Dear colleagues,

ROSATOM is a diversified corporation owning assets and possessing expertise 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.

The Corporation comprises over 300 enterprises and organizations, including research institutes and the world's only nuclear-powered icebreaker fleet.

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, etc.). ROSATOM carries out numerous large-scale international projects abroad and generates substantial overseas revenue.

ROSATOM is also developing new businesses outside its core production and process chain (power generation at large NPPs). These include projects in the sphere of nuclear medicine, wind power, composite materials, additive manufacturing, lasers, robotics, supercomputers, etc.

I would like to emphasize that the nuclear industry makes an important contribution to sustainable development of society as it provides the world with clean and affordable energy, helps to preserve the environment and opens up new opportunities, while innovative products based on nuclear technology improve the quality of people's lives. Multilateral cooperation and partnership on the national and global levels are indispensable for making real progress in this area. It is only together, by joining forces and combining capabilities that we will be able to contribute to achieving the UN Sustainable Development Goals.

Director General of ROSATOM
Alexey Likhachev
ROSATOM has an extensive mineral resource base both in Russia and abroad, ranking second among major uranium mining companies globally.

In-house uranium production in Russia enables the Corporation to guarantee reliable supplies to customers, to secure long-term resources for nuclear power generation and maintain a competitive cost of production.

Atomredmetzoloto JSC is the holding company of ROSATOM’s Mining Division. It consolidates uranium mining assets in Russia. The company’s unique capabilities enable it to perform the full range of industrial operations, from geological exploration to natural uranium mining and processing.

ROSATOM’s foreign uranium mining assets are managed by Uranium One, which is one of the world’s largest uranium mining companies holding a diversified portfolio of assets in Kazakhstan, the US, Tanzania and other countries.

Uranium is enriched by the enterprises of ROSATOM’s Fuel Company, TVEL JSC, using modern gas centrifuge technology, which is currently the most efficient uranium enrichment method.

TENEX JSC is the industry leader promoting uranium conversion and enrichment services and enriched uranium for power and research reactors on the global market. It supplies energy companies operating foreign-design NPPs in Europe, the US, Asia and Africa and satisfies a significant share of demand for uranium enrichment services for foreign-design reactors. TVEL JSC produces and supplies fuel and components for various types of reactors. The company is a leader on the Russian-design NPP market and supplies fuel for one in every six power reactors in the world. The Fuel Division produces and supplies TVS-KVADRAT fuel for Western-design light-water reactors.
ROSATOM is a leader on the global NPP construction market. Over the past 13 years, it has completed the construction of 14 power units both in Russia and abroad.

Currently, five power units in Russia (including a unique floating power unit, Akademik Lomonosov) are at the active stage of construction, while the Corporation's portfolio of foreign projects comprises 36 power units in 12 countries worldwide.

ROSATOM builds modern, safe and reliable NPPs equipped with VVER Generation 3+ reactors meeting all international standards and requirements. The Corporation provides its customers with a unique integrated offer that includes not only NPP design and construction but also a range of services covering its life cycle and supporting the national nuclear programme of the customer country.

ROSATOM is also using a unique BOO ('Build – Own – Operate') model for the construction of Akkuyu NPP in Turkey. BOO projects are managed by Rusatom Energy International JSC.

NPP design and construction services are provided by ROSATOM’s Engineering Division (ASE EC JSC). ROSATOM can build NPPs on a turnkey basis. This involves NPP designing, organization of construction and installation works, and supply of equipment and materials. ASE actively engages local and international suppliers in the implementation of its projects.

A distinguishing feature of ROSATOM’s engineering enterprises consists in extensive use of Multi-D, an innovative system for managing the construction of complex engineering facilities. The use of the Multi-D system helps to speed up design, construction and installation and reduce the cost of projects.
Mechanical engineering

ROSATOM controls the entire production chain of key equipment for the nuclear island and the turbine hall, from R&D and the release of detailed engineering designs to process engineering and manufacture of equipment.

ROSATOM's Mechanical Engineering Division (its holding company is Atomenergomash JSC) is Russia's largest group of mechanical engineering enterprises in terms of production and revenue. It offers a full range of solutions for the design, manufacture and supply of equipment for the nuclear and thermal power industry, the gas and petrochemical industry, shipbuilding and the special steel market.

The Division comprises leading power machine engineering enterprises, including manufacturing, research, service and engineering organizations in Russia, the Czech Republic, Hungary and other countries.

Atomenergomash JSC is currently the largest manufacturer of equipment for VVER reactors and the world's only producer of industrial fast neutron reactors, propulsion systems for nuclear icebreakers and reactor units for small NPPs. It is also the only Russian manufacturer of steam generators and main circulation pumps for NPPs and the country's largest producer of turbine hall equipment for half-speed and full-speed turbines for all types of Russian-design NPPs.

The Mechanical Engineering Division participates in all of ROSATOM's NPP construction projects abroad.
ROSA TOM is Russia’s largest power generation company (accounting for 19% of the country’s total electricity output) and ranks second in the world in terms of installed capacity among NPP operators.

ROSATOM’s Power Engineering Division (its holding company is Rosenergoatom JSC) is the operator of all 10 Russian NPPs (35 power units).

Over the past 20 years, no major safety incidents (on the International Nuclear Event Scale) have been recorded at Russian NPPs. The safety performance of Russian nuclear power plants is consistent with international best practice. The number of unscheduled NPP outages and reactor shutdowns is decreasing steadily. The radiation level in the areas where NPPs are located does not exceed the established regulatory limits and corresponds to the natural background radiation level typical for these areas.

Rusatom Service JSC, a specialized service company of ROSATOM, has a long track record in the servicing, modernization and extension of the life of Russian-design reactors. The company is already present on the market in 15 countries worldwide and services 25 out of 41 power units of NPPs equipped with VVER reactors that are currently in operation outside Russia.

Rusatom Service JSC also offers a full range of services related to specialized training, professional development and secondment in ROSATOM’s enterprises for employees of foreign companies and assists in the development of nuclear infrastructure in customer countries.
ROSATOM offers its foreign customers a full range of services related to the management of spent nuclear fuel (SNF), SNF processing products and operational radioactive waste (RAW), as well as the decommissioning of facilities posing nuclear and radiation hazards.

Extensive expertise gained over many years and a set of measures aimed at developing the relevant technology and infrastructure make ROSATOM’s offer unique due to:

- Practical application of research and engineering developments in the field of radiochemistry, materials science, isotope separation and automation of nuclear fuel fabrication.
- The use of opportunities offered by fast power generation, including effective use of plutonium recovered during SNF processing and a reduction in the volume and hazard level of high-level waste.
- A reduction in logistics costs through the use of larger capacity containers for SNF and RAW transportation and storage.
- The use of mobile processing facilities to process the maximum possible amount of RAW at the sites where it is generated or temporarily stored.

Construction and operation of easy-to-build structures for temporary storage of solid radioactive waste until it is transferred for conditioning or disposal.

Russian technologies and services in the sphere of SNF and RAW management are promoted on the global market by TENEX JSC.

ROSATOM has developed a unique solution for SNF processing which involves closing the nuclear fuel cycle and recovering products that have commercial value in order to reprocess and reuse them in the nuclear fuel cycle.

TVEL JSC is an integrator in the sphere of nuclear facility decommissioning. It consolidates the relevant expertise and capabilities of enterprises in the industry operating in Russia and abroad.
Research and innovations

ROSATOM’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 product in this area is a Nuclear Research and Technology Centre (NRTC), which serves as a platform for conducting scientific research, addressing current issues in the sphere of healthcare and agriculture and developing skills and competencies required for industrial application of nuclear technology. A project of this kind is currently underway in Bolivia; it is unique in the global nuclear industry (being the most elevated site in the world). Rusatom Overseas JSC, a company of ROSATOM, is responsible for promoting the integrated NRTC construction offer on foreign markets. ROSATOM offers its foreign customers NRTCs based on research reactors.

To date, over 120 research reactors based on Russian technology have been built in Russia and abroad. Over 50 research reactors are currently in operation in Russia.

In order to develop the relevant research capabilities, ROSATOM is implementing an in-house project to build a Multi-Purpose Fast Neutron Research Reactor (MBIR), which will be used to conduct a number of international experiments.

The activities of research institutes and enterprises are coordinated by ROSATOM’s Research Division (its holding company is Science and Innovations JSC). The Research Division gives special focus to closing the nuclear fuel cycle using fast neutron reactors. With this end in view it is implementing the Proryv (Breakthrough) Project. 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.

ROSATOM is actively involved in a number of international research projects, including the International Thermonuclear Experimental Reactor (ITER) project initiated by Russia.
In November 2018, ROSATOM approved a Uniform Digital Strategy (UDS) until 2030. This is a comprehensive document incorporating global expertise, current trends in the sphere of technology, ROSATOM’s competitive advantages and growth areas.

The UDS gives priority to developing ROSATOM’s digital products and putting them on the market.

In 2018, ROSATOM unveiled its first replicable digital product, Logos Air-Hydro. It is a tool for 3D modelling of fluid and gas dynamics for the purposes of engineering analysis in high-technology industries. This is a high-performance product enabling highly accurate calculations; it is compatible with corporate software and easily adaptable to new engineering applications.

2018 also saw the commissioning of the first stage of a Data Centre in the vicinity of Kalinin NPP. This data centre will be the largest in Russia and one of the largest data centres in Europe. A network of data centres of this kind, which will be created as part of the Mendeleev Project, will help to provide Russian people with equal access to digital public services.

The Digital Enterprise product is a comprehensive enterprise process management solution. It meets the strictest information security requirements.

The Berkut Vehicle Tracking solution is a fleet management system.

Mobile data centres are based on a car platform. They are characterized by mobility, flexible configuration and rapid deployment.

Containerised data centres are high-performance data centres that do not require a special building.

ROSATOM also offers the Smart City digital product (see Infrastructure Solutions section) and the Multi-D integrated solution (see Engineering and Construction section).

They can be installed quickly and are easy to transport.

ROSATOM has commissioned the first stage of the Data Centre near Kalinin NPP.
NovaWind JSC, the holding company managing wind power projects, consolidates all of ROSATOM’s wind power assets and capabilities in the leading wind power segments and technological platforms.

Rated capacity of NovaWind's wind farms totals 1 GW. This is sufficient to provide permanent power supply for 167,000 apartments.

Over 20 years of operation, a wind farm of this size will help to save 92 million barrels of oil.

To promote wind power capabilities, NovaWind JSC and the Dutch company Lagerwey have established a joint venture, Red Wind, which will be responsible for marketing and sales in Russia, turnkey supply of wind turbines and after-sales service.

After obtaining references for the construction of wind farms in Russia, ROSATOM plans to expand into the international market.

Wind farms of NovaWind

ROSATOM is actively developing the Russian wind power generation market.
New products

Promising materials and technologies

ROSATOM’s activities include the introduction of promising materials and cutting-edge technologies.

ROSATOM produces polymer composite materials based on carbon fibre with carbon content ranging from 92% to 99.99%. Composite materials are used in the aerospace, nuclear and automotive industries, construction, shipbuilding, bridge construction and manufacture of consumer goods.

Composite materials are considerably lighter in weight, while their strength, elasticity, chemical and corrosion resistance are several times higher than those of conventional materials.

UMATEX JSC is the holding company managing the enterprises that produce high-strength high-modulus carbon fibre and fabrics.
ROSATOM is developing new high-technology equipment and radiopharmaceuticals based on isotopes produced in-house. The Corporation supplies solutions for nuclear medicine centres comprising diagnostic and radiotherapy modules worldwide. ROSATOM is a major supplier of medical radioisotopes to the international market.

ROSATOM is establishing a network of nuclear medicine centres in Russia. It also offers similar centres to foreign customers. ROSATOM has concluded an agreement on the construction of a Nuclear Medicine Centre in Malaysia.

Rusatom Healthcare JSC, the integrator and holding company in this area of ROSATOM’s business, has the relevant capabilities in the sphere of nuclear medicine and innovative radiation processing technologies.

ROSATOM offers nuclear medicine technologies and services that enable timely diagnosis and effective treatment of certain types of cancer.

A network of nuclear medicine centres is being formed by ROSATOM in Russia.

Major supplier of medical radioisotopes to the international market.
The Clean Water Project involves developing solutions for water desalination and purification and wastewater treatment. ROSATOM designs, builds, upgrades and services water supply, wastewater treatment and water purification facilities for the energy, oil and gas, petrochemical, food and other industries. It has designed seawater desalination plants for arid regions.

As part of the Smart City project, ROSATOM is implementing systems for the automation and digitization of production and distribution processes. For instance, the Digital Water Supply and Sewerage System enables effective management of water supply and sewerage systems as part of municipal utilities infrastructure.

Rusatom Infrastructure Solutions LLC is the industry-wide integrator of these businesses.

ROSATOM is implementing infrastructure projects aimed at fostering social and economic development of towns and cities through the use of innovative digital solutions.
3D printing enables a considerable reduction in the weight of components and the lead time.

ROSATOM is actively developing energy storage systems, offering technical solutions for the power industry, electrical engineering and transportation. Energy storage systems based on lithium-ion batteries considerably reduce the cost of ownership of equipment over its life cycle by extending its service life.

ROSATOM has established an industry integrator, Rusatom Additive Technologies LLC, which produces 3D printers and powder for additive manufacturing and provides 3D printing services, as well as an industry integrator responsible for energy storage systems, Cathode Materials LLC.

ROSATOM implements projects involving the use of additive manufacturing technologies and manufactures products that have a complex shape and cannot be produced by machining or casting.
ROSATOM’s capabilities enable it to produce digital systems for the management of complex processes and design power grid solutions. ROSATOM has a proven track record and over 60 years of experience in implementing and servicing automated process control systems for power units equipped with Russian-design reactors in Russia and abroad.

Relying on its expertise in automation, ROSATOM offers its customers only those solutions that have been tested and approved and comply with global standards and whose safety and reliability have been confirmed by fail-free operation of critical facilities, such as NPPs, in Russia and abroad.

Rusatom Automated Control Systems JSC is the single centre integrating ROSATOM’s capabilities in the sphere of automated process control systems. It manages 16 research and manufacturing enterprises possessing unique competencies in the manufacture of automation systems.
ROSATOM owns the world’s only nuclear-powered icebreaker fleet and has a long track record in the construction and operation of nuclear icebreakers.

The Russian nuclear-powered fleet comprises five vessels: the 50 Let Pobedy, Yamal, Vaygach and Taymyr nuclear icebreakers and Sevmorput, a nuclear-powered LASH carrier. Construction of three new multipurpose nuclear icebreakers (project 22220) is currently underway.

By escorting vessels along the Northern Sea Route, ROSATOM helps to reduce the amount of time required for delivering goods from Asia to Europe by more than a third.

Under a new federal law, in 2018, ROSATOM became the Infrastructure operator of the Northern Sea Route. As such, it will be responsible for the development of seaport infrastructure, enabling navigation and escorting vessels throughout the year.

New products

Northern Sea Route

18 million tonnes

Cargo traffic along the Northern Sea Route in 2018

Infrastructure operator of the Northern Sea Route

Nuclear-powered icebreaker fleet

the only one in the world
## ROSATOM in numbers

<table>
<thead>
<tr>
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<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
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</thead>
<tbody>
<tr>
<td>Revenue under IFRS, USD billion</td>
<td>16.1</td>
<td>13.5</td>
<td>13.1</td>
<td>16.6</td>
<td><strong>16.4</strong></td>
</tr>
<tr>
<td>Power generation, billion kWh</td>
<td>180.5</td>
<td>195.2</td>
<td>196.4</td>
<td>202.9</td>
<td><strong>204.3</strong></td>
</tr>
<tr>
<td>Taxes paid, USD billion</td>
<td>2.7</td>
<td>2.7</td>
<td>1.9</td>
<td>2.5</td>
<td><strong>3.0</strong></td>
</tr>
<tr>
<td>Labour productivity, USD thousand per person</td>
<td>88.8</td>
<td>78.7</td>
<td>78.0</td>
<td>99.6</td>
<td><strong>99.0</strong></td>
</tr>
<tr>
<td>10-year portfolio of overseas orders, USD billion</td>
<td>101.4</td>
<td>110.3</td>
<td>133.4</td>
<td>133.5</td>
<td><strong>133.2</strong></td>
</tr>
<tr>
<td>Overseas revenue, USD billion</td>
<td>5.2</td>
<td>6.2</td>
<td>5.6</td>
<td>6.1</td>
<td><strong>6.5</strong></td>
</tr>
<tr>
<td>10-year portfolio of orders for new products (outside the scope of the Corporation), USD billion</td>
<td>—</td>
<td>—</td>
<td>10.3</td>
<td>14.0</td>
<td><strong>17.3</strong></td>
</tr>
<tr>
<td>Cargo traffic along the Northern Sea Route, million tonnes</td>
<td>1.7</td>
<td>2.0</td>
<td>5.3</td>
<td>7.2</td>
<td><strong>18.0</strong></td>
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</tbody>
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Contact details and useful links

ROSATOM STATE ATOMIC ENERGY CORPORATION
24 Bolshaya Ordynka Street, Moscow, 119017
Tel.: +7 (499) 949-45-35

CONTACTS FOR THE MEDIA:
Andrey Cherepinsinov, Director of the Communications Department
Tel.: +7 (499) 949-44-12
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: BNAarseev@rosatom.ru

CONTACTS FOR COOPERATION IN THE DEVELOPMENT OF NEW BUSINESSES:
Dmitry Baydarov, Deputy Director of the Corporate Development and International Business Unit, Head of the Office of Support for New Businesses
Tel.: +7 (499) 949-47-88
Email: DYBaydarov@rosatom.ru

OFFICIAL CORPORATE WEBSITE:
www.rosatom.com

PUBLIC ANNUAL REPORTS:
http://www.rosatom.ru/aboutcorporation/public_reporting/

OFFICIAL WEBSITE FOR PLACEMENT OF ORDERS FOR THE PROCUREMENT OF GOODS, WORKS AND SERVICES FOR ROSATOM:
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