an office with an area of 60 m². There were no injured persons or damage to property.
  The cause of the fire was an arson.

GRI 403-10

5.1.8. Radiation exposure of employees

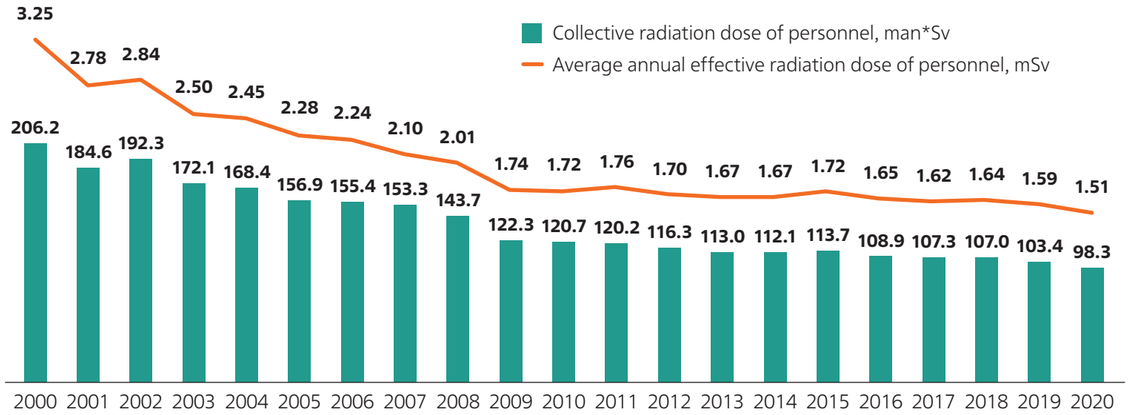
Ionising radiation is an occupational hazard specific to ROSATOM's organisations. The criteria of employee radiation safety are laid down in the Radiation Safety Standards (NRB-99/2009), the Basic Sanitary Rules of Radiation Safety (OSPORB-99/2010) and other regulations. Most nuclear organisations provide workplace conditions that fully comply with the requirements set out in these documents.

Average annual effective radiation dose of the personnel

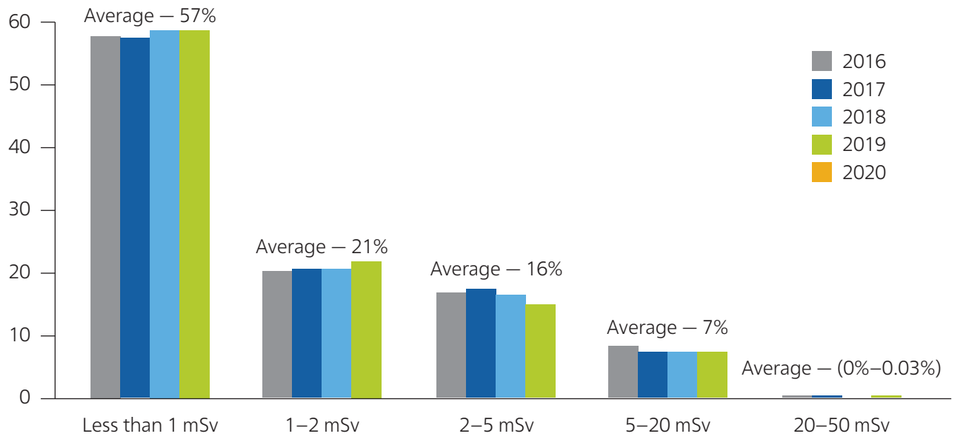
As at 31 December 2020, 65,018 people (group A personnel) in ROSATOM's organisations were under individual radiation exposure monitoring, including 39,821 people (group A personnel) in JSC Atomenergoprom. The number decreased by 0.08% compared to 2019.

In 2020, the average annual effective radiation dose of ROSATOM's personnel totalled 1.51 mSv (1.47 mSv in JSC Atomenergoprom). Over the past ten years, the average effective dose, the structure of personnel exposure and the number of employees exposed to radiation have been varying insignificantly and remain low. The annual exposure limit of 50 mSv was not exceeded.

Changes in the collective and average annual effective radiation dose of the personnel of ROSATOM's organisations



Distribution of group A personnel by dose ranges, %



Individual radiation risks

In 2020, ROSATOM continued to monitor radiation risks for group A personnel using the IRAW occupational radiation risk assessment system. Individual risk was calculated for 65,018 people (39,821 people in JSC Atomenergoprom), or 100% of the total number of group A employees. The vast majority of group A employees work in the conditions of acceptable occupational risk. For 758 people (628 people in JSC Atomenergoprom) individual risk exceeded the regulatory limit of 10-3; they account for 1.17% of the total number of employees included in the IRAW system (1.58% for JSC Atomenergoprom). The high-risk group comprises mainly industry veterans, whose average age exceeds 60 years.

Changes in the key indicators of the IRAW system in ROSATOM, %

	2018	2019	2020
Share of employees in the negligible and acceptable occupational risk areas	98.92	98.92	98.83
Share of employees in the high-risk group	1.08	1.08	1.17
Share of employees in the industry undergoing individual radiation exposure monitoring and included in the IRAW system	98.80	99.8	100.0

Changes in the key indicators of the IRAW system in Atomenergoprom, %

	2018	2019	2020
Share of employees in the negligible and acceptable occupational risk areas	98.24	98.32	98.36
Share of employees in the high-risk group	1.76	1.68	1.64
Share of employees in the industry undergoing individual radiation exposure monitoring and included in the IRAW system	99.7	99.8	100.0

The average individual radiation risk in Atomenergoprom stood at 7.3·10-5 in 2020. Over the last three years, the average individual radiation risk did not exceed 8% of the regulatory limit, while the maximum individual risk has been decreasing steadily.

Over the last three years, the average individual radiation risk across ROSATOM did not exceed 6.5% of the regulatory limit, while the maximum individual risk has been decreasing steadily.

Individual radiation risks of personnel, relative units

Division/complex/unit	2018	2019	2020
Power Engineering Division	$9.6 \cdot 10^{-5}$	$9.0 \cdot 10^{-5}$	$9.3 \cdot 10^{-5}$
Mechanical Engineering Division	$4.5 \cdot 10^{-5}$	$4.0 \cdot 10^{-5}$	$3.9 \cdot 10^{-5}$
Fuel Division	$2.4 \cdot 10^{-5}$	$2.5 \cdot 10^{-5}$	$2.5 \cdot 10^{-5}$
Mining Division	$2.5 \cdot 10^{-5}$	$2.8 \cdot 10^{-5}$	$2.8 \cdot 10^{-5}$
Nuclear Weapons Division	$4.5 \cdot 10^{-5}$	$4.4 \cdot 10^{-5}$	$4.4 \cdot 10^{-5}$
Environmental Solutions	$3.7 \cdot 10^{-5}$	$3.8 \cdot 10^{-5}$	$3.7 \cdot 10^{-5}$
Science and Innovations	$7.9 \cdot 10^{-5}$	$7.4 \cdot 10^{-5}$	$7.4 \cdot 10^{-5}$
Engineering and Construction	$2.9 \cdot 10^{-5}$	$1.6 \cdot 10^{-5}$	$9.4 \cdot 10^{-5}$
Rusatom Healthcare	-	$2.0 \cdot 10^{-5}$	$1.9 \cdot 10^{-5}$
Northern Sea Route	-	$4.8 \cdot 10^{-5}$	$4.7 \cdot 10^{-5}$
Total across the Corporation	$6.3 \cdot 10^{-5}$	$6.1 \cdot 10^{-5}$	$6.2 \cdot 10^{-5}$

5.1.9. Functioning of systems for technical regulation, standardisation, compliance assessment and ensuring the uniformity of measurement

I. Summary of measures in the sphere of accreditation, expert certification, standardisation and technical regulation

1. Information on the accreditation of certification bodies and testing laboratories and certification of accreditation experts

Accreditation of certification bodies and testing laboratories and certification of accreditation experts are carried out as part of public services provided by the Corporation pursuant to Federal Law No. 210-FZ of 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 2020, ROSATOM received 92 applications for the provision of government accreditation services in the use of nuclear energy (one application was subsequently withdrawn by the applicant) and issued 21 accreditation certificates (following initial accreditation and (or) renewal).

The following decisions were made:

- To grant accreditation to eight organisations (eight testing laboratories (centres));
- To deny accreditation as testing laboratories (centres) to four organisations;
- To expand the scope of accreditation of seven organisations;
- To reduce the scope of accreditation of three organisations;
- To refuse to reduce the scope of accreditation of one organisation;
- To renew the accreditation certificates for four organisations that had complied with instructions;
- To deny one organisation the provision of a government service involving the confirmation of compliance by the accredited entity with instructions to address the identified instances of non-compliance;
- To invalidate the accreditation certificate of one organisation.

24 scheduled inspections were carried out in 2020. Based on the findings of the inspections, ROSATOM issued instructions to five inspected organisations and, accordingly, suspended five accreditation certificates. To date, in four instances, instructions have been carried out, and the competency of accredited entities has been verified; in one instance, instructions have not been carried out, and one accreditation certificate has been invalidated.

Overall, as at 31 December 2020, ROSATOM accredited a cumulative total of:

- 7 certification bodies;
- 52 testing laboratories (centres) (two of which had their certificates suspended at the time, with one of the two certificates invalidated in 2021).

Information about the accredited entities is available on ROSATOM's official website at http://www.rosatom.ru/about/tekhnicheskoe-regulirovanie/akkreditatsiya-v-oblasti-ispolzovaniya-atomnoy-energii-/.

In 2020, ROSATOM received no applications for the certification of experts on accreditation in the use of nuclear energy.

As at 31 December 2020, ROSATOM awarded certification to a cumulative total of 43 accreditation experts:

- 13 experts on certification bodies;
- 30 experts on testing laboratories (centres).

Information about the persons who underwent certification is available on ROSATOM's official website at http://www.rosatom.ru/about/tekhnicheskoe-regulirovanie/akkreditatsiya-v-oblasti-ispolzovaniya-atomnoy-energii-/.

Proper organisation and the high quality of accreditation and certification of experts enabled ROSATOM to avoid appeals from applicants, accredited entities and persons seeking the status of accreditation experts in 2020.

2. Information about compliance assessment activities

2.1. Mandatory product certification. To ensure the safety of nuclear facilities, in the reporting year, 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.

Following the certification conducted in 2020, 428 compliance certificates were issued (there are no targets for the issuance of certificates, and, accordingly, there are no deviations from the targets; note: following scheduled inspections of certified products, as at 31 December 2020, certification bodies suspended six compliance certificates and invalidated 66 compliance certificates).

2.2. Evaluation of technical documentation. As at 31 December 2020, there were 24 expert organisations operating in the industry.

In the reporting year, expert organisations issued 580 expert opinions on the compliance of technical documentation with mandatory requirements and approved 445 amendments to technical documentation.

2.3. Information about certification testing activities. As at 31 December 2020, there were six main materials science organisations that assess compliance in the form of tests (certification testing).

In the reporting year, 1,075 certificates were issued for new welding technologies, and one certificate was issued for non-destructive testing systems.

2.4. 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 approved by Order No. 52 of the Federal Environmental, Industrial and Nuclear Supervision Service dated 6 February 2018 (registered with the Ministry of Justice of the Russian Federation on 7 March 2018, registration No. 50282), as at 31 December 2020, 13 documents on personnel certification in accordance with the GOST R 50.05.11-2018 standard were developed and came into force; three bodies were authorised to perform competency verification in accordance with the GOST R 50.05.11-2018 standard.

In the reporting year, 6,238 personnel certification procedures were performed.

3. Information about standardisation activities

Pursuant to Article 8 and Article 10 of Federal Law No. 317-FZ of 1 December 2007 on State Atomic Energy Corporation Rosatom, 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, in 2020:

- Amendments were made to the Standardisation Programme of ROSATOM (Orders of ROSATOM No. 1/504-P dated 20 May 2020 and No. 1/1505-P dated 10 December 2020);
- The following documents were approved:
  - 38 national standards;
  - 5 provisional national standards;
  - 7 standards of ROSATOM;
- Main standardisation organisations (MSOs) were appointed:
  - JSC Atomenergoproekt is the MSO for selecting the locations, conducting surveys and designing facilities for the peaceful use of nuclear energy (Order of ROSATOM No. 1/503-P dated 20 May 2020);
  - JSC Rosenergoatom is the MSO for personal protective equipment (Order of ROSATOM No. 1/1386-P dated 26 November 2020);
  - LLC RusAT is the MSO for additive manufacturing (Order of ROSATOM No. 1/1287-P dated 2 November 2020);
- ROSATOM approved and brought into force the following standards regulating standardisation in the use of nuclear energy:
  - STO 95 12058-2019: Rules for Compiling, Maintaining and Using a Collection of Documents on Standardisation in the Use of Nuclear Energy (Order of ROSATOM No.1/188-P dated 21 February 2020);
  - STO 95 12059-2020: Compiling, Maintaining, Updating and Publishing a Consolidated List of Documents on Standardisation (Order of ROSATOM No.1/640-P dated 19 June 2020);
- Amendments were made to the consolidated list of documents on standardisation containing information about the documents (sections of documents) on standardisation whose application is mandatory (Orders of ROSATOM No. 1/706-P dated 8 July 2020 and No. 1/824-P dated 29 July 2020).

The updated consolidated list of documents on standardisation is available on ROSATOM's official website.

II. Summary of measures supporting the functioning of the system for ensuring the uniformity of measurements

1. Legal framework underlying the system for ensuring uniformity of measurements in the use of nuclear energy

The legal framework underlying the system for ensuring the uniformity of measurements in the use of nuclear energy is available on the website

In 2020, the following documents were approved:

- A list of measurements subject to government regulation aimed at ensuring the uniformity of measurements and performed as part of activities involving the use of nuclear energy, and the relevant mandatory metrological requirements, including measurement accuracy indicators;
- The procedure for the certification of standards of measurement in the use of nuclear energy;
- The Regulations on the Metrological Service of ROSATOM.

Jointly with the Ministry of Industry and Trade of Russia, ROSATOM developed and approved an Order on Amendments to Orders of the Ministry of Industry and Trade of the Russian Federation No. 2037 dated 10 October 2014 and No. 196 dated 16 March 2010; the document sets out the requirements for the recording by ROSATOM of information on calibration testing of measuring instruments applied in the use of nuclear energy.

2. Information system and expert activities aimed at ensuring the uniformity of measurements in the use of nuclear energy

In the reporting year, the following developments took place in the section of the Federal Information Fund for Ensuring the Uniformity of Measurements on the use of nuclear energy:

- 13,508 entries were made concerning measurement methodologies (methods), standards of measurement, measuring instruments of approved types and information on calibration testing of measuring instruments;
- A unit for recording information on calibration testing of measuring instruments applied in the use of nuclear energy was put into operation as part of the Information System for maintaining the section on the use of nuclear energy; 3,705 entries were made.

Pursuant to laws and regulations underlying the system for ensuring the uniformity of measurements in the use of nuclear energy, in 2020, the following documents were reviewed:

- 140 sets of files on the testing of measuring instruments applied in the use of nuclear energy in order to approve their type;
- Files on two systems in order to classify technical equipment as measuring instruments;
- One set of files on the testing of reference standards applied in the use of nuclear energy in order to approve their type;
- 103 sets of files on the certification of standards of measurement applied in the use of nuclear energy.

Mandatory metrological evaluation of 39 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 48 draft standards and technical specifications applied in the use of nuclear energy was carried out.

3. Establishment of the Calibration System at ROSATOM

In 2020, a Calibration System for the use of nuclear energy was created. As part of this system, a core organisation of the metrological calibration service was created and is operating.

In the reporting year, the competency of two of ROSATOM's organisations was verified; four calibration techniques were developed, and metrological evaluation of 18 calibration techniques was carried out.

4. Interlaboratory comparisons (ILCs)

As part of the system of interlaboratory comparisons, ILCs of mechanical properties of metal samples and ILCs of dimensions, weight and radiometric measurements were carried out. In 2020, a total of 54 organisations of ROSATOM took part in the ILCs.

5. Inspection of the condition and use of measuring instruments, compliance with metrological rules and standards, and evaluation of measurement capabilities

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 facilities, 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 2020, metrological supervision was carried out in 24 organisations, and measurement capabilities were assessed in 83 laboratories of ROSATOM's organisations.

Based on the findings of metrological supervision, in the reporting year, a consolidated report was prepared for submission to the Russian Federal Agency for Technical Regulation and Metrology (Rosstandart) as part of federal supervision.

6. Activity of the standard reference data service in the use of nuclear energy (SRDNE)

In the reporting year:

- Files on the certification of reference data on nuclear physics characteristics and short-term mechanical properties of structural materials applied in the use of nuclear energy were registered and prepared for approval;
- A Framework for the Development of the Standard Reference Data Service in the Use of Nuclear Energy for the Period from 2021 through 2026 was developed and approved by the relevant institution of Rosstandart, and further reviewed and approved by the commission for certification of reference data in the use of nuclear energy.

5.1.10. Plans for 2021

In the area of radiation safety, in 2021, ROSATOM plans to continue to implement the Basic Principles of Government Policy on Nuclear and Radiation Safety in the Russian Federation until 2025 and beyond approved by Decree No. 585 of the President of the Russian Federation dated 13 October 2018.

In terms of upgrading and developing the information and analysis system for the monitoring of radiation risks for employees of ROSATOM's organisations that operate facilities designed for the peaceful use of nuclear energy, a report on the validation and development of methods for optimising radiation protection of group A personnel of ROSATOM's organisations will be presented in order to minimise the occupational radiation risk in accordance with the principles of regulation, validation and optimisation.

In the area of development and implementation of standardisation documents that set out requirements for radiation monitoring tools in the use of nuclear energy harmonised with international standards developed by the International Electrotechnical Commission (IEC) and the International Organisation for Standardisation (ISO), ROSATOM

will approve standards setting out general requirements, terms and definitions, and methods for processing measurement results applicable to radiation measurement. In addition, ROSATOM will initiate the development of two more standards setting out requirements for instruments measuring the ambient and/or directional dose equivalent (intensity) of beta, X-ray and gamma radiation.

In terms of improving the IRMS, in 2021, ROSATOM plans to:

- Include the FTNPP (a potential radiation hazard category 2 facility) in the IRMS;
- Initiate the implementation of 34 measures forming part of the industry-wide Programme for Development of the IRMS for the period from 2021 through 2030;
- Conclude a cooperation agreement on subsoil monitoring with the Federal Agency for Mineral Resources (Rosnedra);
- As part of organisational and methodological support of the IRMS, hold an industry-wide workshop titled 'Communication in the Course of Radiation Monitoring in ROSATOM's Organisations' and hold meetings of the Radiation Monitoring Council in ROSATOM's organisations involving experts from outside the industry.

RAW and SNF Management and Decommissioning of Facilities Posing Nuclear and Radiation Hazards

Key results in 2020:

- All targets of FTP NRS 2 were achieved; progress in the achievement of the Programme's main goal totalled 22.3% (as against a target of 19.8%).
- Nine facilities posing nuclear and radiation hazards were decommissioned.
- One nuclear submarine and one nuclear maintenance ship were dismantled.

5.2.1. Outcomes of the Federal Target Programme on Nuclear and Radiation Safety for the period from 2016 through 2020 and for the period until 2030

GRI 103-2

In 2020, active work continued as part of the implementation of the Federal Target Programme on Nuclear and Radiation Safety for the period from 2016 through 2020 and for the period until 2030 (FTP NRS 2), including:

- Decommissioning industrial uranium-graphite reactors at FSUE Mining and Chemical Plant and JSC Pilot Production and Demonstration Centre for Decommissioning of Uranium-Graphite Nuclear Reactors and the BR-10 research reactor at JSC State Scientific Centre of the Russian Federation Leypunsky Institute for Physics and Power Engineering (IPPE);
- Dismantling the *Sibir* nuclear icebreaker
- Maintaining the Techa Cascade of Reservoirs in a safe condition in accordance with the developed Strategic Master Plan for Addressing Issues Related to the Techa Cascade of Reservoirs;
- Preparing the shut-down power units at JSC Rosenergoatom's NPPs (Leningrad NPP, Bilibino NPP, Beloyarsk NPP) for decommissioning;
- Safe removal of RAW in federal ownership from storage sites, its preparation for disposal, transportation and transfer for disposal;
- Construction of SNF and RAW management infrastructure at Leningrad, Smolensk and Kursk NPPs;
- Rehabilitation of radiation-contaminated sites; in the reporting year, the area of rehabilitated radiation-contaminated sites totalled 41,900 m^2.

In addition, ROSATOM completed the mothballing of the B-1 and B-25 storage pools for radioactive waste at JSC Siberian Chemical Plant and renovation of site 13 at the radiochemical plant of JSC Siberian Chemical Plant and obtained a permission for its commissioning.

At year-end 2020, all targets under FTP NRS 2 were achieved; progress in the achievement of the main goal of FTP NRS 2 totalled 22.3%, as against the target of 19.8%.

GRI 103-2

5.2.2. Development of the integrated national system for radioactive waste management

Volume of accumulated RAW

At year-end 2020, the volume of RAW totalled 5.69×10^8 m³, of which 5.53×10^8 m³ were classified as accumulated RAW ('nuclear legacy').

RAW generation in 2020

	Very low-level waste	Low-level waste	Intermediate-level waste	High-level waste
Solid RAW, m³	$7.6 \cdot 10^5$	$5.37 \cdot 10^3$	$1.1 \cdot 10^2$	$2.17 \cdot 10^2$
Liquid RAW, m³	-	6.31·105	$4.55 \cdot 10^4$	$2.62 \cdot 10^4$

In 2020, work on the third stage of development of the Integrated National System for Radioactive Waste Management continued.

Commissioning of RAW disposal facilities

Renovation of the near-surface disposal site for solid radioactive waste in Novouralsk (Sverdlovsk Region) was completed. Acceptance certificates were issued for the completed facility under forms KS-11 and KS-14; its capacity totals 39,300 m³.

Outcomes and progress on plans for the construction and renovation of RAW management infrastructure

In 2020, work continued on the first stage of a permanent disposal facility (deep repository) for class 1 and class 2 RAW (Nizhnekansky Rock Massif, Krasnoyarsk Territory): construction of a power supply facility and surface facilities for an underground research laboratory was underway.

Licences were obtained from Rostekhnadzor for the selection of locations and construction of disposal sites for class 3 and 4 RAW in the CATF of Seversk (Tomsk Region) and the CATF of Ozersk (Chelyabinsk Region). Construction of complexes of auxiliary buildings and structures and warehouses, transport infrastructure, internal and external utility networks was started.

In the reporting year, disposal of class 3 and 4 RAW in the repository in Novouralsk (Sverdlovsk Region) continued; 6,900 m³ of RAW were accepted for disposal.

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).

5.2.3. SNF management

GRI 103-2

As at 31 December 2020, the volume of SNF accumulated in the Russian Federation totalled 25,260 tonnes (including 16,554 tonnes of SNF in federal ownership). In the reporting year, 591 tonnes of SNF were accumulated.

During the reporting year, 947.5 tonnes of SNF were removed from nuclear facilities in the Russian Federation, and 99.7 tonnes of various types of SNF were reprocessed (including 33.4 tonnes of SNF in federal ownership). Reprocessed SNF accounted for 16.9% of the total volume of SNF generated in the Russian Federation during the year.

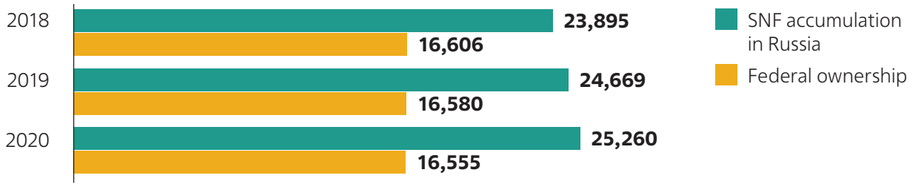
In 2020:

- 7,488 spent fuel assemblies (SFAs) from RBMK-1000 reactors were removed and placed in dry storage at FSUE Mining and Chemical Plant;
- 255 SFAs from VVER-1000 reactors were removed and placed in temporary storage for subsequent reprocessing at FSUE Mining and Chemical Plant;
- 330 SFAs from VVER-440 reactors, 315 SFAs from BN-600 reactors and 131 SFAs from VVER-1000 reactors were transported to FSUE Mayak Production Association for reprocessing;
- Removal of SNF from the sites of research institutes and industrial reactor facilities continued.

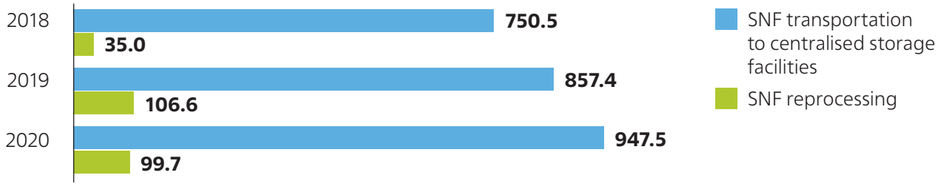
No new SNF reprocessing capacities were commissioned in 2020.

In the reporting year, the construction of the second start-up facility of the Pilot and Demonstration Centre (PDC) for SNF Reprocessing continued at FSUE Mining and Chemical Plant. 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 transportation to storage facilities and reprocessing, tonnes

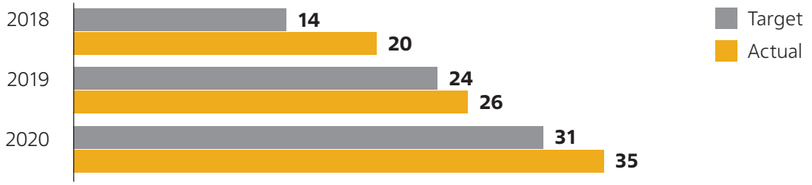


GRI 103-2

5.2.4. Decommissioning of facilities posing nuclear and radiation hazards

In 2020, nine facilities posing nuclear and radiation hazards were decommissioned.

Decommissioning and dismantling of facilities posing nuclear and radiation hazards, units (as a cumulative total since 2016)



In the reporting year, radiation and environmental monitoring of the Yenisei River floodplain was continued; by the end of 2020, no areas requiring rehabilitation had been identified.

As part of a project to develop an industry-wide information system for decommissioning, a pilot project to create a site-level system at JSC NIKIET based on a prototype developed earlier was completed. The implementation of the second similar pilot project at FSUE RADON was continued.

5.2.5. Dismantling of nuclear submarines

In 2020, one nuclear submarine and one nuclear maintenance ship were dismantled.

17 reactor compartments of dismantled nuclear submarines and two hull units of nuclear maintenance ships were prepared and put into long-term storage.

2,058 SFAs were unloaded and transported for further processing.

5.32 tonnes of spent nuclear fuel and 448.05 m3 of liquid radioactive waste were reprocessed; 947.3 m3 of solid radioactive waste were conditioned.

In 2020, using international technical assistance funds (a total of RUB 1.36 billion was received), ROSATOM completed the transportation of SNF unloaded from the storage facility of the disused Lepse floating maintenance base to Murmansk; 686 SFAs were removed from the storage facility in Andreev Bay using technical equipment purchased with the international technical assistance funds.

5.2.6. Plans for 2021 and for the medium term

In 2021, ROSATOM will continue to implement the Federal Target Programme on Nuclear and Radiation Safety for the Period from 2016 through 2020 and until 2030, including:

- Continued construction of the Pilot and Demonstration Centre for Spent Nuclear Fuel Reprocessing (the second start-up facility) based on innovative technologies at FSUE Mining and Chemical Plant. In 2021, ROSATOM plans to obtain a permission to commission the second start-up facility of the Pilot and Demonstration Centre with a capacity of up to 250 tonnes of SNF per year, with the commissioning scheduled for 2022;

- Transportation of accumulated SNF from NPP sites to long-term storage facilities;
- Removal of RAW from storage sites, preparation for disposal, transportation to disposal sites and transfer for disposal.

In terms of the dismantling of nuclear submarines, surface ships with a nuclear propulsion unit and nuclear maintenance ships, in 2021, ROSATOM will:

- Continue the dismantling of one nuclear submarine and unloading of spent nuclear fuel from dry storage tanks in Andreev Bay;
- Prepare eight reactor compartments of dismantled nuclear submarines for placement into long-term storage.

Environmental Safety

Key results in 2020:

- Expenditure on environmental protection totalled RUB 26.89 billion
- Gross greenhouse gas emissions in the Corporation's organisations totalled 6,095.43 tonnes.
- Pollutant emissions into the atmosphere from nuclear organisations totalled 38,000 tonnes.
- Water consumption totalled 6,059 million m³.

5.3.1. Environmental safety and environmental protection management

GRI 102-11
GRI 103-1

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 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;
- Transparency and making information on environmental aspects of operations of organisations in the industry publicly available.

GRI 103-2

The Corporation's goals and initiatives in the sphere of environmental safety and environmental protection are stipulated in the Uniform Industry-Wide Environmental Policy of ROSATOM and Its Organisations.

Uniform Industry-Wide Environmental Policy of ROSATOM and Its Organisations

A list of environmentally relevant organisations of ROSATOM is compiled and updated on an annual basis (54 organisations[89] in 2020). The Corporation's management gives special focus to their operations. Adhering to the principle of transparency, environmentally relevant organisations issue public reports on environmental safety on an annual basis and circulate them to stakeholders.

An important tool for environmentally focused governance is a three-year Comprehensive Plan for the Implementation of the Environmental Policy. In 2020, the Corporation and its organisations continued to implement organisational, operational and technical measures in accordance with the Comprehensive Plan for 2019–2021 approved in 2019.

GRI 103-2

In the reporting year, the Corporation continued to develop its environmental, energy and quality management systems, as well as the occupational health and safety management system. Management systems are in place in environmentally relevant organisations. They comprise:

- Environmental management systems compliant with the ISO 14001 standard (in place in 39 environmentally relevant organisations, planned for implementation in two environmentally relevant organisations);
- Quality management systems compliant with the ISO 9001 standard (in place in 45 environmentally relevant organisations, planned for implementation in one environmentally relevant organisation);
- Occupational health and safety management systems compliant with the OHSAS 18001 standard (in place in 31 environmentally relevant organisations, planned for implementation in three environmentally relevant organisations);
- Energy management systems compliant with the ISO 50001 standard (in place in 19 environmentally relevant organisations, planned for implementation in five environmentally relevant organisations).

[89] The list of organisations is available on the reporting portal: https://www.report.rosatom.ru/555.html.

GRI 103-3

Performance assessment

To assess progress in the implementation of the Uniform Industry-Wide Environmental Policy, ROSATOM applies the Uniform Industry-Wide Guidelines for the Use of Environmental Performance Indicators. The Guidelines are based on the requirements of environmental legislation of the Russian Federation and incorporate modern scientific and methodological approaches, as well as recommendations of international standards for corporate and non-financial reporting on environmental aspects.

The list of environmental performance indicators of an organisation is grouped according to three criteria: indicators for the assessment of the negative environmental impact, indicators for the assessment of current cost effectiveness of the organisation's environmental activities and indicators for the assessment of effectiveness of environmental management in the organisation.

ROSATOM also has an internal inspection body which monitors the organisations' environmental compliance and the effectiveness of environmental protection measures. It is mandatory for each organisation to carry out industrial environmental control and monitoring of its operations. For this purpose, the organisations use fixed and mobile laboratories, stations monitoring pollutant content in various components of the environment, including monitoring wells, and weather stations.

This approach to managerial decision-making enables ROSATOM to align economic interests of the business and environmental interests of society.

5.3.2. Financing of environmental measures

In 2020, expenditure on environmental protection in ROSATOM's organisations totalled RUB 26.89 billion, including expenditure on environmental measures totalling RUB 19.56 billion and fixed asset investment totalling RUB 7.33 billion.

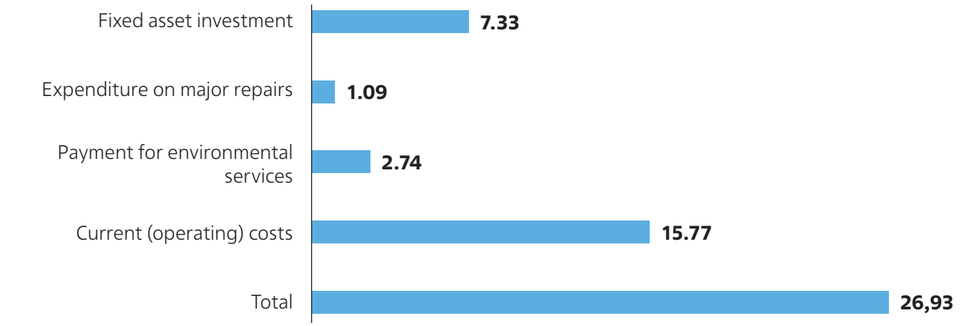
Environmental costs increased by RUB 3.34 billion year on year. The increase in expenditure on environmental protection was due to an increase in current costs related to wastewater collection and treatment at Novovoronezh NPP, as well as an increase in investment related to purchasing gas scrubbers and improving industrial waste management processes at FSUE Mining and Chemical Plant.

Environmental costs at ROSATOM, RUB billion

	2018	2019	2020
Expenditure on environmental measures	15.44	17.30	19.56
Fixed asset investment	8.80	6.25	7.33
Total	**24.24**	**23.55**	**26.89**

The largest portion of expenditure on environmental measures was allocated for ensuring radiation safety (45.2%), collecting and treating wastewater (23.7%), managing industrial and consumer waste (15.0%), protecting the atmosphere and preventing climate change (7.6%).

Environmental cost structure at ROSATOM in 2020, RUB billion

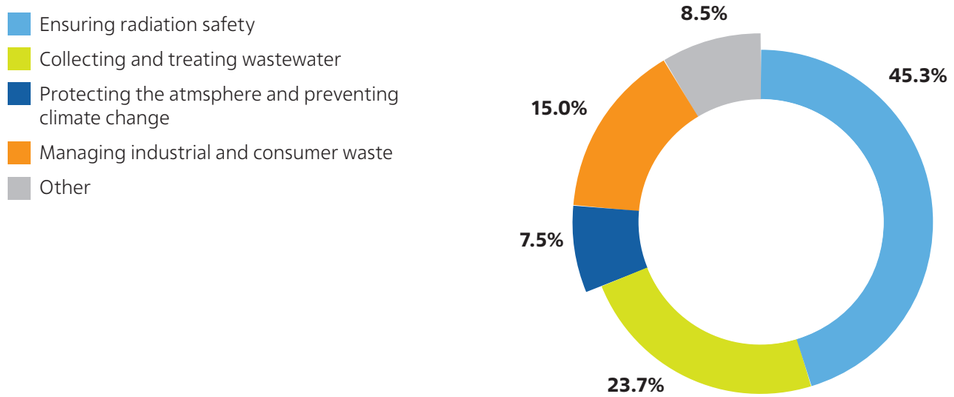


A major part of fixed asset investment was allocated for the protection of the atmosphere (59.8%), as well as protection and sustainable use of water resources (22.2%).

Branches of JSC Rosenergoatom account for 72.6% of the total fixed asset investment of ROSATOM's organisations aimed at environmental protection (RUB 5.32 billion). ROSATOM's organisations account for 4.2%[90] of the total amount of environmental investment in the Russian Federation.

[90] Calculated based on data provided in the Government Report on the Status and Protection of the Environment of the Russian Federation in 2019.

Environmental cost structure in 2020



5.3.3. Environmental charges and fines

In 2020, charges for the negative environmental impact totalled RUB 75.6 million, including charges for allowable emissions and discharges of pollutants, disposal of industrial and consumer waste totalling RUB 35.1 million (46.4%), and charges for excess emissions and discharges totalling RUB 40.5 million (53.6%).

Charges for the negative environmental impact, RUB million

	2018	2019	2020
Charges for allowable emissions (discharges) of pollutants (disposal of industrial and consumer waste), total, including:	33.7	34.0	35.1
into water bodies	7.3	6.0	3.1
into the atmosphere	2.9	3.1	3.1
for disposal of industrial and consumer waste	23.5	24.9	28.9
Charges for excess emissions (discharges) of pollutants (disposal of industrial and consumer waste), total, including:	51.9	21.0	40.5
into water bodies	13.4	5.7	15.2
into the atmosphere	22.7	8.8	13.9
for disposal of industrial and consumer waste	15.8	6.5	11.4
Charges for allowable and excess emissions (discharges) of pollutants (disposal of industrial and consumer waste), total	**85.6**	**55.0**	**75.6**

GRI 103-3

In 2020, government watchdogs on natural resource management detected minor violations in certain organisations in the industry, for which they imposed administrative penalties in the form of fines.

In 2020, government watchdogs detected 255 violations at potentially hazardous facilities, which is 14.43% less than the number of violations detected during previous inspections over the past three years; at the same time, no concerns were raised during 45% of inspections conducted by government watchdogs in 23 organisations of the Corporation.

GRI 307-1

The amount of fines imposed on ROSATOM's organisations for environmental non-compliance totalled RUB 3.9 million[91]. The violations detected by government watchdogs did not necessitate restrictions on production or business operations of the organisations and caused no environmental damage.

The number of administrative violations detected during the reporting period remained the same as in 2019 (36 violations per year), but due to the tightening of requirements in the field of environmental protection and natural resource management, the total amount of fines increased by RUB 1.7 million. At the same time, it should be noted that government watchdogs on natural resource management did not order ROSATOM's organisations to repair environmental damage; no non-financial sanctions were imposed on the Corporation or its organisations in 2020 for non-compliance with environmental legislation and regulatory requirements in the field of environmental protection; there was no need for the use of dispute resolution mechanisms.

[91] The increase in the amount of fines is due to amendments to the Code of Administrative Offences of the Russian Federation which regulate environmental responsibilities of natural resource users in terms of their waste management activities. The amendments extend the scope and stipulate the amount of fines for other kinds of violations in this sphere, with sanctions now imposed for non-compliance not only with environmental, sanitary and epidemiological requirements but also with requirements for environmental protection when generating, managing and treating industrial and consumer waste, substances that destroy the ozone layer and other hazardous substances.

5.3.4. Pollutant emissions into the atmosphere

In 2020, pollutant emissions into the atmosphere totalled 38,000 tonnes; the pollutant capture rate reached 92.2%. The Corporation's organisations accounted for 0.2% of the total emissions in the Russian Federation.

GRI 305-7

Pollutant emissions into the atmosphere[92], '000 tonnes

	2018	2019	2020
Total (excluding CO_2), including:	39.9	38.6	38.0
Particulate matter	13.8	13.4	14.2
NO_x emissions	10.6	10.2	6.1
SO_2 emissions	9.4	9.7	11.6
CO emissions	3.7	3.5	3.3
Hydrocarbon emissions, including:	1.7	1.4	2.2
Methane emissions	0.2	0.2	0.8
Volatile organic compounds	1.2	1.1	1.2
Other gaseous and liquid compounds	0.7	0.4	0.6

Pollutant emissions into the atmosphere decreased by 600 tonnes compared to 2019 due to a reduction in fuel combustion at ROSATOM's thermal power plants (CHPPs), which produce electricity and heat for the needs of both ROSATOM's organisations and the towns and cities in which they are located. Significant changes in sulphur dioxide and nitrogen oxide emissions were due to a shift to different types of fuel at the CHPPs.

Pollutant emissions from individual groups of pollution sources, '000 tonnes

	From fuel combustion for electricity and heat generation	From production and other processes
Particulate matter	13.2	1.0
NO_x	5.2	0.9
SO_2	10.6	1.0
CO	2.5	0.8
Hydrocarbons, including volatile organic compounds (excluding methane)	0.03	1.4

[92] The Corporation's organisations use chemical analysis methods or automatic gas analysers to report on their pollutant emissions.

Emissions of major ozone-depleting substances, tonnes of chlorofluorocarbon-11 equivalent[93]

Substance	2018	2019	2020
Dichlorodifluoromethane (Freon 12)	75.04	72.24	72.24
Chlorodifluoromethane (Freon 22)	0.19	0.21	0.09
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.00	0.00	0.00
Chlorotrifluoromethane (Freon 13)	164.21	164.21	164.21
Tetrafluoromethane (Freon 14)	6.24	6.24	6.24
Total	**245.68**	**242.90**	**242.78**

GRI 305-6

Emissions of ozone-depleting substances decreased in 2020 as a result of a decrease in chlorodifluoromethane emissions at JSC Electrochemical Plant due to a reduction in the capacity of refrigeration equipment.

Initiatives to reduce harmful emissions into the air

To reduce pollutant emissions into the atmosphere by ROSATOM's organisations, in 2017, the Corporation developed a Plan of High-Priority Measures to Reduce the Negative Impact of ROSATOM's Organisations on the Environment until 2020. Key measures implemented as part of this plan included the following:

- JSC Research Institute of Scientific Instruments upgraded the system for treating air emissions from the chemical milling section, which enabled a 20% reduction in pollutant emissions into the atmosphere;
- Electrical equipment was upgraded at power unit No. 3 of Kursk NPP, which made it possible to dismantle the air compressor station and reduce emissions of mineral oil aerosols from compressors by 0.07 tonnes per year;
- Two oil-filled transformers were replaced with dry-type transformers at JSC CNIITMASH, which reduces the risk of transformer oil spills and evaporation into the atmosphere;
- The ash collector of a boiler unit was replaced in the Krasnokamensk branch of JSC Rusatom Infrastructure Solutions (JSC RIR), which helped to reduce particulate matter emissions into the atmosphere.

[93] The data are presented taking into account the ozone depletion potential of substances under the Montreal Protocol on Substances that Deplete the Ozone Layer.

As part of implementation of the Plan, in the reporting period, nuclear organisations also systemically implemented high-priority measures, which included:

- Reducing the man-made impact on water bodies and the atmosphere;
- Reducing industrial and consumer waste generation and ensuring safe waste management;
- Organisational measures aimed at ensuring environmental compliance.

As a result of implementation of the industry-wide plan, between 2017 and 2020, 40 organisations of the Corporation managed to reduce pollutant emissions into the atmosphere and wastewater discharge by 17% and 12% respectively. At the same time, the rate of pollutant capture from flue gas increased by 9.7% to 92.2% in 2020. To save water, the share of recycled and reused water is increased every year.

5.3.5. Greenhouse gas emissions

GRI 103-1

Climate change is recognised as one of the biggest problems facing the international community, businesses and citizens. The Russian government has ratified the Paris Agreement, whereby the participating countries take on a commitment to reduce greenhouse gas emissions.

To meet the international legal commitments of the Russian Federation on climate and minimise risks associated with ROSATOM's operations, a greenhouse gas emissions accounting system is being developed in the Russian nuclear industry:

GRI 102-15
GRI 103-2

- In 2019, a framework high-level document was developed and approved: the Regulations on a System for Accounting for Greenhouse Gas Emissions Generated by the Operations of Organisations in the Russian Nuclear Industry;
- In 2020, the Uniform Industry-Wide Guidelines for Accounting for Greenhouse Gas Emissions in Nuclear Organisations were developed.

In 2020, gross greenhouse gas emissions totalled 6,108.34 tonnes, which is 5.9% higher than in 2019. This change was due to the recalculation of emissions from the Corporation's waste disposal facilities in accordance with the methodology for quantifying pollutant emissions from solid domestic and industrial waste landfills.

Gross greenhouse gas emissions by ROSATOM's organisations, tonnes[94]

Substance	2018	2019	2020
Carbon dioxide[95]	5,802.284	5,451.820	5,216.911
Methane	239.72	193.734	766.619
Nitrous oxide	0	0	0
Trifluoromethane	0	0	0
Perfluoromethane	124.806	124.806	124.806
Perfluoroethane	0	0	0
Sulphur hexafluoride	0	0	0
Total	**6,166.810**	**5,770.360**	**6,108.336**

ROSATOM's organisations accounted for 0.04% of total greenhouse gas emissions in Russia in CO_2 equivalent, or 947,000 tonnes of CO_2 equivalent[96].

Greenhouse gas emissions by CHPPs/TPPs

GRI 103-3

The holding company JSC Rusatom Infrastructure Solutions (RIR) and its branches account for greenhouse gas emissions using a calculation method based on instructions and guidelines for quantifying greenhouse gas emissions by organisations carrying out economic and other activities in the Russian Federation, approved by Order No. 300 of the Ministry of Natural Resources and Environment of Russia dated 30 June 2015.

Under the methodology, quantitative assessment of CO_2 emissions from stationary fuel combustion is carried out using a calculation method depending on fuel consumption.

[94] Quantitative estimates of greenhouse gas emissions are based on data obtained from statistical observation forms 2-TP (air).

[95] The data are presented using a coefficient of 1.57 calculated by converting CO to CO_2 based on molar mass.

[96] According to the Federal State Statistics Service, in 2018, greenhouse gas emissions in Russia totalled 2,220.1 million tonnes of CO_2 equivalent: https://rosstat.gov.ru/storage/mediabank/nmV0UuE3/Ochrana_2020.pdf.

Specific CO_2 emissions from CHPPs/TPPs, kg of CO_2/MWh

Branch name	2018	2019	2020	Comments
Branch of JSC RIR in Novouralsk	2,369.729	2,095.402	2,052.942	The decrease in specific CO_2 emissions was related to improved performance of steam boilers and a decrease in specific consumption of fuel equivalent (SCFE)
Branch of JSC RIR in Glazov	2,388.82	1,599.48	1,509.39	The decrease in specific CO_2 emissions was related to improved performance of steam boilers and a decrease in SCFE
LLC RIAR Generation	1,793	1,727	1,611	The decrease in specific CO_2 emissions was related to improved performance of steam boilers and a decrease in SCFE
Branch of JSC RIR in Seversk	1,712	1,840	1,840	Electricity generation: 1,015,595.014 MWh in 2018; 1,122,695.956 MWh in 2019; 971,652.588 MWh in 2020
Branch of JSC RIR in Krasnokamensk	1,405.94	1,389.56	1,433.96	The increase was caused by an increase in SCFE due to fuel quality
Total across JSC RIR	1,638.12	1,617.19	1,617.35	Total specific indicators were calculated by dividing total annual greenhouse gas emissions by total electricity output

Specific emissions of other pollutants: SO_2, NO_x, particulate matter, mercury, etc. (excluding CO_2) from CHPPs/TPPs, g/MWh

Branch name	2018	2019	2020	Comments
Branch of JSC RIR in Novouralsk	2,695.727	1,820.881	1,331.109	The decrease in specific pollutant emissions was related to improved performance of steam boilers and a decrease in SCFE
Branch of JSC RIR in Glazov	3,939.94	3,520.00	2,164.40	The decrease in specific pollutant emissions was related to improved performance of steam boilers and a decrease in SCFE
LLC RIAR Generation	3,319	4,022	5,770	In 2019, allowable emission limits were set using a different methodology for calculating emissions
Branch of JSC RIR in Seversk	4,961.777	4,488.442	5,186.170	Electricity generation: 1,015,595.014 MWh in 2018; 1,122,695.956 MWh in 2019; 971,652.588 MWh in 2020
Branch of JSC RIR in Krasnokamensk	Pollutant emissions are included in total emissions from PJSC PIMCU under an agreement			
Total across JSC RIR	4,477.11	4,025.31	4,264.13	Total specific indicators were calculated by dividing total annual pollutant emissions by total electricity output

In the medium term, the company plans to reduce CHPP/TPP capacity, which will enable a reduction in pollutant and greenhouse gas emissions.

Planned commissioning of CHPP/TPP capacities, MWh

Branch name	2021	2022	2023	Comments	Total investment, RUB million
Branch of JSC RIR in Novouralsk	-	-	-	No capacity commissioning planned	-
Branch of JSC RIR in Glazov	-	+60 MW	-	Demothballing of equipment	21.67
LLC RIAR Generation	-	-	-	No capacity commissioning planned	-
Branch of JSC RIR in Seversk	-	+100 MW	-	Simultaneous decommissioning of two turbine units is scheduled for 2022: -50 MW (TA-6), -100 MW (TA-13).	40.61
Branch of JSC RIR in Krasnokamensk	-	-	-	No capacity commissioning planned	-
Total across JSC RIR	**-**	**+160 MW**	**-**	**-**	**62.28**

Installed capacity of CHPPs/TPPs, MWh

Branch name	2020
Branch of JSC RIR in Novouralsk	24.9
Branch of JSC RIR in Glazov	24.9
LLC RIAR Generation	20.5
Branch of JSC RIR in Seversk	449
Branch of JSC RIR in Krasnokamensk	410
Total across JSC RIR	**929.3**

GRI 303-1
GRI 303-2
GRI 103-2
GRI 103-3

5.3.6. Water use

The nuclear industry is a major water user. Water use in the industry is managed in accordance with the Water Strategy of the Russian Federation until 2020 in order to ensure sustainable use of water as a valuable but limited resource.

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 ROSATOM 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 ROSATOM's regions of operation.

The main consumers of water among ROSATOM's organisations are Leningrad NPP and Kola NPP (81.9% of the total water withdrawal); all water withdrawn from water bodies by the NPPs (more than 99%) is used for operational needs (cooling of the processing medium in turbine condensers and heat exchangers) and returned to water bodies without any contamination.

In 2020, water withdrawal from natural sources by ROSATOM's organisations made up 8.9% of the total water withdrawal in the Russian Federation, totalling 6,059.2 million m³, which is 472.1 million m³ less than in 2019. The decrease was mainly due to a reduction in seawater withdrawal at Leningrad NPP following the commissioning of a new unit with a closed-circuit cooling system.

GRI 303-3

Total water withdrawal, million m³

Source	2018	2019	2020
Seawater	4,979.7	4,215.1	3,772.7
Fresh surface water, including rivers, marshes and lakes	2,219.7	2,203.5	2,191.2
Groundwater	100.4	96.9	77.5
Rainwater	2.0	2.0	2.4
Water from third-party organisations	16.0	13.8	15.4
Total	**7,317.8**	**6,531.3**	**6,059.2**

GRI 303-4

ROSATOM's regions of operation do not suffer from water shortage. The volume of water used by ROSATOM's organisations in water recycling and reuse systems totalled 36,308.2 million m³ in 2020.

Volume of recycled and reused water

GRI 303-5

	2018	2019	2020
Total volume of recycled and reused water, million m³	34,740.0	35,096.7	36,308.2
Water withdrawal, million m³ (% of recycled and reused water)	7,317.8 (21.1%)	6,531.3 (18.6%)	6,059.2 (16.7%)
Total, million m³	42,057.8	41,628.0	42,367.4
Share of recycled and reused water in water withdrawal, %	474.7	537.4	599.2

The volume of water used by ROSATOM's organisations for their own needs in 2020 totalled 5,985.5 million m³, which is 464.9 million m³ less than in 2019. This was mainly due to a reduction in water consumption at Leningrad NPP.

Water consumption by ROSATOM's organisations for their own needs, million m³

GRI 303-5

Type of consumption	2018	2019	2020
Drinking and sanitary purposes	37.9	41.5	37.6
Operational needs	7,133.3	6,395.7	5,928.5
Other types	14.6	13.2	19.4
Total	**7,185.8**	**6,450.4**	**5,985.5**

Water discharge

GRI 303-4
GRI 306-5

In 2020, wastewater discharge by ROSATOM's organisations totalled 5,389.4 million m³, with clean water compliant with regulatory requirements accounting for 96.7% of the total volume, while the shares of treated wastewater compliant with regulatory requirements and contaminated wastewater stood at 0.7% and 2.6% respectively.

Clean water compliant with regulatory requirements accounts for more than 95% of the total wastewater discharge; therefore, wastewater discharge by ROSATOM's organisations does not have any significant impact on water bodies and related habitats of local flora and fauna.

In the structure of wastewater discharge, the main destinations are seas (3,720 million m³, or 69.0%), lakes (1,185 million m³, or 22.0%) and rivers (403 million m³, or 7.6%).

Wastewater discharge decreased by 475.1 million m3 year on year due to a decrease in discharges from Leningrad NPP into the Gulf of Finland in the Baltic Sea.

In the reporting year, discharge of treated wastewater compliant with regulatory requirements totalled 35.4 million m³, of which 6.1% was treated using the biological method, 2.3% was treated using the physical and chemical method, and 91.6% was treated using the mechanical method.

Contaminated wastewater discharge by ROSTOM's organisations accounted for 1.1% of the total volume of discharges in Russia in 2020.

GRI 306-1

Total wastewater discharge, million m³

Water category	2018	2019	2020
Clean water compliant with regulatory requirements	6,512.3	5,635.3	5,209.8
Treated wastewater compliant with regulatory requirements	44.5	44.9	35.4
Contaminated wastewater	70.1	184.3	144.2
Total	**6,626.9**	**5,864.5**	**5,389.4**

Pollutant content in wastewater in 2020, kg

Chemical oxygen demand	18,522,404.434
Suspended matter	4,045,661.000
Phosphates (phosphorus contained)	25,540.000
Hexavalent chromium	41.558
Trivalent chromium	40.713
Manganese	776.084
Iron	33,573.719
Nickel	57.648
Copper	357.324
Zinc	782.583
Molybdenum	484.983
Cadmium	0.824
Lead	15.472

Initiatives to reduce discharges of harmful substances into water bodies

GRI 303-2

In order to reduce the discharge of pollutants into water bodies from ROSATOM's organisations, in 2017, the Corporation developed a Plan of High-Priority Measures to Reduce the Negative Impact of ROSATOM's Organisations on the Environment until 2020. Key measures implemented as part of this plan included the following:

- Wastewater treatment facilities at Kola NPP were upgraded; this involved replacing the wastewater disinfection system, which helped to prevent the release of highly toxic chlorine transformation products into the environment, and replacing filtering materials in the filters of special water treatment units, which enabled a 20% reduction in the volume of contaminated water from regeneration solutions;
- Water discharge networks were renovated at one of the industrial sites of FSUE RFNC VNIIEF; modular biological treatment facilities were installed at water discharge outlets, which enabled an 80% reduction in suspended matter discharges into water bodies and a decrease in the discharge of petroleum products and iron ions by 50% and 37% respectively;
- A system for collecting, treating and preparing industrial wastewater and storm water runoff for use in the process water supply system was implemented at PJSC Machinery Manufacturing Plant; this made it possible to stop its discharge into the open drainage system and use it in the production process instead of river and artesian water.

5.3.7. Industrial and consumer waste management

In 2020, nuclear organisations produced 30.9 million tonnes of industrial and consumer waste, which is 6.1 million tonnes (24.6%) more than in 2019. 99.97% of the generated waste is hazard class 4 and 5 waste (low-hazard and virtually non-hazardous waste). At the same time, industrial and consumer waste generated in nuclear organisations accounted for 0.4% of the total volume of waste generation in Russia in 2020[97].

Most of the waste (22.3 million tonnes) was generated at PJSC PIMCU. Most of it is class 5 waste (the least hazardous waste).

A significant increase in the volume of waste generated in 2020 was due to an increase in the amount of rock and loose overburden produced at JSC Lunnoye and PJSC PIMCU.

The weight of transferred waste totalled 198,300 tonnes, including 30,300 tonnes of solid household waste transferred to a regional operator. 79.9% of the total amount of waste generated and received by ROSATOM's organisations was recycled, and 0.003% was treated.

[97] Calculated based on data provided in the Government Report on the Status and Protection of the Environment of the Russian Federation in 2018.

GRI 306-2

Industrial and consumer waste management, ‘000 tonnes

Year	Amount at the beginning of the reporting year	Waste generated and received during the year	Recycling and treatment of generated and received waste		Transferred to third-party organisations	Storage in organisations	Amount at the end of the reporting year
			Amount	%			
2018	403,891.9	20,862.3	15,140.3	72.6	176.4	5,565.3	403,872.2
2019	408,868.7	24,782.2	19,120.7	77.2	2,138.7	2,332.7	412,391.5
2020	412,117.464	30,926.3	24,696.4	79.9	198.3	6,033.646	413,886.3

In 2020, ROSATOM did not transport, import, export or process waste that is classified as ‘hazardous’ in accordance with Annexes I, II, III and VIII to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

GRI 306-2

Industrial and consumer waste management[98] in 2020 by hazard class, ‘000 tonnes

Waste hazard class	Waste amount as at 1 January 2020	Waste generated and received in the reporting year	Recycling of generated and received waste		Treatment of generated and received waste		Transfer of waste to third-party organisations	Waste storage at the sites operated by ROSATOM in the reporting year, ‘000 tonnes		Amount in organisations as at 31 December 2020
			‘000 tonnes	%	‘000 tonnes	%		Total	Including burial	
1	0.022	0.253	0.000	0.0	0.000	0.0	0.255	0.00002	0.000	0.020
2	0.038	1.157	0.0002	0.02	0.789	68.2	0.339	0.000	0.000	0.067
3	3.943	6.546	0.006	0.1	0.008	0.1	8.723	0.00002	0.00002	1.752
4	24.203	78.847	0.006	0.01	0.025	0.03	73.954	5.202	1.628	27.438
5	412,089.257	30,839.542	24,695.519	80.1	0.000	0.0	115.061	6,028.444	4,261.138	413,857.067
Total	**412,117.463**	**30,926.345**	**24,695.531**	**79.9**	**0.822**	**0.003**	**198.332**	**6,033.646**	**4,262.766**	**413,886.344**

For details on ROSATOM’s waste treatment projects, see the section ‘Implementation of the Ecology National Project’ in the chapter ‘Strategic Report’.

[98] As from 1 January 2015, the term ‘use’ as a type of industrial and consumer waste management was legally replaced by the term ‘recycling’; however, the scope of the concept has not changed. According to the definition given in Article 1 of Law No. 89-FZ, recycling is the use of waste for the manufacture of goods (products), performance of work and provision of services. According to this definition, reprocessing and reuse are waste recycling options.

5.3.8. Impact on local flora and fauna

GRI 103-1

The high quality of the natural environment is a vital prerequisite for the existence of mankind on Earth. Global environmental problems, such as the greenhouse effect and associated irreversible climate change, the depletion of the ozone layer and a rising level of toxic substances in the environment, ultimately lead to a reduction of biodiversity on the planet.

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 into the atmosphere, which is beneficial to living organisms, including humans. At the same time, the nuclear industry, and primarily nuclear power plants, are subjected to close scrutiny by various environmental organisations, the general public and the media due to the potential radiation impact of nuclear power plants on the environment.

GRI 103-2

In the Russian Federation, there are currently no criteria for quantitative assessment of the radiation impact on flora and fauna, and in the vast majority of cases the assessment of such impacts is viewed as supplementary to the setting of hygienic standards.

Nuclear organisations operating nuclear facilities regularly monitor radionuclide content in local agricultural products, wild-growing foods (berries, mushrooms, etc.) and fodder growing in radiation control areas, as well as in fish and other aquatic organisms living in cooling ponds (for NPPs). The specific activity of dose-forming radionuclides is monitored in food products. Regional offices of the Russian Federal Biomedical Agency (FMBA) conduct independent radiation monitoring of the environment and locally produced food; radiation monitoring of abiotic components of the environment is carried out by the Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet).

GRI 103-3

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.

GRI 304-3

All organisations in the nuclear industry take measures to prevent the degradation of natural ecosystems as a result of their operations. 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 diverters on power lines;
- Maintaining fences along the perimeter of industrial sites in good condition, including in order to prevent animals from entering the premises;
- 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;
- Measures to protect the atmosphere;
- 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 to ensure that industrial sites comply with fire safety requirements;
- Measures to provide protection against noise exposure (using equipment that is less noisy; more effective soundproofing, etc.);
- Lighting of industrial sites at night.

In 2020, ROSATOM's organisations took steps to replenish aquatic wildlife:

- Silver carp were released into the cooling pond of Balakovo NPP (a total of 12.4 tonnes);
- 269,000 juvenile bighead carp were released into the Beloyarsk Reservoir at Beloyarsk NPP;
- The cooling lakes of Kalinin NPP (Pesvo Lake and Udomlya Lake) were stocked with black carp bred during the year (a total of 1,082 kg);
- 8 tonnes of juvenile bighead carp were released into the cooling pond of Novovoronezh NPP for the purposes of biological restoration;
- 239,004 juvenile grass carp and 693,563 juvenile European carp were released into the Tsimlyansk Reservoir at Rostov NPP.

5.3.9. Rehabilitation of disturbed areas

As at the end of the reporting year, the area of land disturbed by ROSATOM's organisations totalled 6,600 ha.

Breakdown by type of operations that caused land disturbance in 2020, '000 ha

Mining	3.5
Construction	2.2
Disposal of industrial waste (including construction waste) and solid household waste	0.8
Survey work	0.0038
Other operations	0.0969

GRI 103-2

In 2020, ROSATOM's organisations implemented a set of measures to restore the productivity and economic value of disturbed land and improve the environment. In the reporting year, the area of rehabilitated (restored) land totalled 37.05 ha. No land was reclaimed for forest plantations, and no reforestation activities were carried out by the Corporation's organisations.

Land rehabilitation in ROSATOM's organisations, ha

Organisation	2018	2019	2020
JSC Lunnoye	0.20	10.76	0.00
PJSC ZIO-Podolsk	0.06	0.07	0.04
JSC Siberian Chemical Plant	4.80	11.30	32.9
FSUE Integrated Plant Elektrokhimpribor	0.04	1.63	2.69
FSUE Russian Federal Nuclear Centre – Academician E.I. Zababakhin All-Russia Research Institute of Technical Physics (RFNC VNIITF)	4.34	0.00	0.00
FSUE RFNC VNIIEF	0.10	5.00	1.30
FSUE PA Sever	0.03	0.00	0.00
Vilyuchinsk Division of FEC DalRAO (branch of FSUE FEO)	0.00	0.76	0.00
FSUE Mayak Production Association	0.00	0.00	0.12
Total	**9.57**	**29.52**	**37.05**

The increase in the area of restored land was due to the completion of mothballing of nuclear legacy facilities at JSC Siberian Chemical Plant.

5.3.10. Emissions and discharges of radionuclides

Emissions of radionuclides

In 2020, radiation burden on the environment was almost unchanged compared to the previous year. The total activity of radionuclides released into the atmosphere by ROSATOM's organisations amounted to $4.91 \cdot 10^{16}$ Bq.

Beta-emitting radionuclides accounted for 98.97% of the total activity ($4.86 \cdot 10^{16}$ Bq).

Permitted and actual emissions of radionuclides by nuclear organisations in 2020

Radionuclide type	Permitted emission, Bq	Actual emission, Bq	Percentage of the permitted level
Alpha-emitting	$3.04 \cdot 10^{15}$	$5.05 \cdot 10^{14}$	16.61
Beta-emitting	$2.92 \cdot 10^{21}$	$4.86 \cdot 10^{16}$	0.002

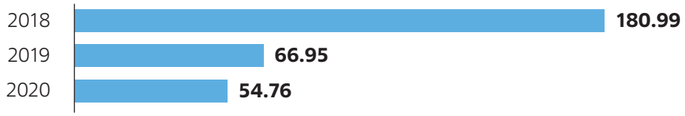
In 2020, radionuclide emissions did not exceed permitted levels.

Discharges of radionuclides

ROSATOM's organisations discharged 54.76 million m^3 of wastewater with a total activity of $4.37 \cdot 10^{13}$ Bq into the open drainage system.

Compared to 2019, wastewater discharges decreased by 18.22%, while the total activity increased by 4.74%.

Volume of wastewater contaminated with radionuclides, million m^3



Total activity of radionuclides discharged into the open drainage system, Bq

Permitted and actual discharge of radionuclides by nuclear organisations in 2020

Radionuclide type	Permitted discharge, Bq	Actual discharge, Bq	Percentage of the permitted level
Alpha-emitting	$1.76 \cdot 10^{11}$	$2.04 \cdot 10^{10}$	11.63
Beta-emitting	$5.32 \cdot 10^{15}$	$4.37 \cdot 10^{13}$	0.82

In 2020, discharges of radionuclides did not exceed permitted levels.

Contaminated sites and their remediation

At year-end 2020, there were radionuclide-contaminated sites in 18 organisations in the industry. The area of contaminated sites totalled 112.28 km^2, including:

- 24.70 km^2 at industrial sites;
- 87.07 km^2 in buffer areas;
- 0.51 km^2 in radiation control areas.

Radioactive contamination is caused mainly by caesium-137 and strontium-90, as well as natural uranium and products of its decay. About 77% (86.33 km^2) of radionuclide-contaminated sites are located around FSUE Mayak Production Association (they were contaminated as a result of an accident in 1957).

GRI 103-1

The area of contaminated sites remediated over the past five years totals 1.33E-2 km2; in 2020, no site remediation was carried out in the industry.

5.3.11. Radiation impact on the population and the environment

According to the findings of radiation and hygienic certification in the Russian Federation[99], additional radiation exposure of the population at the locations of nuclear organisations associated with their day-to-day operation on average did not exceed 1.2% per person of the basic dose limits for the population 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 (7.9% of the basic dose limits for the population; FSUE Mayak Production Association). This is more than three times lower than the medical radiation exposure of the population in the Chelyabinsk Region; the situation is identical to the one recorded in 2018.

According to the Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor)[100], the key factors behind radiation exposure of the population are natural and medical sources of ionising radiation. The average contribution of natural sources of ionising radiation to the total radiation exposure of local residents across Russia stands at 84.9%, while medical sources account for 14.9%. The contribution of organisations using nuclear technology is estimated at a fraction of a percent (0.05%). Over many years, this has been the case in all regions where large facilities posing radiation hazards are situated.

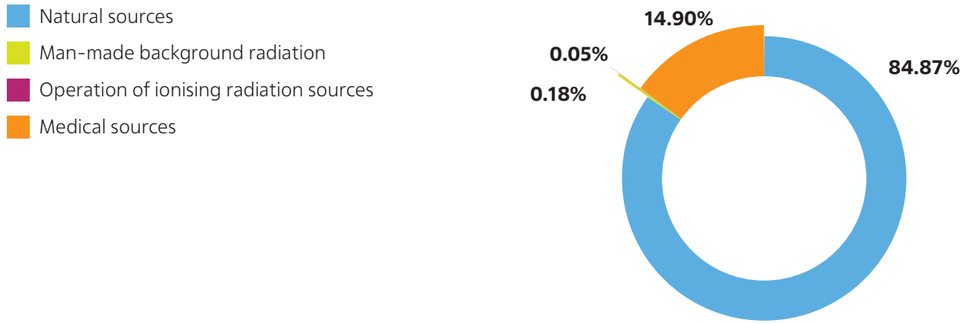
Between 2001 and 2017, average total radiation exposure of local residents from all natural radiation sources across the Russian Federation stood at 3.34 mSv/year per resident.

The factors behind radiation exposure of local residents and the environment from nuclear power plants include emissions of radioactive substances from NPPs into the atmosphere. The radiation impact of emissions of radioactive substances on the population and the environment is regulated by statutory limits for NPPs established by Rostekhnadzor in Q4 2018. 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.

[99] The findings of radiation and hygienic certification of organisations and areas were presented by the State Research Centre Burnasyan Federal Medical Biophysical Centre of the FMBA of Russia for 2019.

[100] State Report on the Status of Sanitary and Epidemiological Well-Being of the Population in the Russian Federation in 2019, Moscow, Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing, 2020. – 299 pages.
The findings of radiation and hygienic certification of organisations and areas in 2019 will be published by Rospotrebnadzor in the summer of 2020.

Key sources of radiation exposure of the population



In 2020, 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:

- 33% of the permitted amount for inert radioactive gases;
- 7% of the permitted amount for carbon-14;
- 1% of the permitted amount for tritium.

Emissions of inert radioactive gases from NPPs by type of reactors, % of the permitted amount

Contribution of NPPs to background radiation measured by ROSATOM

The gamma radiation dose rate is continuously monitored in buffer and radiation control areas around nuclear power plants.

The analysis of field data on the gamma radiation dose rate shows that gamma radiation doses in buffer and radiation control areas of all NPPs are within the limits of natural background radiation which was formed before the start-up of the nuclear power plants and match the readings at monitoring stations. This indicates that nuclear power plants produce no radioactive contamination in the monitored areas.

The findings of regular measurement of the content of radioactive substances in the natural environment in the locations of NPPs show that NPPs have no detectable impact on local residents or the environment.

The contribution of NPP operations to radiation exposure of the population living in the areas where NPPs are located does not exceed the minimum significant dose of 10 μSv/year; the level of radiation risk for local residents is entirely acceptable.

5.3.12. Plans for 2021 and for the medium term

- To maintain fixed asset investment related to environmental protection at the current level.
- To continue to pursue the policy of sustainable use of natural resources and implement a number of measures to reduce the discharge of contaminated wastewater.
- To further reduce hazardous waste generation.

With regard to greenhouse gas emissions, between 2021 and 2023, ROSATOM plans to compile an inventory of sources of greenhouse gas emissions; the inventory will serve as a basis for a quantitative assessment of total greenhouse gas emissions across ROSATOM's organisations.

With regard to the use of ozone-depleting substances by the Corporation's organisations, ROSATOM plans to gradually replace industrial and household refrigeration appliances and air conditioners with modern ozone-friendly equipment.

5.4 Key Projects in the Field of Nuclear and Radiation Safety and Environmental Protection

As part of its efforts to implement the Basic Principles of Government Policy on Nuclear and Radiation Safety in the Russian Federation until 2025 and beyond, ROSATOM:

- Carried out an analysis of laws and regulations of the Russian Federation in terms of their alignment with international requirements and legislative requirements of the Russian Federation for radiation safety;
- Developed and approved the Uniform Industry-Wide Guidelines on the Monitoring of Individual Radiation Risks for the Personnel of ROSATOM's Organisations, which set out requirements for calculating individual radiation risks for the personnel and assessing the associated measurement uncertainty; forming groups of employees who require radiation risk monitoring; procedures for monitoring and benchmarking individual radiation risks against the established acceptable levels.

Since 2020, PJSC Machinery Manufacturing Plant has been operating a system for collecting, treating and preparing industrial wastewater and storm water runoff, which helped to reuse industrial wastewater and storm water runoff collected on the organisation's premises in the process water supply system. This measure made it possible to:

- Completely cease the use of river water;
- Prevent the discharge of pollutants into the open drainage system from six outlets of the storm water runoff drainage system;
- Reduce total wastewater discharges by 59%.

In the reporting year, ROSATOM organised and carried out compliance audits and/or recertification audits of the environmental management systems of operational nuclear power plants and the central headquarters of JSC Rosenergoatom.

PJSC PIMCU started to use mining equipment (load-haul-dump machines) powered by lithium-ion batteries in uranium mining processes; unlike vehicles with internal combustion engines, these machines do not produce any pollutant emissions. Seven machines were put into operation between 2019 and 2021, with eight more machines to be put into operation in 2021.

Appendices

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 2021 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 lead to the conclusion 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 point to the need for more detailed disclosure of information on individual indicators. 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 A.P. Ivanova

Member of the audit team A.V. Romanova

GRI Index

No.	Indicator	Section	Comments
		GRI 101: Foundation (2016)	
GRI 102: General Disclosures (2016)		**Organisational profile**	
	102-1 Name of the organisation	Chapter 'Strategic Report', section 'About ROSATOM', p. 16	
	102-2 Activities, brands, products, and services	Chapter 'Strategic Report', section 'Markets Served by ROSATOM', p. 44 Chapter 'Business Development Report', section 'Business Diversification', p. 223	
	102-3 Location of headquarters	Appendix: Contact Details and Useful Links, p. 442	
	102-4 Location of operations	Chapter 'Business Development Report', section 'Business Diversification', p. 223	
	102-5 Ownership and legal form	Chapter 'Strategic Report', section 'About ROSATOM', p. 16	
	102-6 Markets served	Chapter 'Strategic Report', section 'Markets Served by ROSATOM', p. 44 Chapter 'Business Development Report', section 'Business Diversification', p. 223	
	102-7 Scale of the organisation	Chapter 'Strategic Report', section 'Key Results in 2020', p. 26 Chapter 'Social Report', section 'HR Policy', p. 270	
	102-8 Information on employees and other workers	Chapter 'Social Report', section 'HR Policy', p. 270	
	102-9 Supply chain	Chapter 'Strategic Report', section 'Markets Served by ROSATOM', p. 44	
	102-10 Significant changes to the organisation and its supply chain	Chapter 'Strategic Report', section 'Corporate Governance', p. 149	
	102-11 Precautionary Principle or approach[101]	Chapter 'Social Report', section 'Occupational Safety and Health; Human Rights', p. 285	

[101] Additional information on the use of the precautionary principle is provided in the Unified Industry Policy on Sustainable Development available at https://rosatom.ru/upload/iblock/a42/a42fc-60d74177edf55f9e4ec64618da3.pdf.

No.	Indicator	Section	Comments
	102-12 External initiatives	Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, p. 33 Chapter ‘Social Report’, section ‘Occupational Safety and Health; Human Rights’, p. 285	
	102-13 Membership of associations	Chapter ‘Strategic Report’, section ‘International Cooperation’, p. 62 Chapter ‘Social Report’, section ‘Corporate Volunteering’, p. 308	
		Strategy	
	102-14 Statement from senior decision-maker	Statement of the Chairman of the Supervisory Board, p. 20 Statement of the Director General, p. 24 Statement by Kirill Komarov, p. 218 Statement by Tatyana Terentyeva, p. 260 Statement by Andrey Polosin, p. 314 Statement by Sergey Adamchik, p. 368	
	102-15 Key impacts, risks, and opportunities	Chapter ‘Strategic Report’, sections: ‘Development Strategy’, p. 32 ‘Risk Management’, p. 152 Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 406	
		Ethics and integrity	
	102-16 Values, principles, standards, and norms of behaviour	Chapter ‘Social Report’, section ‘HR Policy’, p. 269	
	102-17 Mechanisms for advice and concerns about ethics	Chapter ‘Strategic Report’, section ‘Prevention of Corruption and Other Offences’, p. 171	
		Governance	
	102-18 Governance structure	Chapter ‘Strategic Report’, section ‘Corporate Governance’, p. 143	
	102-23 Chair of the highest governance body	Chapter ‘Strategic Report’, section ‘Corporate Governance’, p. 143	
	102-26 Role of highest governance body in setting purpose, values, and strategy	Chapter ‘Strategic Report’, section ‘Corporate Governance’, p. 143	
	102-35 Remuneration policies	Chapter ‘Strategic Report’, section ‘Corporate Governance’, p. 143	
		Stakeholder engagement	
	102-40 List of stakeholder groups	Chapter ‘Strategic Report’, section ‘Strategic Communications’, p. 197	
	102-41 Collective bargaining agreements	Chapter ‘Social Report’, section ‘Social Policy’, p. 301	
	102-42 Identifying and selecting stakeholders	Chapter ‘Strategic Report’, section ‘Strategic Communications’, p. 196	
	102-43 Approach to stakeholder engagement	Chapter ‘Strategic Report’, section ‘Strategic Communications’, p. 197 Chapter ‘Report on the Development of Nuclear Towns and Cities’, section ‘Work of ROSATOM’s Public Council and Community Relations’, p. 359	
	102-44 Key topics and concerns raised	Chapter ‘Strategic Report’, section ‘Strategic Communications’, pp. 197, 207	
		Report profile	
	102-45 Entities included in the consolidated financial statements	Chapter ‘Strategic Report’, section ‘Report Profile’, p. 9	
	102-46 Defining report content and topic Boundaries	Chapter ‘Strategic Report’, section ‘Report Profile’, p. 9	
	102-47 List of material topics	Chapter ‘Strategic Report’, section ‘Report Profile’, p. 10	
	102-48 Restatements of information	Chapter ‘Strategic Report’, section ‘Report Profile’, p. 10	
	102-49 Changes in the list of material topics and topic Boundaries	Chapter ‘Strategic Report’, section ‘Report Profile’	Changes in the list and number of material topics covered in the 2020 Report was due to an increase in the number of stakeholders involved in the dialogue. ROSATOM held an online foresight dialogue on materiality in order to identify material topics to be disclosed in the 2020 Report; as part of the dialogue, 39 material topics were selected (the 2019 Report covered 35 material topics).
	102-50 Reporting period	Chapter ‘Strategic Report’, section ‘Report Profile’, p. 9	
	102-51 Date of most recent report	Chapter ‘Strategic Report’, section ‘Report Profile’, p. 9	ROSATOM’s Report for 2019 was published in September 2020.
	102-52 Reporting cycle	Chapter ‘Strategic Report’, section ‘Report Profile’, p. 9	
	102-53 Contact point for questions regarding the report	Appendix: Contact Details and Useful Links, p. 442	

No.	Indicator	Section	Comments
	102-54 Claims of reporting in accordance with the GRI Standards	Chapter ‘Strategic Report’, section ‘Report Profile’, p. 8	
	102-55 GRI content index	Appendix: GRI Content Index, p. 425	
	102-56 External assurance	Chapter ‘Strategic Report’, section ‘Strategic Communications’, p. 212	The statement of public assurance is available on the website at report.rosatom.ru.
	Management approach		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, pp. 32–33 Chapter ‘Social Report’, section ‘Statement by Tatyana Terentyeva’, pp. 260–261 Appendix: Sustainability Report, section ‘Statement of the Director General’, pp. 2–3	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, pp. 34–35 Chapter ‘Social Report’, section ‘Statement by Tatyana Terentyeva’, pp. 260–261	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, pp. 34–35 Chapter ‘Social Report’, section ‘Statement by Tatyana Terentyeva’, pp. 260–261	
	Material topics		
	1. Implementation of ROSATOM’s strategy		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Development Strategy’, p. 30	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Development Strategy’, p. 32	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Development Strategy’, p. 32, Chapter ‘Strategic Report’, section ‘Resource Management’, p. 150–153	
	2. Nuclear and radiation safety		
GRI 416: Customer Health and Safety (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Safety Report’, section ‘Nuclear and Radiation Safety’, p. 371	
	103-2 The management approach and its components	Chapter ‘Safety Report’, section ‘Nuclear and Radiation Safety’, p. 371	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Nuclear and Radiation Safety’, p. 371 Chapter ‘Safety Report’, section ‘Statement by Sergey Adamchik’, p. 368	
	416-2 Incidents of non-compliance concerning the health and safety impacts of products and services	There were no incidents of non-compliance concerning the impacts of products and services on customer health and safety. P. 428	
	3. Prospects for the development of the nuclear power industry		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, p. 34	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, p. 35	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, p. 35	
	5. Development of the Northern Sea Route		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Development of the Northern Sea Route’, p. 84	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Development of the Northern Sea Route’, p. 84	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Development of the Northern Sea Route’, p. 86, Chapter ‘Strategic Report’, section ‘Resource Management’, Chapter ‘Strategic Report’, section ‘Statement of the Director General’, p. 86	
	6. Emergency preparedness		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Safety Report’, section ‘Nuclear and Radiation Safety’, p. 371	
	103-2 The management approach and its components	Chapter ‘Safety Report’, section ‘Nuclear and Radiation Safety’, p. 371	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Nuclear and Radiation Safety’, p. 372, Chapter ‘Safety Report’, section ‘Statement by Sergey Adamchik’, p. 368, Chapter ‘Strategic Report’, section ‘Resource Management’, pp. 150–152, 157	

No.	Indicator	Section	Comments
		8. Performance of government functions	
GRI 415: Public Policy (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Performance of Government Functions’, p. 72	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Performance of Government Functions’, p. 72	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Performance of Government Functions’, pp. 130, 133, 135, 138, 141	
	415-1 Political contributions	ROSATOM does not make any political contributions.	
		9. Performance of the Nuclear Weapons Division	
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Performance of Government Functions’, p. 72	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Performance of Government Functions’, p. 72	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Resource Management’, pp. 166–170	
		11. Corporate governance	
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Corporate Governance’, p. 142	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Corporate Governance’, p. 142	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Corporate Governance’, p. 144, Evaluation of the management approach in the sphere of corporate governance (including compliance with the provisions of the Corporate Governance Code recommended by the Bank of Russia) is carried out only within the scope of business of JSC Atomenergoprom, see the Annual Report of JSC Atomenergoprom for 2020, p. 77	
		12. Development of international business and international cooperation	
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Business Development Report’, section ‘Statement by Kirill Komarov’, p. 218, Chapter ‘Business Development Report’, section ‘Business Diversification’, p. 222	
	103-2 The management approach and its components	Chapter ‘Business Development Report’, section ‘Business Diversification’, pp. 222, 223	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘International Cooperation’, p. 61	
		13. Traditional and new markets	
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Markets Served by ROSATOM’, p. 44	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Development Strategy’, pp. 30–33, Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, pp. 35–38, Chapter ‘Strategic Report’, section ‘Markets Served by ROSATOM’, p. 44	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Markets Served by ROSATOM’, p. 44	
		14. Financial and economic performance	
GRI 201: Economic Performance (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Financial and Investment Management’, p. 177, Chapter ‘Strategic Report’, section ‘Statement of the Director General’, p. 24, Chapter ‘Business Development Report’, section ‘Statement by Kirill Komarov’, p. 218, Chapter ‘Statement of the Chairman of the Supervisory Board’	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Financial and Investment Management’, p. 179	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Financial and Investment Management’, p. 178, Chapter ‘Strategic Report’, section ‘Internal Control System’, pp. 166–170, Report of the Internal Audit Department of State Atomic Energy Corporation Rosatom, p. 424 Chapter ‘Strategic Report’, section ‘Resource Management’, pp. 177–195	
	201-4 Financial assistance received from government	Chapter ‘Strategic Report’, sections: ‘Financial and Investment Management’, ‘Procurement Management’, p. 179	
		15. Innovation and scientific and technological advancement	
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Statement of the Director General’, p. 24, Chapter ‘Business Development Report’, section ‘Statement by Kirill Komarov’, p. 218, Chapter ‘Statement of the Chairman of the Supervisory Board’	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Research and Innovations’, pp. 114–122, Chapter ‘Strategic Report’, section ‘Resource Management’, p. 177	

No.	Indicator	Section	Comments
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Research and Innovations’, p. 116, Chapter ‘Strategic Report’, section ‘Resource Management’, pp. 184–185	
		16. Business diversification	
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Business Development Report’, section ‘Statement by Kirill Komarov’, p. 218, Chapter ‘Business Development Report’, section ‘Business Diversification’, p. 222	
	103-2 The management approach and its components	Chapter ‘Business Development Report’, section ‘Business Diversification’, p. 222	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Internal Control System’, pp. 166–170, Chapter ‘Business Development Report’, section ‘Business Diversification’, p. 222	
		17. Business risks and opportunities	
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Risk Management’, p. 150	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Risk Management’, p. 150	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Risk Management’, p. 153	
		19. Performance of ROSATOM’s Divisions	
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Performance of Divisions’, pp. 130, 133, 135, 138, 141	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Performance of Divisions’, pp. 130, 133, 135, 138, 141	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Performance of Divisions’, pp. 130, 133, 135, 138, 141	
		20. Combating corruption	
GRI 205: Anti-Corruption (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Prevention of Corruption and Other Offences’, p. 171	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Prevention of Corruption and Other Offences’, p. 171	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Prevention of Corruption and Other Offences’, p. 171	
	205-2 Communication and training about anti-corruption policies and procedures	Chapter ‘Strategic Report’, section ‘Prevention of Corruption and Other Offences’, p. 175	No detailed records with a breakdown by category or gender are kept. All employees and partners of ROSATOM can obtain information on anti-corruption measures (including the relevant regulations) on the official website (http://rosatom.ru/about/protivodeystvie-korruptsii).
		21. Procurement and supply chain management	
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Procurement Management’, p. 185	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Procurement Management’, p. 188	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Procurement Management’, p. 188	
		24. Social and economic impact on the regions of operation (including CATFs) and local communities	
GRI 203: Indirect Economic Impacts (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Report on the Development of Nuclear Towns and Cities’, section ‘Work of ROSATOM’s Public Council and Community Relations’, p. 359	
	103-2 The management approach and its components	Chapter ‘Report on the Development of Nuclear Towns and Cities’, section ‘Contribution to the Economy’, p. 335	
	103-3 Evaluation of the management approach	Chapter ‘Report on the Development of Nuclear Towns and Cities’, section ‘Work of ROSATOM’s Public Council and Community Relations’, pp. 359–364 Chapter ‘Report on the Development of Nuclear Towns and Cities’, section ‘Response to the Pandemic: Supporting Urban Residents’, pp. 320–321	
	203-2 Significant indirect economic impacts	Chapter ‘Report on the Development of Nuclear Towns and Cities’, section ‘Contribution to the Economy’, p. 337	

No.	Indicator	Section	Comments
GRI 413: Local Communities (2016)	103-1 Explanation of the material topic and its Boundary	Chapter 'Report on the Development of Nuclear Towns and Cities', sections: 'Development Priorities', p. 321 'Work of ROSATOM's Public Council and Community Relations', p. 359	
	103-2 The management approach and its components	Chapter 'Report on the Development of Nuclear Towns and Cities', section 'Work of ROSATOM's Public Council and Community Relations', p. 359	
	103-3 Evaluation of the management approach	Chapter 'Report on the Development of Nuclear Towns and Cities', section 'Work of ROSATOM's Public Council and Community Relations', pp. 359–364	
	413-1 Operations with local community engagement, impact assessments, and development programmes	Chapter 'Report on the Development of Nuclear Towns and Cities', section 'Work of ROSATOM's Public Council and Community Relations', p. 360	
	413-2 Operations with significant actual and potential negative impacts on local communities	Chapter 'Report on the Development of Nuclear Towns and Cities', section 'Work of ROSATOM's Public Council and Community Relations', p. 361	
	25. Provision of access to energy		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter 'Strategic Report', section 'Markets Served by ROSATOM', p. 44, Chapter 'Business Development Report', section 'International Business Development', p. 232, Chapter 'Strategic Report', section 'Statement of the Director General', p. 24	
	103-2 The management approach and its components	Chapter 'Strategic Report', section 'Performance of Divisions', pp. 137, 140, Reporting materials of Rosenergoatom, Chapter 'Business Development Report', section 'International Business Development', p. 233	
	103-3 Evaluation of the management approach	Chapter 'Strategic Report', section 'Resource Management', pp. 166–170, Chapter 'Strategic Report', section 'Resource Management', pp. 150, 156	
	26. Occupational health and safety		
GRI 403: Occupational Health and Safety (2018)	103-1 Explanation of the material topic and its Boundary	Chapter 'Social Report', section 'Occupational Safety and Health; Human Rights', p. 285	
	103-2 The management approach and its components	Chapter 'Social Report', section 'Occupational Safety and Health; Human Rights', p. 285	
	103-3 Evaluation of the management approach	Chapter 'Social Report', section 'Occupational Safety and Health; Human Rights', p. 286	
	403-1 Occupational health and safety management system	Chapter 'Social Report', section 'Occupational Safety and Health; Human Rights', p. 286	
	403-2 Hazard identification, risk assessment, and incident investigation	Chapter 'Social Report', section 'Occupational Safety and Health; Human Rights', p. 287	
	403-3 Occupational health services that contribute to the identification and elimination of hazards and minimisation of risks	Chapter 'Social Report', section 'Social Policy', p. 299	
	403-4 Worker participation, consultation, and communication on occupational health and safety	Chapter 'Social Report', section 'Occupational Safety and Health; Human Rights', p. 287	
	403-5 Worker training on occupational health and safety	Chapter 'Social Report', section 'HR Policy', p. 276	
	403-6 Promotion of worker health	Chapter 'Social Report', section 'Social Policy', p. 299	
	403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	Chapter 'Social Report', section 'Occupational Safety and Health; Human Rights', p. 293	
	403-9 Work-related injuries	Injury rates have not been calculated for contractor organisations, as no records of hours worked by contractors are kept.	Injury rates have not been calculated for contractor organisations, as no records of hours worked by contractors are kept.
	403-10 Work-related ill health	Chapter 'Social Report', section 'Occupational Safety and Health; Human Rights', p. 288 Chapter 'Safety Report', section 'Nuclear and Radiation Safety', p. 383	No data are collected and no records are kept on occupational diseases of employees in contractor organisations. No records are kept on the number of fatalities as a result of work-related ill health.
	27. Cooperation with universities and recruitment of young professionals		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter 'Social Report', section 'Statement by Tatyana Terentyeva', p. 260, Chapter 'Strategic Report', section 'Research and Innovations', p. 123	

No.	Indicator	Section	Comments
	103-2 The management approach and its components	Chapter ‘Social Report’, section ‘Employee Training’, p. 274, Chapter ‘Social Report’, section ‘Social Policy’, p. 301	
	103-3 Evaluation of the management approach	Pp. 296–297	
	28. Personnel management, social policy and corporate culture 46. Personnel management, planning, training, retraining and knowledge transfer. Mentoring 47. Personnel education		
GRI 401: Employment (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Social Report’, section ‘HR Policy’, p. 275	
	103-2 The management approach and its components	Chapter ‘Social Report’, section ‘HR Policy’, p. 269	
	103-3 Evaluation of the management approach	Chapter ‘Social Report’, section ‘Social Policy’, pp. 296-297	
	401-2 Benefits provided to full-time employees	Chapter ‘Social Report’, section ‘Social Policy’, p. 298	
GRI 402 Labour/ Management Relations (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Social Report’, section ‘HR Policy’, p. 269	
	103-2 The management approach and its components	Chapter ‘Social Report’, section ‘HR Policy’, p. 269	
	103-3 Evaluation of the management approach	Chapter ‘Social Report’, section ‘Social Policy’, pp. 296–297	
	402-1 Minimum notice periods regarding significant operational changes		The Corporation fully complies with the requirements of the law concerning the minimum notice periods regarding significant changes. The minimum notice period for significant operational changes is consistent with the time frame stipulated in the Labour Code of the Russian Federation.
GRI 404 Training and Education (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Social Report’, section ‘Employee Training’, p. 274, Chapter ‘Social Report’, section ‘Statement by Tatyana Terentyeva’, p. 260	
	103-2 The management approach and its components	Chapter ‘Social Report’, section ‘HR Policy’, pp. 269, 275	
	103-3 Evaluation of the management approach	Chapter ‘Social Report’, section ‘Social Policy’, pp. 296–297	
	404-1 Average hours of training per year per employee by gender and employee category	Chapter ‘Social Report’, section ‘HR Policy’, p. 275	ROSATOM keeps no records of average hours of training per employee by gender. No breakdown by gender or employee category is provided.
	404-2 Programmes for upgrading employee skills and transition assistance programmes	Chapter ‘Social Report’, section ‘HR Policy’, p. 275	
	29. Work of ROSATOM’s Public Council		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Report on the Development of Nuclear Towns and Cities’, section ‘Work of ROSATOM’s Public Council and Community Relations’, p. 359	
	103-2 The management approach and its components	Chapter ‘Report on the Development of Nuclear Towns and Cities’, section ‘Work of ROSATOM’s Public Council and Community Relations’, p. 359	
	103-3 Evaluation of the management approach	Chapter ‘Report on the Development of Nuclear Towns and Cities’, section ‘Work of ROSATOM’s Public Council and Community Relations’, p. 360	
	30. Respect and exercise of human rights		
GRI 406: Non-discrimination (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Social Report’, section ‘Occupational Safety and Health; Human Rights’, p. 285	
	103-2 The management approach and its components	Chapter ‘Social Report’, section ‘Occupational Safety and Health; Human Rights’, p. 285	
	103-3 Evaluation of the management approach	Chapter ‘Social Report’, section ‘Occupational Safety and Health; Human Rights’, p. 286	
	406-1 Incidents of discrimination and corrective actions taken	Chapter ‘Social Report’, section ‘Occupational Safety and Health; Human Rights’	No incidents of discrimination were recorded in 2020.
	34. Response to the pandemic (business continuity, personnel, external stakeholders) 43. Development of herd immunity against COVID-19		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Social Report’, section ‘Response to the Pandemic’, p. 265 Chapter ‘Report on the Development of Nuclear Towns and Cities’, section ‘Response to the Pandemic: Supporting Urban Residents’, p. 319	

No.	Indicator	Section	Comments
	103-2 The management approach and its components	Chapter ‘Social Report’, section ‘Response to the Pandemic’, p. 265	
	103-3 Evaluation of the management approach	Chapter ‘Social Report’, section ‘Response to the Pandemic’, p. 266	
	35. Radiation impact on the environment		
GRI 304: Biodiversity (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 398	
	103-2 The management approach and its components	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 399	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 399	
	304-3 Habitats protected or restored	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 416	
	36. Development of technologies reducing the environmental footprint		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 398	
	103-2 The management approach and its components	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 399	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 399	
	37. Environmental protection and environmental performance		
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 398	
	103-2 The management approach and its components	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 399	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 399	
	38. Emissions and discharges		
GRI 305: Emissions (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 406	
	103-2 The management approach and its components	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 406	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 399	
	305-6 Emissions of ozone-depleting substances	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 406	
	305-7 Nitrogen oxides (NO_x), sulphur oxides (SO_x), and other significant air emissions	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 406	
	39. Management of effluents and waste		
GRI 303: Water and Effluents (2018)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Safety Report’, section ‘Statement by Sergey Adamchik’, p. 368	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Markets Served by ROSATOM’, p. 60, Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 410	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 410	
	303-1 A description of how the organisation interacts with water, including how and where water is withdrawn, consumed, and discharged	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 410	
	303-2 Management of water discharge-related impacts	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 410	
	303-3 Water withdrawal	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 410	
	303-4 Water discharge	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 411	No breakdown into fresh-water and other water is provided (due to a lack of a centralised accounting system).
	303-5 Water consumption	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 411	
GRI 306: Water and Effluents (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 398	
	103-2 The management approach and its components	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 399	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 399	
	306-1 Water discharge by quality and destination	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 412	
	306-2 Waste by type and disposal method	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 414	
	306-3 Significant spills	There were no significant spills in the reporting period.	
	306-5 Water bodies affected by water discharges and/or runoff	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 411	

No.	Indicator	Section	Comments
		40. Compliance with environmental and technical standards	
GRI 307: Environmental Compliance (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Safety Report’, section ‘Statement by Sergey Adamchik’, p. 368	
	103-2 The management approach and its components	Chapter ‘Safety Report’, section ‘Environmental Safety’, pp. 398–399	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 403	
	307-1 Non-compliance with environmental laws and regulations	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 403	
		41. Energy efficiency	
GRI 302: Energy (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Business Development Report’, section ‘Energy Efficiency’, p. 242	
	103-2 The management approach and its components	Chapter ‘Business Development Report’, section ‘Energy Efficiency’, p. 242	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 399	
	302-4 Reduction of energy consumption	Chapter ‘Business Development Report’, section ‘Energy Efficiency’, p. 245	
		42. Management of disturbed and contaminated areas	
GRI 304: Biodiversity (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 415	
	103-2 The management approach and its components	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 415	
	103-3 Evaluation of the management approach	Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 415	
	304-3 Habitats protected or restored	Chapter ‘Safety Report’, section ‘Rehabilitation of Disturbed Areas’, p. 417	
		44. Volunteering	
GRI 103: Management Approach (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Social Report’, section ‘Corporate Volunteering’, p. 305	
	103-2 The management approach and its components	Chapter ‘Social Report’, section ‘Corporate Volunteering’, p. 305	
	103-3 Evaluation of the management approach	Chapter ‘Social Report’, section ‘Corporate Volunteering’, p. 309	
		45. Adaptation to climate change and greenhouse gas emissions	

No.	Indicator	Section	Comments
GRI 305: Emissions (2016)	103-1 Explanation of the material topic and its Boundary	Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, p. 34 Chapter ‘Business Development Report’, section ‘Energy Efficiency’, p. 242 Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 406	
	103-2 The management approach and its components	Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, p. 35, Chapter ‘Safety Report’, section ‘Environmental Safety’, p. 406	
	103-3 Evaluation of the management approach	Chapter ‘Strategic Report’, section ‘Sustainable Development Management’, p. 35	
	305-6 Emissions of ozone-depleting substances	Chapter ‘Safety Report’, section ‘Pollutant Emissions into the Atmosphere’, p. 405.	

Glossary, Abbreviations and Acronyms

Glossary

AA1000 Stakeholder Engagement Standard (AA1000SES)	A regulatory framework for designing, implementing, evaluating, communicating and assuring the quality of stakeholder engagement, including as part of reporting and accountability processes of organisations
Becquerel (Bq)	A unit of nuclide activity in a radiation source equal to nuclide activity where one nucleus decays per second
BOO (Build – Own – Operate) contract	A contract imposing obligations related to the construction, ownership and operation of a facility
Capacity factor	The ratio of actual electricity output of a reactor unit during its operation to electricity output that would have been produced during its operation at full nameplate capacity without shutdowns
Closed nuclear fuel cycle	A nuclear fuel cycle in which spent nuclear fuel is processed in order to extract uranium and plutonium for nuclear fuel refabrication
Corporate business model	A model comprising key business processes used by the organisation to create and maintain its value in the short, medium and long term
Corporate social responsibility	A concept whereby an organisation takes into account stakeholder needs. It is a set of obligations voluntarily assumed by the organisation's executives to take into account the interests of employees, shareholders, local communities in the organisation's regions of operation, government bodies and municipal governments and other stakeholders. These obligations are funded mainly from the organisation's own funds and are aimed at implementing significant internal and external social (in a broad sense) programmes whose outcomes help develop the organisation, improve its reputation and image, and enable constructive stakeholder engagement
Depleted uranium	Uranium with a lower content of the U-235 isotope than natural uranium (e.g. uranium in spent fuel from reactors fuelled with natural uranium)
Dialogue with stakeholders (as part of reporting processes)	An event held in accordance with the international AA1000 Series of Standards to facilitate communication between the organisation and representatives of key stakeholders when preparing and promoting its public reports
Digitisation	A systematic approach to the use of digital resources in order to improve labour productivity, gain a competitive advantage and promote overall economic development
Enrichment (isotopic)	a) The amount of atoms of a specific isotope in a mixture of isotopes of the same element if it exceeds the share of this isotope in a naturally occurring mixture (expressed as a percentage); b) a process resulting in an increase in the content of a specific isotope in a mixture of isotopes
EPC (Engineering – Procurement – Construction) contract	A contract imposing obligations related to the turnkey construction of a facility, i.e. obligations related to engineering, procurement and construction of a facility. Unlike a BOO contract, it does not provide for ownership of the facility to be built
EPCM (Engineering – Procurement – Construction – Management) contract	A contract imposing obligations related to the turnkey construction (engineering, procurement and construction) and management of a facility. Unlike a BOO contract, it does not provide for ownership of the facility to be built
ESG principles	Principles underlying an organisation's operations and taking into account environmental (E), social (S) and governance (G) factors. The term 'ESG' is widely used by the investment community; the ESG principles are essentially similar to sustainability principles
Fast neutrons	Neutrons whose kinetic energy exceeds a certain limit. This limit varies within a broad range and depends on the application (reactor physics, protection or radiation monitoring). In reactor physics, this limit is usually set at 0.1 MeV
First criticality	A stage in the commissioning of an NPP which involves loading nuclear fuel into the reactor, achieving first criticality and performing required physical experiments at a power level at which heat is removed from the reactor through natural heat losses
Fuel assembly	A set of fuel elements (rods, bars, plates, etc.) held together with spacer grids and other structural elements that are transported and irradiated in the reactor in one piece. Fuel assemblies are loaded into the reactor core
Global Reporting Initiative (GRI)	An international system for reporting on economic, environmental and social performance based on the Sustainability Reporting Standards
Global Reporting Initiative (GRI) Sustainability Reporting Standards	The Standards outline the Principles for defining report content and ensuring the appropriate quality of reporting information; disclosures comprising performance indicators related to an organisation's economic, environmental and social impacts, approaches to managing these impacts and other characteristics
Industry-wide emergency prevention and response system (IEPRS)	A functional subsystem for emergency prevention and response in organisations within the jurisdiction of ROSATOM
Integrated report	A report consolidating all material data on the organisation's strategy, corporate governance, performance indicators and prospects to present a comprehensive picture of its economic, social and environmental status. The report gives a clear idea of value creation in the organisation at present and in the future
International Integrated Reporting Council (IIRC)	An international organisation responsible for promoting and updating the International Integrated Reporting Framework. The objective of the IIRC is to develop universal approaches to corporate reporting in order to promote sustainable development of the global economy
International Standard on Assurance Engagements (ISAE) 3000 (Revised), Assurance Engagements Other Than Audits or Reviews of Historical Financial Information	An international standard for the audit of non-financial reports
Natural background radiation	Ionising radiation including cosmic radiation and ionising radiation from naturally distributed natural radionuclides (on the surface of the Earth, in the air, food, water, the human body, etc.)
Non-financial reporting	Reports provided by an organisation on its performance beyond its core operational and financial activities (and the management of this performance). Examples of non-financial reports include sustainability reports, corporate social responsibility reports, environmental reports, reports on philanthropy, etc.

NPP safety	The ability of an NPP to ensure radiation safety for personnel, the general public and the environment within required limits during normal operation and in the event of an accident
Nuclear fuel	Material containing fissionable nuclides which, after being placed in a nuclear reactor, enables a nuclear chain reaction
Nuclear fuel cycle (NFC)	A sequence of manufacturing processes aimed at ensuring the operation of nuclear reactors, ranging from uranium production to radioactive waste disposal
Nuclear power	A branch of power engineering that uses nuclear energy for electricity and heat generation
Nuclear safety	The ability of nuclear facilities to prevent nuclear accidents and radioactive leaks
Operator	An organisation that has obtained a permit from a regulator for the operation of an NPP or another nuclear facility
Pilot operation	A stage in the commissioning of a nuclear power plant from the power start-up to acceptance of the power plant for commercial operation
Power start-up	A stage in the commissioning of an NPP at which the NPP starts to generate energy, and the operation of the NPP is tested at various power levels, up to the level specified for commercial operation
Radiation burden	A sum of individual doses of radiation received or planned in the course of operation, maintenance, repairs, replacement or dismantling of equipment at a nuclear facility
Radiation monitoring	Measures for obtaining information on radiation levels in the organisation and in the environment and on human exposure to radiation (including dosimetry and radiometric monitoring)
Radiation safety	Protection of the current and future generations of people and the environment against the harmful impact of ionising radiation
Radioactive discharge	Controlled release of radionuclides into industrial reservoirs as a result of the operation of a nuclear facility
Radioactive release	Controlled atmospheric emission of radionuclides by a nuclear facility
Radioactive waste	Materials and substances unsuitable for further use, as well as equipment and products with radionuclide content above prescribed levels
Radioactive waste disposal	Safe placement of radioactive waste in repositories or any places that rules out waste withdrawal or a possibility of radioactive leaks into the environment
Radioactive waste processing and conditioning	Process operations aimed at ensuring that the physical form and condition of radioactive waste are appropriate for its disposal
Recommendations of the Russian Union of Industrialists and Entrepreneurs (RSPP) for Use in Governance Practice and Corporate Non-Financial Reporting (basic performance indicators)	A system of economic, social and environmental performance indicators for non-financial reports developed by the RSPP in order to facilitate the adoption of responsible business principles. It is based on a number of framework documents developed by UN organisations (including the UN Global Compact) and the Global Reporting Initiative, as well as methodological and procedural guidelines of the Federal State Statistics Service of the Russian Federation and guidelines developed by the RSPP (the Social Charter of Russian Business, Recommendations on the Preparation of Non-Financial Reports 'Five Steps Towards Social Sustainability of Companies', etc.)
Research reactor	A nuclear reactor designed for use as an object of research to obtain data on reactor physics and technology required in order to design and develop similar reactors or components thereof
Separative work unit (SWU)	A measure of efforts expended on the separation of a given amount of material with a specific isotopic composition into two fractions with different isotopic compositions; separative work is measured in kilograms, and enrichment and energy costs are calculated per kilogram of separative work performed
Spent nuclear fuel processing	A set of chemical engineering processes for removing fission products from spent nuclear fuel and for regeneration of fissionable material for reuse
Stakeholder assurance of the report	A procedure organised in accordance with the AA1000SES (2015) international standard whereby representatives of principal stakeholders provide assurance for the report by confirming the materiality and completeness of information disclosed in the report, and whereby the organisation responds to requests and proposals from stakeholders. The outcome of stakeholder assurance is a Statement of Public Assurance signed by representatives of principal stakeholders and included in the report
Stakeholders	Individuals and/or legal entities and groups of individuals or entities that make an impact on the organisation's operations through their actions and/or are affected by the organisation. An organisation may have different stakeholders (national and international regulatory (supervisory) authorities, shareholders, consumers of goods and services, business partners, suppliers and contractors, civil society organisations, local communities, trade unions, etc.) with differing and conflicting interests
Sustainable development	A process of economic and social change whereby the exploitation of natural resources, allocation of investments, the focus of scientific and technical development, personal development and institutional changes are aligned with each other and strengthen the present and future potential for meeting human needs and aspirations
Sustainable Development Goals	17 interdependent goals set in the 2030 Agenda for Sustainable Development adopted by 193 countries at the session of the UN General Assembly in 2015. The goals include eradicating poverty in all its forms, reducing inequality and addressing climate change
Uranium conversion	A chemical engineering process involving the transformation of uranium-containing materials into uranium hexafluoride
Uranium hexafluoride	A chemical compound of uranium and fluorine (UF6), which is the only highly volatile uranium compound (when heated to 53°C, uranium hexafluoride changes directly from the solid state into the gaseous state); it is used as feedstock for the separation of uranium-238 and uranium-235 isotopes using gaseous diffusion or the gas centrifuge method and for production of enriched uranium
Uranium ore enrichment	A combination of processes for primary treatment of uranium-containing mineral resources in order to separate uranium from other minerals contained in the ore
Water-cooled water-moderated power reactor (VVER)	A power reactor in which water is used as both a coolant and a moderator. Russian NPPs typically use two versions of VVER reactors: VVER-440 and VVER-1000

List of Abbreviations and Acronyms

APCS	Automated process control system
ARMS	Automated radiation monitoring system
CATF	Closed administrative and territorial formation
CHPP	Combined heat and power plant
DUHF	Depleted uranium hexafluoride
ESG	Environmental, social and corporate governance
ESP	Executive succession pool
FAIR	Facility for Antiproton and Ion Research
FMBA of Russia	Federal Biomedical Agency
FTP	Federal target programme
GRI	Global Reporting Initiative
HLW	High-level waste
IAEA	International Atomic Energy Agency
IARMS	Industry-Wide Automated Radiation Monitoring System
IGA	Intergovernmental agreement
IP	Intellectual property
IRAW	Individual risk assessment workstation
ITER	International Thermonuclear Experimental Reactor
KPI	Key performance indicator
LNG	Liquefied natural gas
LTIFR	Lost Time Injury Frequency Rate
NEIC	Nuclear Energy Information Centre
NFA	Nuclear fuel assembly
NFC	Nuclear fuel cycle
NFE	Nuclear fuel element
NPP	Nuclear power plant
NRS	Nuclear and radiation safety
NRTC	Nuclear Research and Technology Centre
NSR	Northern Sea Route
NWD	Nuclear Weapons Division
OECD NEA	Nuclear Energy Agency of the Organisation for Economic Cooperation and Development
PDEF	Pilot and demonstration energy facility
PSEDA	Priority social and economic development area
R&D	Research and development
RAW	Radioactive waste
RBMK	High-power channel-type reactor
RMS	Risk management system
RPS	ROSATOM Production System
SNF	Spent nuclear fuel
tHM	Tonnes of heavy metal
TPP	Thermal power plant
UN SDGs	UN Sustainable Development Goals
VVER	Water-cooled water-moderated power reactor
WPP	Wind power plant

GRI 102-53
GRI 102-3

Contact Details and Useful Links

State Atomic Energy Corporation Rosatom
Address: 24 Bolshaya Ordynka Street, Moscow, 119017
Multi-line telephone service: +7 (499) 949-45-35
Email: info@rosatom.ru

Contacts for the media

Andrey Cheremisinov, Director of the Communications Department
Tel.: +7 (499) 949-44-12, 949-46-34 (reception desk)
Email: press@rosatom.ru

Contacts for investors

Irina Danilova, Director for Treasury
Tel.: +7 (499) 949-29-79
Email: IIDanilova@rosatom.ru

Contacts for foreign customers and partners

Boris Arseev, Deputy Director of the Corporate Development and International Business Unit, Director of the International Business Department
Tel.: +7 (499) 949-28-21
Email: BoNiArseev@rosatom.ru

Contacts for cooperation in the development of new businesses

Dmitry Baydarov, Head of the New Business Support Department
Tel.: +7 (499) 949-47-88
Email: DYBaydarov@rosatom.ru

ROSATOM's anti-corruption hotline

Tel.: +7 (800) 100-07-07
Email: 0707@rosatom.ru

Official corporate website

http://www.rosatom.ru/

Official reporting portal

https://www.report.rosatom.ru

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 blog on Twitter

https://twitter.com/rosatom

Official community page on Facebook

https://www.facebook.com/rosatom.ru/

Official channel on YouTube

http://www.youtube.com/user/MirnyAtom