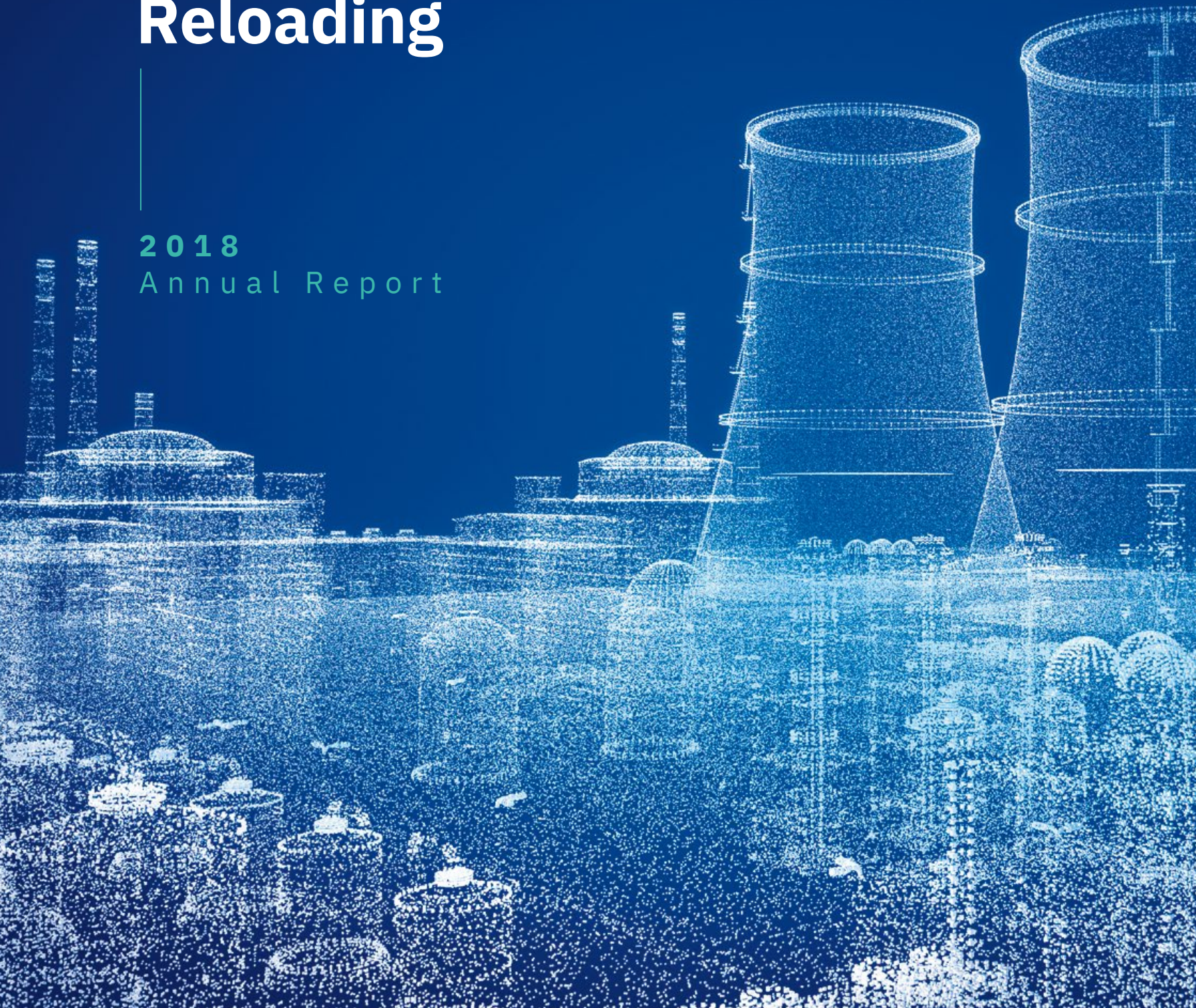


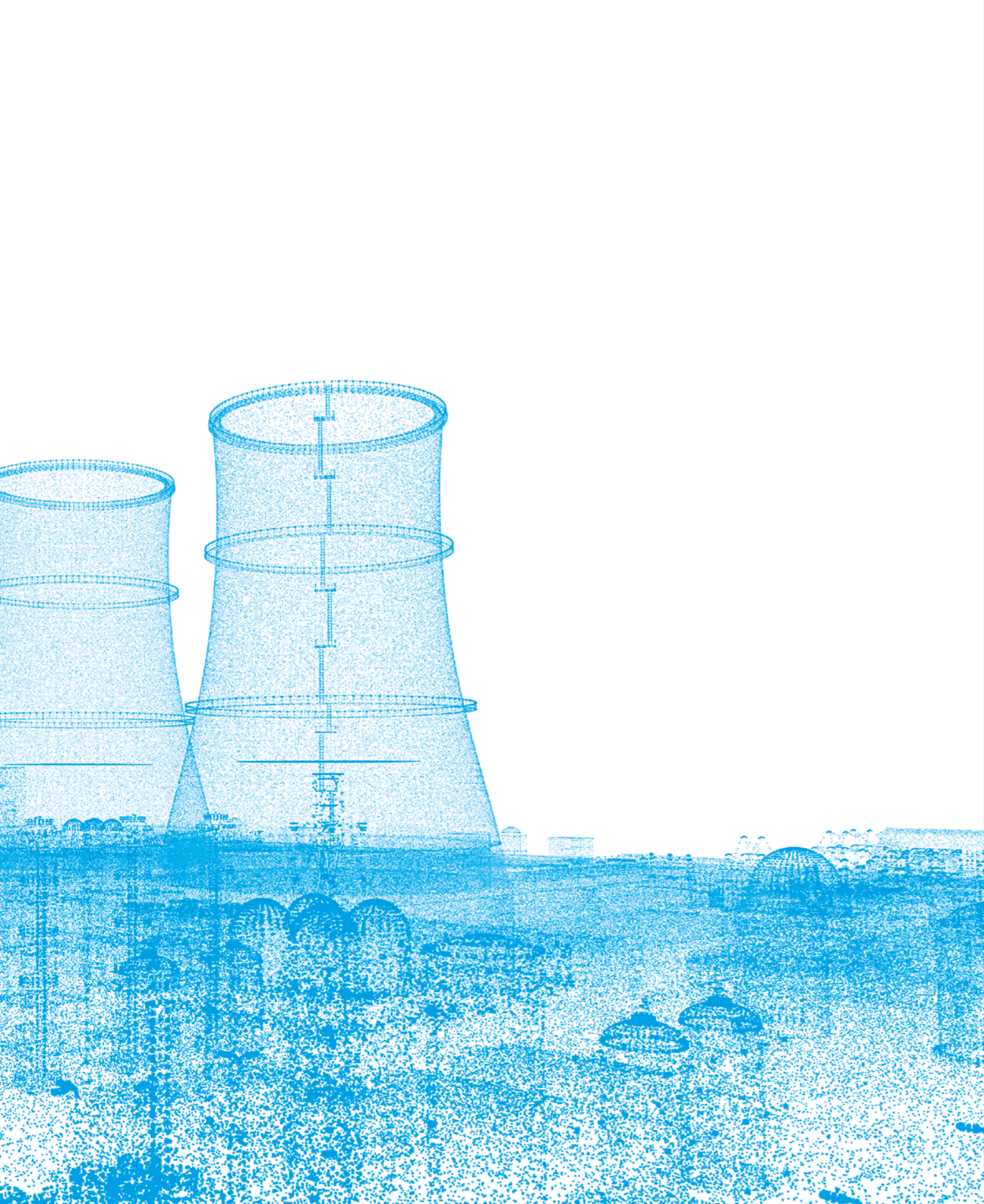


ROSATOM STATE CORPORATION ENGINEERING DIVISION

Transformation: Reloading

2018
Annual Report





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Transformation: Reloading

2018
Annual Report

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CEO Statement

GRI 102-14

Dear colleagues and partners,

The year 2018 was a major landmark in two areas – implementation of the projects in the current product portfolio and transformation aimed at enhancing the efficiency of business operations.

As of December 2018, the Division's product portfolio included 31 NPP units. The reporting year witnessed **the commissioning of Tianwan NPP Units 3&4 in the People's Republic of China**. Against the background of our growing efficient cooperation with the Chinese partners, General Contract for construction of Tianwan NPP Units 7&8 came into effect and Frame Contract for construction of Xudapu NPP Units 3&4 was signed.

The construction of Akkuyu NPP Unit 1 (Turkey) and Rooppur NPP Unit 2 (Bangladesh) reached the stage of first concrete.

As to the projects implemented within the Russian Federation, the major milestones of the Engineering Division's operation were **commissioning of Rostov NPP Unit 4, power startup of Leningrad NPP-2 Unit 1** – a power plant of generation III+, **the first concrete pouring in the foundation slab of the reactor building of Kursk NPP-2 Unit 1** that is the first NPP in Russia, the construction of which applies VVER-TOI – the state-of-the-art national design.



16.8
bln RUR
EBITDA

In 2018, the Engineering Division's income reached the point of 202 billion rubles which makes a 15.2% increase compared to 2017. The growth of this value is mostly accounted for by implementation of such projects as Rooppur NPP in Bangladesh, Kudankulam NPP in India, Belarus NPP. One fifth of Rosatom State Corporation's total revenue was provided by the Engineering Division.

The engineering business is considered by Rosatom State Corporation's management to be the key priority. That is why in 2018 the management especially focused on enhancement of the internal processes efficiency in order to ensure that the deadlines and the costs criteria are met during implementation of all projects in the project portfolio. The main principles of **the transformation** are reducing the number of the Engineering Division's management levels, enhancing the project managers' functions and responsibilities, optimizing the performance of the design unit.

As to other aspects of its activities, the Engineering Division is engaged in continuous process of digitalization, in particular the use of the digital model during NPP design and construction which is a prerequisite for ensuring quality and standardization of designs. As part of the digitalization process, the Division operates according to Rosatom State Corporation's digital strategy adopted in 2018.

The concept of the Division's **sustainable development** is generated according to the UN Sustainable Development Goals until 2030 and respective international standards. In the reporting year, the Division pursued a consistent policy of social responsibility through high standards in the area of environmental protection, occupational health and safety which is essential for the company's sustainable development.

202
bln RUR
Revenue

A successful implementation of the projects in the project portfolio offers a challenge for both our organization and the whole industry. I am confident that this challenge will be met owing to the comprehensive support rendered by Rosatom State Corporation and the Division employees' professional competence, dedication and commitment to results.

It is noteworthy that being an engineering company of the global level, we put much emphasis on the openness and transparency of our business. We strive to ensure that any stakeholder should be able to trace the Company's background, witness its major changes, assess the implementation of its strategic goals and be aware of the plans and future commitments. In order to facilitate the implementation of this task, we issue annual reports that are elaborated on the annual basis and apply the principles and guidelines stipulated in the International Integrated Reporting Framework standard. On top of that, we foster dialogues with stakeholders. We are responsible for the information provided in the report and we believe it to have all the compulsory elements.

Alexander Lokshin

President of JSC ASE EC,
First Deputy Director General
for Operations Management
of Rosatom State Corporation

Company's Background

- Company's Background
- International Footprint
- 2018 Milestones
- Financial and Operational Highlights 2018



76.95

bln USD
10-year Portfolio of Overseas Orders
(traditional products)



21.51

bln RUR
Net profit

Company's Background

Rosatom State Corporation Engineering Division operates using 50-year experience of the nuclear industry in Russia and state-of-the-art technologies



GRI 102-1, 102-3, 102-5

The Engineering Division* was established by integration of the industry's leading companies: JSC ASE EC (Nizhny Novgorod) – managing company, JSC ASE (Nizhny Novgorod), JSC “Atomenergoproekt” (Moscow) and JSC ATOMPROM (St. Petersburg) and other.

According to the results of 2018, the Engineering Division of Rosatom State Corporation is the leader of the global NPP construction market.

Vision:

We seek to build a competitive business that is successful in implementation of construction projects and complex engineering construction management projects and aims to maximize the shareholder value of the Engineering Division.

GRI 102-16

The Division's values

correspond to those of Rosatom State Corporation:



Safety



Responsibility for the result



Efficiency



One team



One step ahead



Respect

* The organizations within the management framework are listed in the Section “Corporate Management”, the Division's operational assets are listed in Appendix 7 of the Book of Appendices.



JSC ASE



JSC ASE EC



JSC ATOMPROM

Mission:

We manage construction of complex engineering facilities based on the vast experience in implementing nuclear projects. We create shareholder value and ensure implementation of their objectives on the Russian and global markets.

GRI 102-2

Main areas of activities:



Design of high-power NPPs



Construction of high-power NPPs on the terms of EPC, EPC(M)



Multi-D-based digital technologies for management of complex engineering facilities

GRI 102-13

Membership of associations:

- Federation of employers of atomic industry, power engineering and science of Russia;
- Association of innovative design;
- European Utility Requirements;
- Self-regulating organization “Association of the engineering-prospecting organizations in nuclear branch “SOJUZATOMGEO”;
- Self-regulating organization “Association of the designing organizations in nuclear branch “SOJUZATOMPROM”;
- National Association of consulting engineers in the construction field;
- Czech nuclear forum;
- Association “Self-regulatory regional industry federation of employers “Association of Nizhny Novgorod developers”;
- Association of construction companies in the nuclear industry (ASKAO);
- Russian department of buildingSMART;
- International Federation of Consulting Engineers (FIDIC);
- Engineering Construction Risk Institute (ECRI).

International Footprint






GRI 102-4, 102-6

The operations areas are Europe, Middle East, Asia, Northern Africa, Asia-Pacific Region.

The project owners are countries that seek to diversify their power system and provide their economy with cheap electricity

30%
of the global NPP construction market

80%
of the Engineering Division's revenue is provided by foreign projects

-  Main core projects (NPP design and construction)
-  Back-end
-  Branch offices
-  Representative offices
-  Subsidiaries



2018 Milestones



January

19.01.2018 — Power start-up of Rostov NPP Unit 4.



February

15.02.2018 — Putting into commercial operation of Tianwan NPP Unit 3 (China).



March

- 09.03.2018** — Power start-up of Leningrad NPP-2 Unit 1 (Russia).
- 23.03.2018** — Completion of installation of the reactor pressure vessel of Belarus NPP Unit 1.
- 30.03.2018** — Start of the foundation slab concreting in the reactor building at Akkuyu NPP Unit 1 (Turkey).



April

28.04.2018 — Start of the foundation slab concreting in the reactor building at Kursk NPP-2 Unit 1 (Russia).

May

- 14.05.2018** — Awarding of International Project Management Association Certificate corresponding to grade 4 competence in project, program and portfolio management based on IPMA Delta model.
- 22.05.2019** — JSC ASE EC and JSC ASE obtain ISO 9001:2015 and ISO 14001:2015 international standard certificates.

June

- 08.06.2018** — Signing a strategic package of documents defining the guidelines for the Russian-Chinese nuclear cooperation that includes inter alia:
 - Frame Contract for joint construction of new units at the Tianwan NPP site (Units 7&8);
 - Frame Contract for construction of Russia-designed NPP at the new site in China (Xudapu NPP Units 3&4).



July

- 08.07.2018** — Start of the foundation slab concreting for the reactor building at Rooppur NPP Unit 2 (Bangladesh).
- 24.07.2018** — Detailed design documentation was issued for commencement of earthworks and excavation of pits for the main buildings of Kudankulam NPP Unit 5 (India).

At the photo: Sheikh Hasina, the Honourable Prime Minister of the People's Republic of Bangladesh, Yury Borisov, the Deputy PM of the Russian Federation for the military-industrial complex and Alexander Lokshin, the First Deputy Director General for Operations Management, Rosatom State Corporation participate in an official ceremony of the first concreting of the Rooppur NPP Ppower Unit 2 foundation



August

- 18.08.2018** – Start of installation of the molten corium trap at Rooppur NPP Unit 1 (Bangladesh).
- 25.08.2018** – **Physical start-up of Tianwan NPP Unit 4 (China).**
- 27.08.2018** – Start of the foundation slab concreting of the turbine building at Rooppur NPP Unit 1 (Bangladesh).



September

- 28.09.2018** – **Commissioning of Rostov NPP Power Unit 4 (Russia).**



October

- 10.10.2018** – Signing of the Contract for development of the basic design for Tianwan NPP Units 7 & 8 (China).
- 26.10.2018** – **Safety systems flushing on the open reactor completed at Belarus NPP Unit 1.**
- 28.10.2018** – Submitting documents for of El-Dabaa NPP Units 1,2 construction licensing.



November

- 13.11.2018** – Beginning of installation of the molten corium trap (core catcher) at Kursk NPP-2 Unit 1.
- 18.11.2018** – **Start of assembly works at the reactor at Belarus NPP Unit 1. Core barrel installed in the reactor pressure vessel.**



December

- 07.12.2018** – Start of the foundation slab reinforcing of the reactor building at Kursk NPP-2 Unit 2.
- 22.12.2018** – **Putting Tianwan NPP Unit 4 (China) into commercial operation.**

Events after the Reporting Date



February

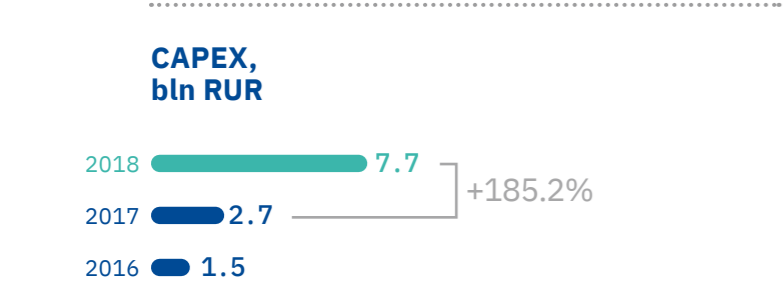
- 18.02.2019** – **Commencement of physical startup of Novovoronezh NPP-2 Unit 2.**
- 18.02.2019** – Installation of the molten corium trap at Kursk NPP-2 Unit 1.
- 19.02.2019** – Power supply for auxiliary loads under the design layout at Belarus NPP Unit 1.



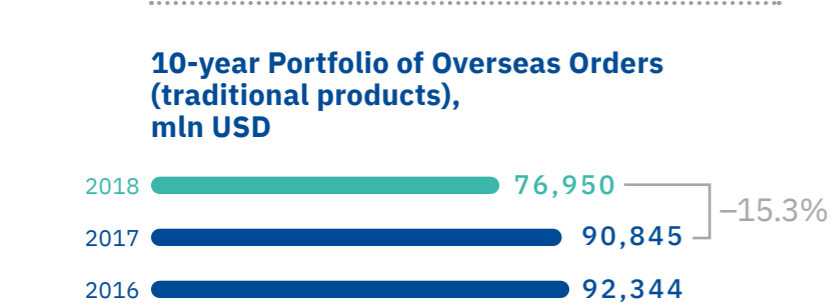
March

- 07.03.2019** – **Signing of General Contract for construction of Tianwan NPP Units 7 & 8, signing of Technical Design Contract for Xudapu NPP Units 3 & 4.**

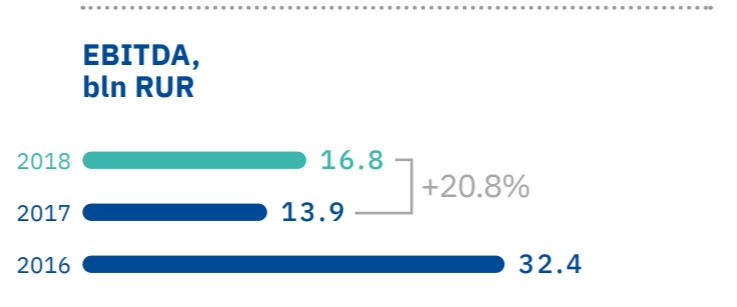
Financial and Operational Highlights 2018



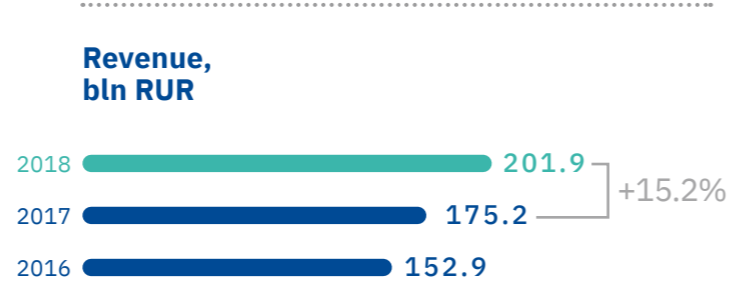
Summing up the investment program implemented by the Engineering Division in 2018, the amount of 4.2 billion rubles has been saved owing to the procurement procedures and withdrawal from or cancellation of earlier scheduled actions of the investment program.



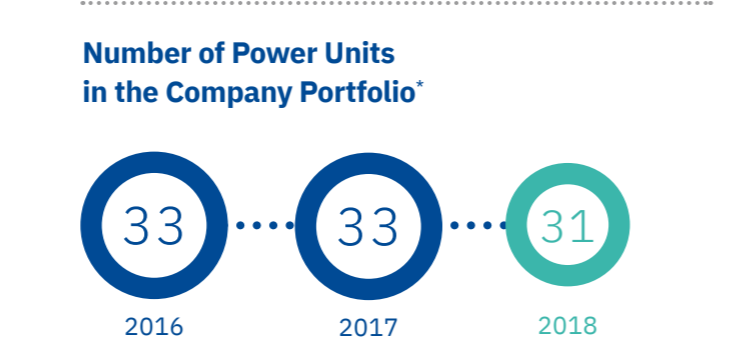
Dynamics of the project portfolio is related to the change in the portfolio structure and implementation of contracts.



The losses incurred over Belene NPP Project were reimbursed upon the Final Award by the Arbitration Court in 2016. This factor influenced the EBITDA index. The index growth in 2018 resulted from the efficient cost management process and the restrained management expenses.

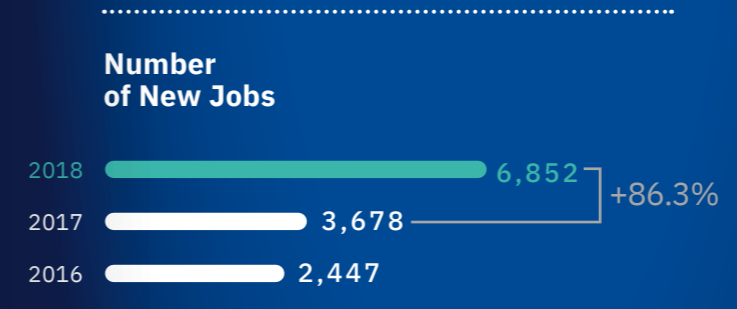
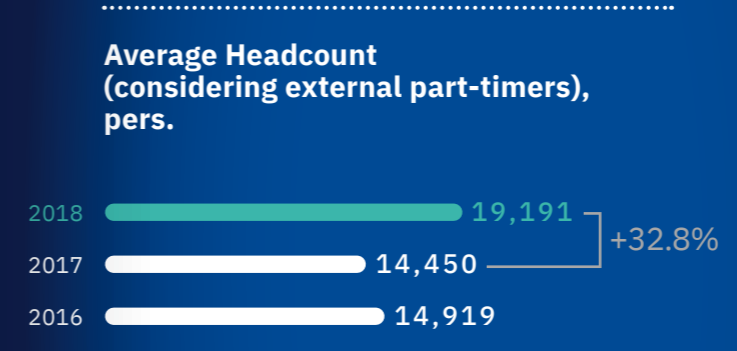


In 2018, the revenue amounted to 202 billion rubles. The parameter had grown compared to 2017 by 15.2%. The most sizeable shares in the revenue are those accounted for by CEW and equipment businesses. The biggest contribution to the revenue was made by Rooppur NPP (Bangladesh), Kudankulam NPP (India) and Belarus NPP projects.



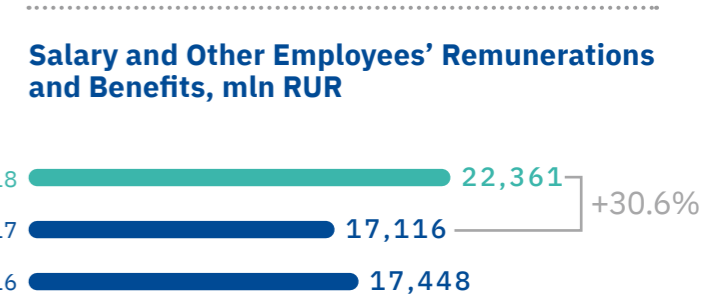
The number of power units is estimated with account of commissioning of Tianwan NPP Units 3&4 and Rostov NPP Unit 4 and signing of new NPP construction contracts.

* Power units are included in the Engineering Division's orders portfolio based on concluding of the contract, while they are withdrawn from the orders portfolio upon the power unit handover to the Customer.

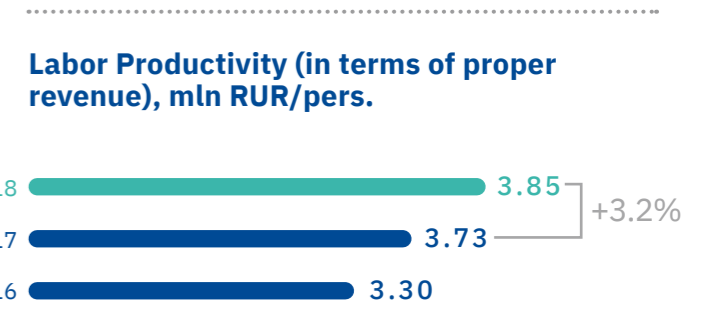


The growth of newly generated jobs and staff size is explained by:

- transition to the active stage of NPP construction abroad, such as Rooppur in Bangladesh, Belarus NPP and Kursk NPP in Russia;
- enhancing the competence of employees of the design division as part of the foreign projects;
- development of IT-competences as part of implementation of the "Digital Economy" program.



The benefits increase owing to the annual indexation of salaries.



The actions aiming to raise the efficiency of the basic operational processes stimulate a steady growth of labor productivity and business efficiency.



The average age of the Engineering Division employees has remained to be at most 41 year for the last three years, and it demonstrates a tendency towards decreasing. This is owing to methodical endeavors to rejuvenate the staff provided that the key competences in designing and construction of complex engineering facilities are retained. We appreciate knowledge and industry background of our personnel in the age of maturity. Simultaneously, we aim to employ young staff members with competences in the area of digital technologies, knowledge of foreign languages who are ready to perceive the experience and learn to take decisions.

Chapter 1

Strategic Overview

- 1.1. Engineering Division Strategy and its Implementation
- 1.2. Risks and Opportunities
- 1.3. Corporate Governance





Director for Organization Development

Maria Armand

– What is transformation of the Engineering Division?

Transformation of the Division started in 2018 in order to ensure the Engineering Division’s readiness to manage the NPP projects portfolio in full scope and within the established deadlines. For the second year running the Division delivered to its Customers 3 power units and carried out the first concreting of three more power units, which is an unprecedented scale of the Company’s works. Just to compare, we used to commission one power unit and make one concreting annually.

In 2018 the Division’s portfolio included 31 power units. At the same time, new contracts are being concluded — the nuclear power industry is definitely attractive for the customers.

All this prompts us a decision to search for new management approaches, use digital technologies in designing and construction, improve the quality of management (reduce the time and cost, standardize the purchase of equipment, implement new software).

The Division’s transformation embraces all main areas of activities ranging from production to organizational and IT lines of work. The transformation aims to ensure the Division’s growing competitiveness on the global market and to enhance its business efficiency. At the same time, the absolute commitment to timely implementation of the portfolio projects at the established cost is our top target.

The transformation program is focused on generation of a new organizational model of the Engineering Division. In 2018, the main management functions were divided into three key areas:

- management of NPP construction projects portfolio at the design stage;
- management of NPP construction projects portfolio at the construction stage;
- support of NPP construction projects — corporate functions.

At the same time, according to the new line of thinking, the supporting services (purchase and procurement, financial, corporate ones etc.) should ensure that managers of NPP construction projects are given maximum support and relieved from routine tasks.

The changed organizational model is **mainly focused on a project-oriented organization where the NPP construction project is a key management center** and the project manager is a Company’s chief executive having all necessary powers and resources to implement the project objectives.

Besides the changes in the organizational model, we are also implementing “Team to support changes in the key industry’s focus areas” project that is a basis for developing the Division’s full-scale system to pool and communicate experiences accumulated through NPP construction projects. It aims to extend the experience from lessons learned and best practices of NPP construction projects and preclude recurrence of earlier detected mistakes during implementation of current and future projects.



As I have already said, the renovation of the management structure and system will allow us to get prepared for the main challenge of tomorrow, i.e. the scale of construction, while **NPP customers will be offered a flexible customized proposal.**

– How does the transformation influence the project management and design?

In the end of 2018, the Unified Design Institute was founded to consolidate the experience and competence of St. Petersburg, Moscow and Nizhny Novgorod key design institutes of the Division. We are confident that unified design engineering will allow efficient resource management, facilitate a unified engineering policy and unified engineering solutions and their follow-up at all stages of NPP construction projects. In order to strengthen the project management, the director of the Joint design institute was entrusted with a number of authorities in the area of engineering and construction project management at the stage of designing that earlier were the responsibility of JSC ASE EC president.

In order to enhance the efficiency of designing and consolidate the resources in the key areas of design operations, the “Program for development of VVER reactor designing” was launched at the end of the year. The program includes 12 projects consolidated in two areas, namely “Designing and Technologies” and “Design Management”. The projects include, among others things, standardization of engineering solutions and unification of equipment, calendar network planning, resource and quality management. The program draws much attention to reference books and data in order to provide the digital design systems with the updated and reliable information to take prompt and grounded management decisions. The important feature is the Program’s applicability as a prompt mirroring of the results on the portfolio’s projects. The key result of the Program shall be the final establishment of the joint design institute as a smooth conveyor for producing design products of proper quality ensuring an absolute implementation of the orders portfolio and new projects based on the Customers’ most advanced requirements.

These changes are expected to result in compulsory fulfillment of the licensing deadlines for our projects, replenishment of each project with qualified designers, sufficiency of the project-based information models and documentation for the respective construction stage.

80%

the weight of the index in terms of deadlines and costs in the KPI map

– What changes are underway in NPP construction processes and equipment procurement?

The construction management portfolio has also witnessed significant changes of the organizational model. At the stage of construction, the project portfolio manager now has an immediate authority over construction project managers whose status has been promoted to the position of vice-presidents — construction project directors, with their authorities and responsibilities amplified and excessive management levels liquidated.

As to the logistical support, such as procurement, we have started standardizing the tender process for package lots as part of the transformation process. The concept of transition to procurement based on package lots has already been approved and implemented in pilot projects. The list of NPP facilities subcontracted in the form of package lots has been approved. **It is important for us to collect a pool of suppliers and contractors that ensure timely and proper performance of works in their respective areas.**

We are currently synchronizing construction schedules of all NPPs in the Division's portfolio which will allow synchronization of all processes. We enlarge the information base of foreign projects, information about local markets, we develop the system of inter-project experience and knowledge sharing. This is an industry-wide program that is successfully implemented in our division. This program aims to use efficiently the knowledge accumulated during implementation of the construction projects.

– How does the transformation process impact the personnel? Are there any new undertakings in this area?

The Division keeps improving the KPI system, the follow-up of activities. This year the focus has remained to be shifted to the employees' utmost motivation to meet the deadlines and cost requirements. KPIs related to implementation of the construction projects have been established for employees of all divisions including supporting functions. In this year, the weight of the index has been raised to 80% in terms of deadlines and costs

in the KPI map. By comparison, in 2017 the weight of this index was 55%. **Our task is to ensure complete supervision over implementation of the NPP construction program** which has been contracted rather than planned only.

Active work is underway to optimize the resource planning processes. The task of this area is to establish in sufficient detail and understand the demand for resources and competences in all areas, to understand the amount of external resources to be used, the amount of internal resources and competences to be used inside the division. Proceeding from this, we develop detailed resource plans with account of redistribution of resources between projects since as part of the project management we look closely at the possibility to balance the resources, we manage risks as a whole in the projects portfolio including the resource economy.

The generation of the unified corporate culture facilitating the smooth processes of changes during the transformation is aimed at creating an environment when all the Company's employees understand their goals, tasks and strategy of its development, when they are aware of their role in these processes and act based on the logic of partnership and efficient horizontal interface making a focus on common goals. This work is implemented as part of the philosophy of changes carried out by the State Corporation in the industry.

A meeting between A.E. Likhachev, Director General of Rosatom State Corporation and the staff members, multi-stage Director Days, "Open dialogue", KPI project have been held over the past year. A new communication channel, such as "Open dialogue between the management and the staff" has been established. The cycle of horizontal interface sessions has been launched, the corporate functions customer focus assessment has been implemented. A new communication channel has been created: HRHelpASE@ase-ec.ru.

As part of the mid-term planning, we plan to increase by 30% the amount of information materials (news, articles, interviews and others) dedicated to the topic of transformation, introduce new columns dedicated to new career opportunities and continuity, training management and personnel development.

“ The transformation aims to ensure the Division's growing competitiveness on the global market and to enhance its business efficiency. At the same time, the absolute commitment to timely implementation of the portfolio projects at the established cost is our top target”

We envisage to launch the Company's renewed internal portal, involve the personnel into building of new internal communication channels primarily through the work of the Team for support of changes for the "Improvement of internal communication system" project.

– Is the digitalization process underway in the Company? What is the difference between the digital transformation and the division's transformation as a whole?

Part of reply to this question is implicated in the question itself. The digital transformation is one of the components of the global process of the division's reset.

The digitalization topic was covered in much detail in the division's annual report in 2017 that is why I'm not going to dwell upon this sector for long. I'd like to point out some of the digitalization areas, such as synchronization of the division's information systems and the main industry's participants of NPP construction processes which embrace a common IT-architecture, digitalization of processes, NPP information models (a ready basis for the NPP digital counterpart). A large industry program has been developed which includes about 50 projects in the "Digitalization of NPP construction process" area. It is aimed at providing the maximum tool support of our projects. Here we work over verification of the data and elaboration of model IT-architectures for all construction projects, over integration of the systems inside our division and formation of the NPP complex information model to be handed-over to the Customer.

As a result we plan to reach a state when the analytical data for all processes is automatically downloaded from the systems, the information systems are synchronized, simple operations, such as translation, standards control and others are automated.

Moreover, it is essential for us to ensure synchronization with other divisions in this and other areas. This program has a discipline such as integration of intradivisional information chains. Since an NPP construction project involves about twelve organizations of the nuclear industry, **we have to foster efficient interface, also at the level of information systems,** with other organizations.

As a summary I can say that we are aware of the economic and social significance of the Division's business and we set a task for ourselves such as to ensure the business sustainability; we are involved in the process of change in order to offer to our Customers the best price on the NPP design and construction market.

1.1 Engineering Division Strategy and its Implementation

Meeting the NPP construction deadlines and cost requirements for both contracted and future projects is the **Company's absolute business priority**

The strategy of the Engineering Division's activities was approved in 2014 and is focused on achieving Rosatom State Corporation's strategic goals.

According to the implemented organizational changes, A.M. Lokshin, First Deputy Director General for Operations Management of Rosatom State Corporation was appointed as Head of the Engineering Division from December 08, 2018. This appointment will allow maximum synchronization of the strategic priorities of Rosatom State Corporation and the Engineering Division.

One of Rosatom State Corporation's strategic goals is growth of its share on the international markets, the prerequisite of which is strict fulfillment of the Engineering Division's contracts within the established parameters. Meeting the NPP construction deadlines and cost requirements for both contracted and future projects is the Company's absolute business priority.

This target is achieved by:

- Continuous improvement of operational and project management processes;
- Application of efficient digital tools and information systems throughout the whole project life cycle from the stage of pre-contractual works up to NPP commissioning;
- Improvement of quality at each stage of NPP construction;
- Development of the core personnel.

Besides, the strategic objectives of the Engineering Division and the State Corporation as a whole include reducing the production costs and time period of NPP construction.

The Company's objectives are as follows:

- Capability to deliver to the market the NPP projects that are competitive in terms of the cost of rated capacity kilowatt and LCOE;
- Readiness to design and implement NPP construction projects within the established cost parameters.

Construction of high power NPPs is an absolute priority for the Company that is why the development of Multi-D digital technologies ensuring the design and construction of complex capital projects within the established time and cost parameters is so important. As part of the Common Digital Strategy of Rosatom State Corporation, we implement industrial "NPP Construction Process Digitalization" program that is strategically focused on improvement of NPP construction quality with application of digital technologies.

The "NPP Construction Process Digitalization" program of the Engineering Division includes 5 main areas of activity:

1. Quality assurance of design is ensured owing to creation of NPP digital modeling tools.
2. Digitalization of combined intrafunctional and intradivisional production chains means building of chains of data transmission between systems at various stages of the construction life cycle.
3. NPP construction management — construction and site IT-structure management.
4. Development of Multi-D digital platform is aimed at developing a digital platform for NPP construction processes management.
5. NPP construction cost management means implementation of a complex system of time and cost management for NPP construction.

Based on analytical information about the trends on the priority markets, about the state of the macroeconomic environment, competitive analysis, new partner patterns, taking into account the priorities of the Shareholders' activity, mid- and long-term plans of the organization's activity and key performance indicators are confirmed and updated on an annual basis. Respective decisions are taken at strategic sessions with the shareholders' participation, not less than 2 times a year (the KPI sessions are held on a quarterly basis, in order to check that the established targets are achieved and the risk control is implemented). The business priorities are identified at the Company's level on a collegiate basis as part of internal sessions with participation of the Company's top management.

Changes in the priorities are reflected in the Company's business plan which is verified and, if needed, updated on an annual basis and in the updated strategic Company's materials.

During generation of strategies, long- and mid-term plans and development programs, the Company applies the market analytical data that reflect the trends of the most important markets (in terms of technology) and the regions of operation, a competitive analysis and benchmarking of the main players at the prioritized markets and regions of operation.

The sources of this information are:

- Daily reviews of the public sources of information, such as mass media, companies' publications etc.;
- Periodical reviews on the regions of presence that are generated by partners' organizations (the periodicity is determined depending on the region of presence);
- holding of and participation in major industry forums, seminars with leading companies;
- OASIS industrial information system systematizing the data on key partners, customers etc.

The Russian Federation implements a full-scale program of nuclear power development. The established goals are achieved by expanded reproduction of Russian nuclear industry products based on the development of the nuclear power industrial and research potential and nuclear and radiation safety system, preservation of unity of the process chains on the basis of innovation development.

As part of implementation of the objective aimed at establishing itself as the leader of the global market of nuclear technologies and services, Rosatom State Corporation builds up the projects portfolio of NPPs abroad.

As part of the core business, the Engineering Division of Rosatom State Corporation's plans to construct NPPs in Russia are established according to the investment program of Rosenergoatom JSC related to NPP construction in Russia. The Engineering Division of Rosatom State Corporation implements NPP construction projects abroad based on the Russian technologies by making a considerable contribution to global expanding of Rosatom State Corporation's core business, since the Division accounts for about 90% of the State Corporation's NPP construction projects abroad.

1.1.1. NPP Engineering and Construction Market

GRI 102-6

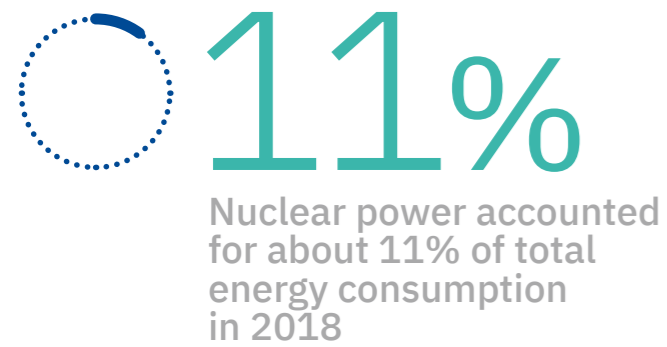
Following the results of 2018, Rosatom State Corporation retains leadership on the global NPP construction market¹.

Nuclear power accounted for about 11% of total energy consumption in 2018. According to IAEA data, 30 countries in the world have nuclear electrical generating capacity and 13 of them depend on the nuclear electricity production by more than 1/4. The countries with the largest share of nuclear electricity production are France (71.6%), Ukraine (55.1%), Slovakia (54%), Hungary (50%) and Belgium (49.9%).

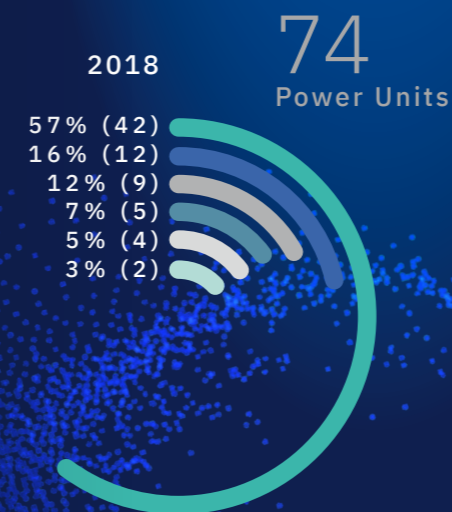
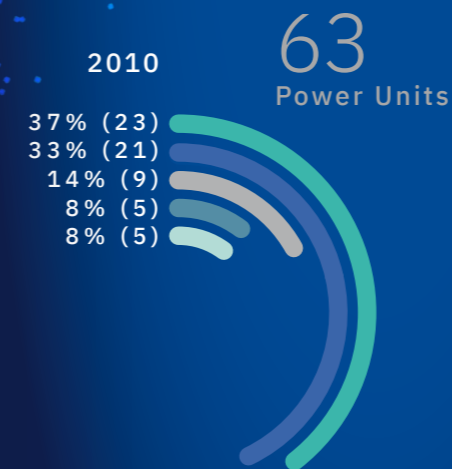
In 2018, the amount of operational nuclear power reactors on the territory of Russia, including those recently connected to the grid, amounted to 37 units with a total capacity of 30.1 GW. In 2018, while competing with the world nuclear generating companies, Rosatom State Corporation was globally ranked as the second company coming next to the French EDF in terms of installed power capacity (see p. 29).

The main type of globally operating reactors are light water reactors (such as VVER, PWR, BWR, LWGR) that accounted for 85.5% of the global market. The heavy water reactors of PHWR (CANDU) type accounted for 11%.

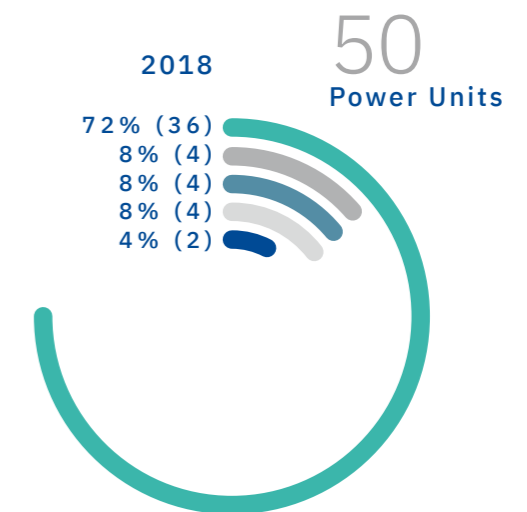
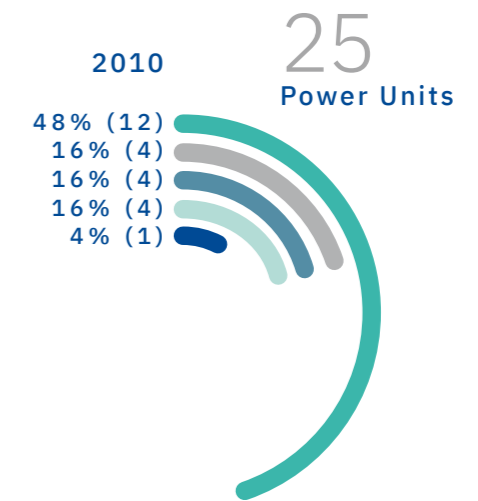
¹ Not considering producers of heavy water reactors (Candu Energy) and companies operating on the domestic market only (NPCIL).



Total portfolio of for NPP construction projects, % (PU)



Portfolio of overseas NPP construction projects, % (PU)

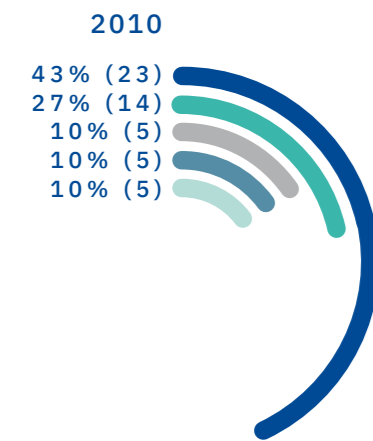


● Rosatom State Corporation²
● EDF/AREVA
● China
 ● Westinghouse
● KEPCO
 ● Other³

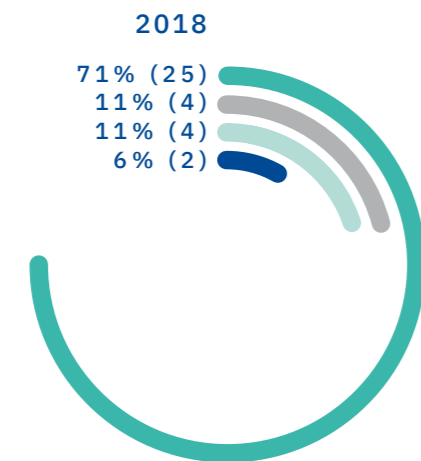
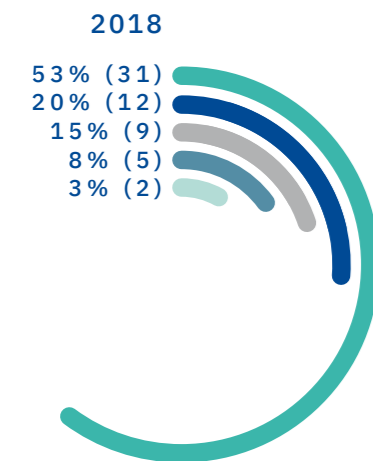
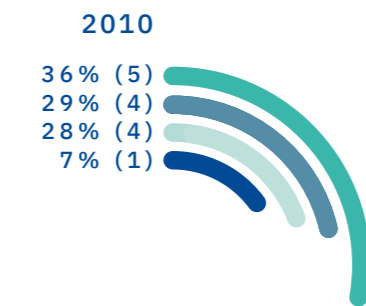
² The following was not taken into account: power units put into operation in 2018 (power units of Rostov NPP and Leningrad-2 NPP), FNHPP.

³ 4 Turkish units in SINOP (agreement with MHI).

Total number of reactors under construction, % (PU)



Number of overseas reactors under construction, % (PU)



- Rosatom State Corporation
- China
- KEPCO
- EDF/AREVA
- Westinghouse

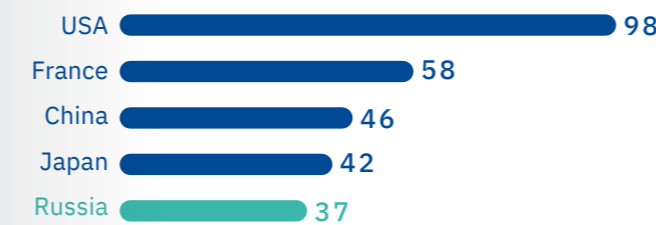
Currently, Asian countries prevail in the demand for NPP construction due to fast-growing need in electric energy in this region. Being the major global player in terms of the number of NPP construction projects in the overseas portfolio, Rosatom State Corporation strengthens its presence abroad.

The leading global analytic agencies forecast a considerable growth of installed capacity in nuclear power. By 2035 the International Energy Agency, UxConsulting and the World Nuclear Association expect the increase of operational nuclear power units capacity under the basic scenario and by various estimates, from 450 to 500 GW.

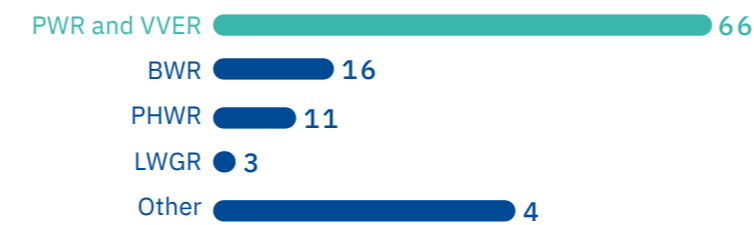


Leningrad NPP-2 (Russia)

Leading countries in terms of operational nuclear power reactors



Nuclear power reactors in the world (% of the total amount of operational nuclear power units)



The Engineering Division of Rosatom State Corporation is the leader of the global NPP construction market. At the same time, the Company's main strategic goal is to retain until 2030 the leading position on the global market in terms of power units to be constructed and the market share taking into account the market growth trends in absolute terms and under the competition strengthened between the well-established and the emerging players (with China and Korea becoming more active). At the same time, besides the growing competition between the market players, the pressure caused by other sources of generation is intensified.

The prioritized task for the Engineering Division is to implement the program aiming to reduce the NPP construction time and cost including optimization of the physical/natural project parameters and application of up-to-date construction technologies.

Among the main competitors in the segment of NPP construction, we must acknowledge French companies that have significant references. Chinese and Korean companies are rated as new competitors that have no significant references yet are capable of showing a high competitive potential in terms of the technologies cost.

1.1.2. Business Model

The updated Company's business model was presented and approved at the meeting chaired by A.E. Likhachev, Director General of Rosatom State Corporation, on 16.10.2017. In order to implement the business model, in 2018 the Engineering Division introduced several organizational changes, namely, new structural divisions and functions, new processes, the previous processes were updated. Respective changes are stipulated in the organization's local normative acts. The changes are made known via internal measures aiming primarily at employee's familiarization with them and at external events carried out by the Engineering Division including ATOMEXPO, dialogues with stakeholders and business meetings.

Realizing the significance of its own business for the economy and the society, the Engineering Division identifies business sustainable development as its primary goal, also by means of increasing of its aggregate cost/value for the shareholders, a wide range of stakeholders and society on the whole. The term "cost/value" does not imply only products manufactured or services rendered or financial results, but a combination of the Company's economic, social and ecological impact on the society and the environment. The chain of the Engineering Division value creation (in the main business core) is a component part of the uniform value chain of the nuclear industry. The Division defines its business model as a system creating value within short-, mid- and long-term perspective and aiming to achieve strategic goals. The Company's business model is based on its long-term strategy.

Business Model

GRI 102-15

Index value as of 31.12.2017

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Index value as of 31.12.2018

Financial Capital



Revenue	175.2 bln RUR	Investments	2.71 bln RUR	Integral investment efficiency indicator	98.9 %
EBITDA	13.9 bln RUR	Payroll budget and social payments	17,116 mln RUR		
Net profit	5.59 bln RUR	Expenses for occupational health and safety	264.13 mln RUR	Expenditures for environmental protection	0.02 bln RUR
		Expenditures for personnel training	167.99 mln RUR		

Manufactured Capital



No incidents according to INES scale of level 2 and higher	Quality Management System ISO 9001-2015		
The amount of procurement contractual obligations	409.8 bln RUR	Share of equipment procurement from Russian manufacturers	91 %
		Amount of power units in the portfolio	33 units

Intellectual Capital



Investments in R&D	0.08 bln RUR	Certificates for computer software and databases	26	Submitted national and regional claims for inventions	106
RF patents of invention, useful models	5	Design as part of Proryv Project			

Human Capital



Average head count	14,463 pers.	Share of employees covered by collective agreements	57 %		
Average amount of training hours per employee	28.4	Share of employees younger than 35 years	40 %	LTIFR	0.06

Social and Relationship Capital



Share of transparency (open procurement published at the Electronic Trading Platform)	94.93 %	Creation of new jobs	3,678
Taxes and fees imposed on and paid by organizations of the Engineering Division	6.24 bln RUR	Amount of charity funds	0.27 bln RUR

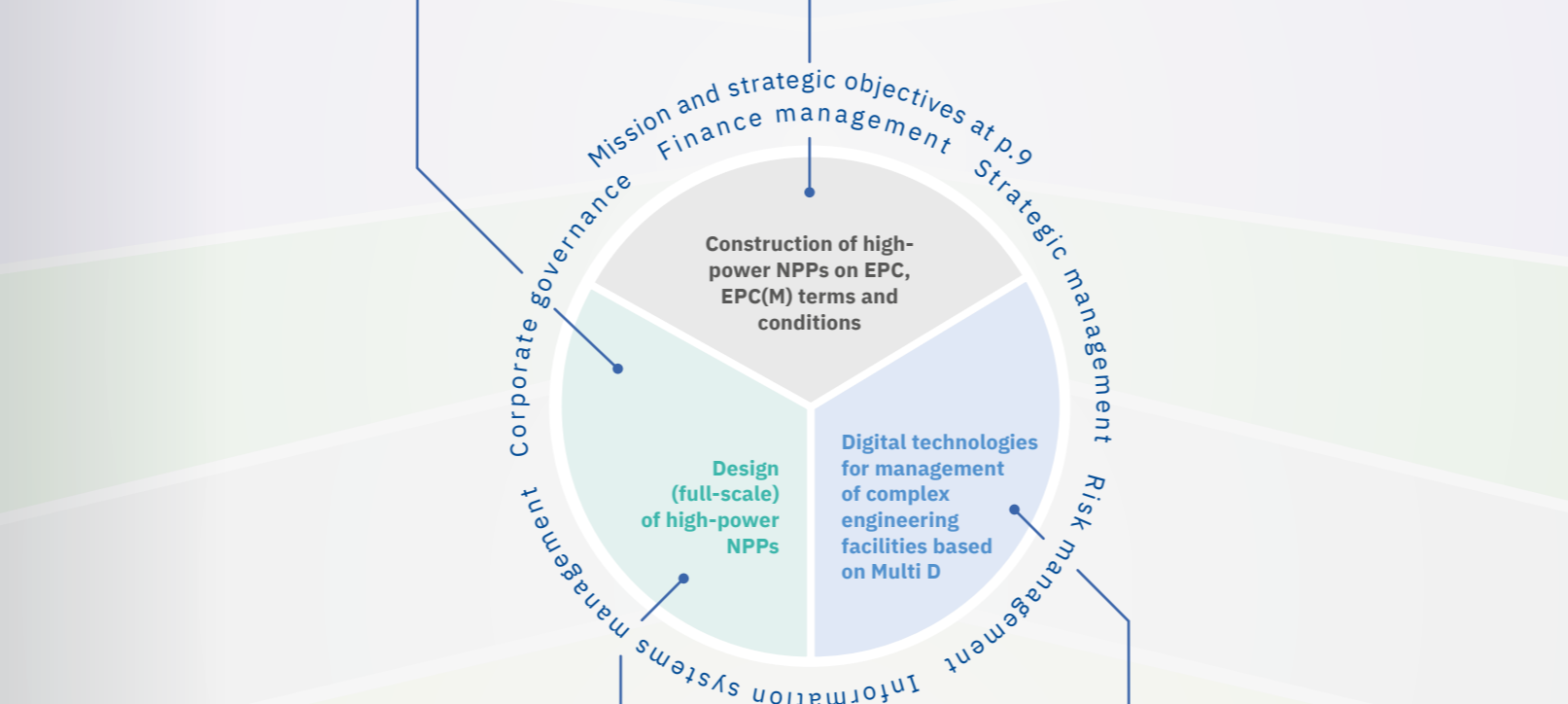
Natural Capital



Water intake during NPP construction:	GRI 303-3		Division's power consumption during NPP construction:	
Surface waters, including swamps, rivers, lakes and oceans	27.6 thous. m ³	Underground waters	11.6 thous. m ³	Electrical power
		Municipal and other water supply systems	121.3 thous. m ³	Thermal power
CO emissions during NPP construction	12.04 tons	Amount of generated waste during NPP construction	4.73 thous. tons	GRI 306-2
		Surface of reclaimed soils, (2015-2017)	351.8 thous. m ²	

Engineering and Construction of high-power NPP with Pressurized Water Reactors

VVER-1000 (reactor type)	VVER-1200 (reactor type)	VVER-TOI (reactor type)
Safety generation III	Safety generation III+	Safety generation III+
Factory type The last power unit of this series, Rostov NPP Power Unit 4 was handed over for commercial operation in 2018	Factory type: full-scale	Factory type In 2018 "first concrete" for Power Unit 1 of Kursk NPP-2 was poured – the first plant in the territory of Russia to be erected in compliance with the state-of-the-art national design – VVER-TOI
1,000 MW Electric power • 3,000 MW Thermal capacity	1,200 MW Electric power • 3,212 MW Thermal capacity	1,255 MW Electric power • 3,300 MW Thermal capacity
Emissions of greenhouse gases and pollutants, annually: CO – 8.3 tons/year CO ₂ – absent SO ₂ – 1.2 tons/year	Emissions of greenhouse gases and pollutants, annually: CO – 3.2 tons/year CO ₂ – absent SO ₂ – 1.1 tons/year	
GRI 303-3 Water intake by VVER-1200 reactor NPP (with the recycling system): – surface waters, including swamps, rivers, lakes and oceans – 120,000 thous. m ³ – underground waters (service and drinking water) – 1,300 thous. m ³ – rain water collected and stored by the company – 430 thous. m ³		



NPP design within the framework of Proryv Project

Reactor type BR-1200	Reactor type Brest-300 (low and medium capacity NPPs)
Stage of works: design	Stage of works: design
1,200 MW Rated electrical power • 2,800 MW Heat power	300 MW Rated electrical power • 700 MW Heat power

Multi-D digital platform, national digital platform, etc.

Revenue	201.9 bln RUR	Investments	7.75 bln RUR	Integral investment efficiency indicator	103.9 %
EBITDA	16.8 bln RUR	Payroll budget and social payments	22,361 mln RUR		
Net profit	21.51 bln RUR	Expenses for occupational health and safety	263.30 mln RUR	Expenditures for environmental protection	0.02 bln RUR
		Expenditures for personnel training	195.64 mln RUR		

Manufactured Capital

No incidents according to INES scale of level 2 and higher	Quality Management System ISO 9001-2015		
The amount of procurement contractual obligations	685.5 bln RUR	Share of equipment procurement from Russian manufacturers	96 %
		Amount of power units in the portfolio	31 units
		Number of "Rosatom Production System" projects	75
		Common economic effect from implementation of RPS-projects	~100 mln RUR

Intellectual Capital

Investments in R&D	0.10 bln RUR	RF patents of invention, useful models	15	Certificates for computer software and databases	12
Foreign states' patents, including decisions to issue patents	11	Submitted national and regional claims for inventions	112	Amount of avant-projects	8
Design as part of Proryv Project					

Human Capital

Average head count	19,191 чел.	Share of employees covered by collective agreements	41 %		
Average amount of training hours per employee	34.4	Share of employees younger than 35 years	44 %	LTIFR	0.05

Social and Relationship Capital

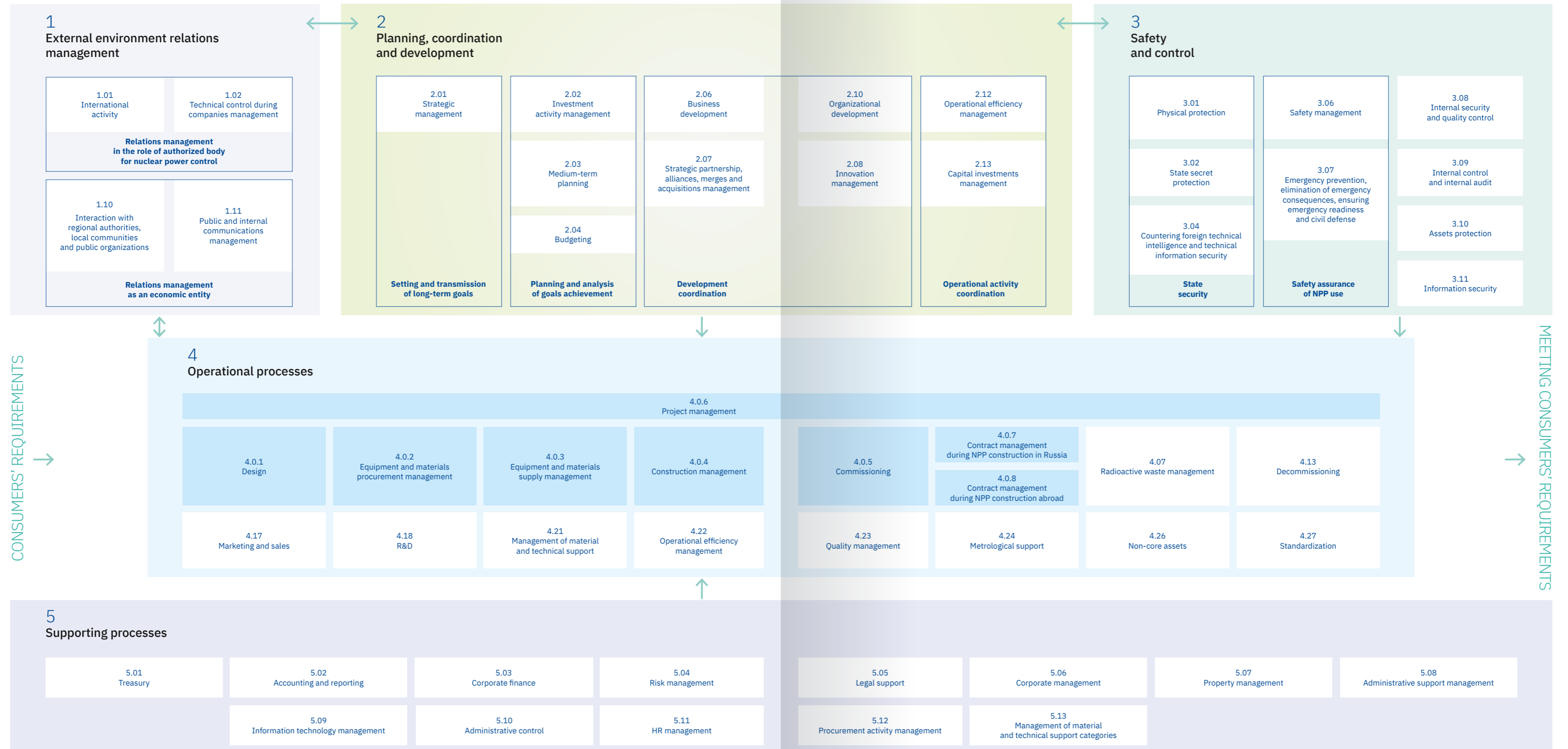
Share of transparency (open procurement published at the Electronic Trading Platform)	95.35 %	Creation of new jobs	6,852
Taxes and fees imposed on and paid by organizations of the Engineering Division	15.43 bln RUR	Amount of charity funds	0.51 bln RUR

Natural Capital

Water intake during NPP construction:	GRI 303-3		Division's power consumption during NPP construction:	
Surface waters, including swamps, rivers, lakes and oceans	76.9 thous. m ³	Underground waters	10.6 thous. m ³	Electrical power
		Municipal and other water supply systems	158.9 thous. m ³	Thermal power
CO emissions during NPP construction	8.62 tons	Amount of generated waste during NPP construction	5.55 thous. tons	GRI 306-2

* Icons denote UN Sustainable Development Goals.

Process model of the Engineering Division



1.2

Risks and Opportunities

1.2.1. Risk Management System

1.2.2. Map of Risks and Opportunities

1.2 Risks and Opportunities

Risk management is one of the conditions to achieve the strategic goals of the Engineering Division

GRI 102-15, 102-29

1.2.1. Risk Management System

In order to manage risks, the Division applies proven methodological approaches on the basis of international standards. In 2018, the risk management standard for the Engineering Division's complex engineering construction projects was updated taking into account the best international practice.

Risk management in 2018

In 2018, risk management of 12 NPP construction projects was carried out in the following areas:

- high-level risks (major risks affecting the project implementation within the period until the project completion);
- milestones risks (milestones achievement on time);
- budget/business-plan risks for the current calendar year and over the next three years;
- risks of project actual cost deviation from the contract value by cost items;
- project risks reviewed at OBEYA meetings.

The risks are detected (identified) in each project, risk owners are specified, corrective measures on risks mitigation are developed by design unit specialists and business areas experts. Implementation of these measures allowed reducing the level of a number of risks.

The final annual report which includes reports on all projects has been issued. The data base on risks is supplemented taking into account the current year's experience.



Territory of Tianwan NPP (China)

In order to computerize the process during the project risk management, automated risk management system (ARMS) is applied. The ARMS main functions are as follows:

- automatic risk identification;
- generation of the data base of NPP construction projects key risks;
- projects risk map maintenance;
- tracing the schedule of the compensating measures.

The Engineering Division took part in implementation of Rosatom State Corporation project for quantitative assessment of NPP construction project risks, the results of which are:

- quantitative assessment of the NPP construction project risks according to the capital project risk management practices of the Russian and global major power companies and requirements of the Total Cost Management Standard of the Association for the Advancement of Cost Engineering (AACE) for 6 NPP construction projects;
- Additional extended parametrical evaluation of NPP construction project risks in 7 NPP construction projects.

The industrial conference of internal auditors was held whose key topic was to review the prospective areas of interface between the risk management functions and the internal control and audit service.

300 persons were trained as part of the corporate training in the area of "Risk management".

The managers of Rosatom State Corporation Engineering Division were trained as part of the risk management course in Engineering & Construction Risk Institute (ECRI).

Risk insurance

The purpose of risk insurance is providing insurance coverage of the Company's property interests when carrying out its production and economic activity, as well as when fulfilling obligations of the contracts under implementation.

Peculiarities of the insurance coverage in the Division are stipulated by the character of the activity to be carried out, projects geography, legislative aspects of the customer countries, customers' requirements, contractual obligations.

Due to this, each particular project is ensured by its unique insurance, the parameters of which depend on the terms of the contracts and agreements to be concluded, specifics of the region, as well as on the national legislation of the country where the project is implemented.

Insurance is made in Russian and foreign insurance companies. The selection of insurers depends on legislative regulations of the customer's country and the customer's requirements. When applicable, risks are allocated in Russian insurance companies that have passed pre-qualification of Rosatom State Corporation.

The package insurance of CEW is made with mandatory involvement of reinsurance companies, both international and Russian ones. If needed, specialized insurance brokers, such as Nuclear insurance broker, AON, Marsh, Willis and others are engaged for insurance.

Subcontractors' works and personnel engaged in a Project are to be insured as well. Subcontractors are responsible for insurance of their own construction machinery and personnel.

1.2.2. Map of Risks and Opportunities

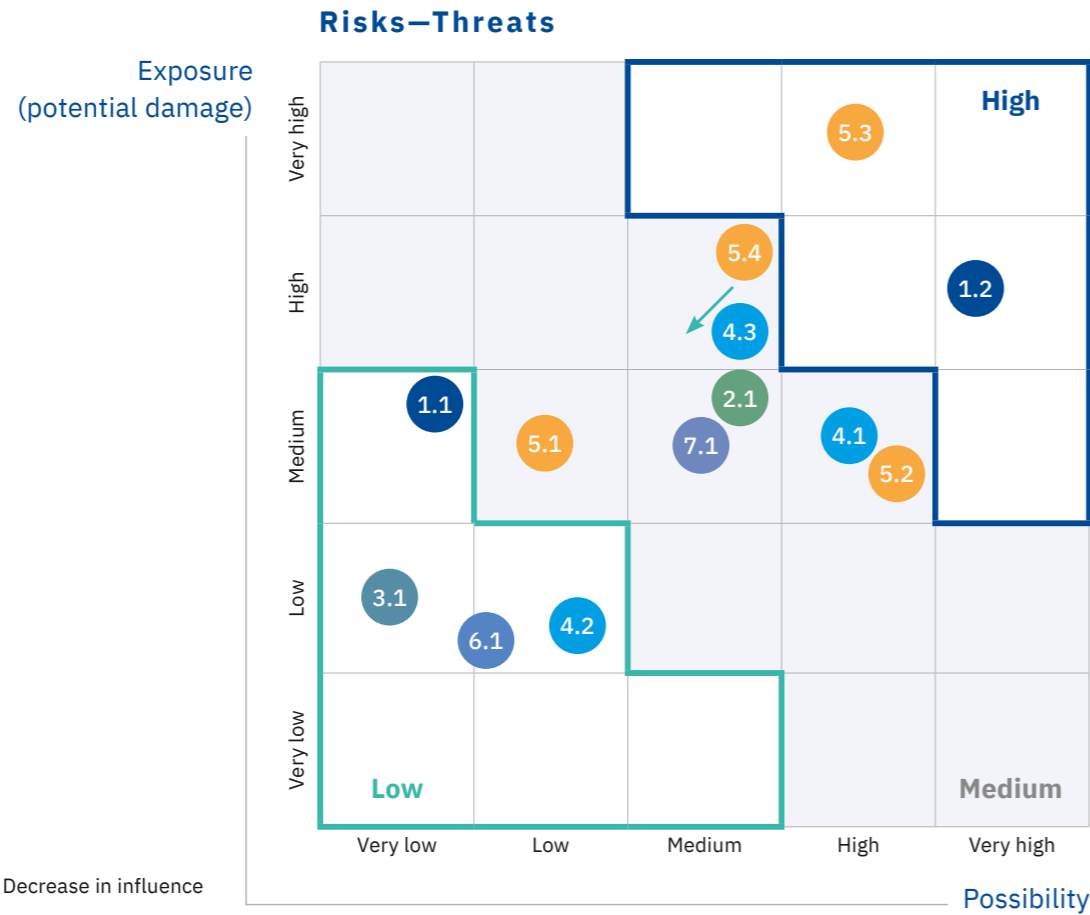
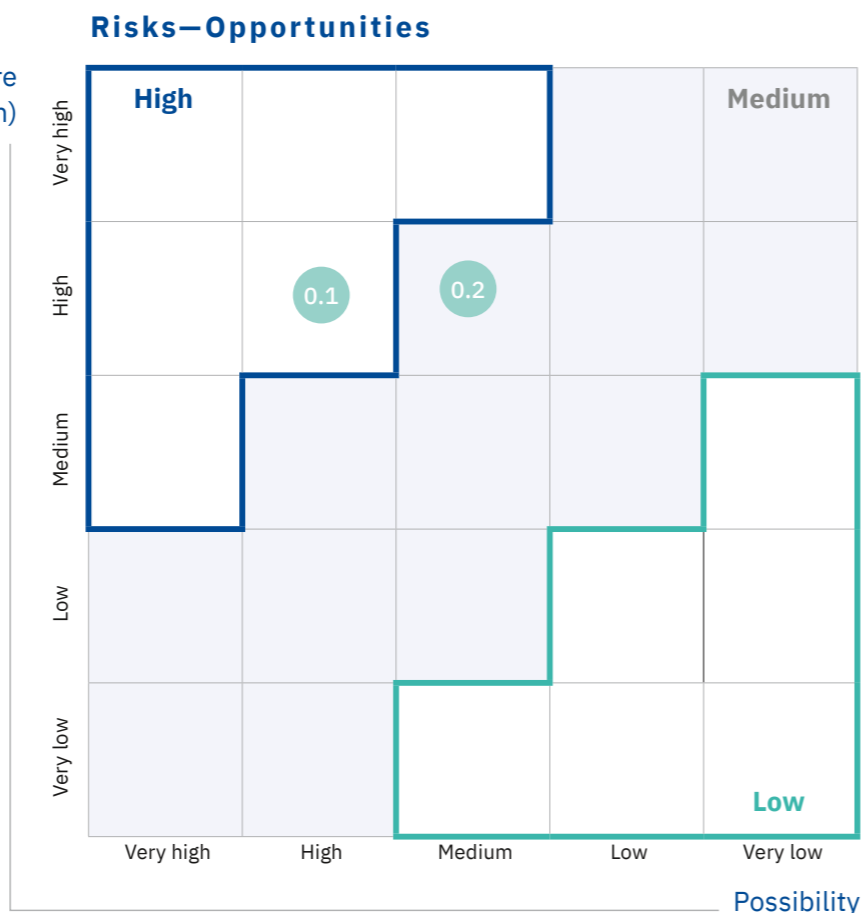


Table 1. Risk change dynamics and key risk management measures of 2018

Following the results of 2018 the Engineering Division's key risks were updated.

Category	Risk No.	Name of risk (risk factor)	Trend	Trend justification	Key activities on risk management and response to risks emerged in 2018. Risk management results in 2018
RISKS—THREATS					
Political risks (including the political and economic instability of the target markets and in RF)	1.1	Risk of violation of the RF international commitments.	Introduced for the first time	The introduction of the risk is caused by separation of external and internal factors of political risks.	Complete fulfillment of the RF international commitments.
	1.2	Risk of violation of the sanctions of foreign states.	At the level of 2017	Maintaining the high level of risk continued sanctions by the USA and EU and retaliatory sanctions by Russia.	In 2018, Engineering Division's activities were not influenced by the risk.
Reputational Risks (change of perception of reliability and advantages of Rosatom State Corporation and its organizations and/or their products by stakeholders in comparison with the current or expected perception)	2.1	Reputational risk (major incidents in the global nuclear industry).	At the level of 2017	The risk dynamics has remained unchanged. The global nuclear industry has not witnessed major nuclear incidents.	Organization of continuous informational exchange with mass media on the activities of the Division, organization of press-tours to NPPs constructed by the Company, organization of PR-support of all important events.
		Mass media publications (in RF and abroad) of articles discrediting Russian nuclear technologies in the traditional and prospective markets.		In some cases, the Company's overseas projects development are faced with opposition from local public organizations and political structures. In general, the scale of this opposition is relatively low, however, such events are periodically covered by the media.	Measures undertaken to strengthen the positive public attitude towards development of the nuclear power industry through further improvement of the information transparency and open communication with all stakeholders. <ul style="list-style-type: none"> Regular interaction with the public and the mass media in the regions of operation. Informing the public on all important events related to JSC ASE EC core business. Publication of the Company's Reports including the Integrated Annual Report. Analysis of stakeholders' structure, identification of their expectations, expansion of stakeholder groups, involvement of foreign stakeholders. Participation in Russian industrial events and international exhibitions and conferences. Strengthening the brand presence on foreign markets through marketing promotion of the brand.
Commercial risks	3.1	Risk of the contractual partners' (external/internal suppliers and buyers) failure to fulfill their obligations in full scope within the established period of time (credit risk for suppliers and buyers).	At the level of 2017	The risk remained at the level of 2017.	In order to minimize the credit risks for contractual partners, the financial status is monitored on the quarterly basis. Within the framework of competitive procedures, the contractual partners' financial resources are assessed. The Company uses guarantees provided by the partner banks of Rosatom State Corporation.
Economic and financial risks	4.1	Risk of unfavorable changes of currency rates (currency risk).	At the level of 2017	In 2018, the trend towards ruble weakening versus major currencies was observed (USD, Euro).	The Engineering Division was not exposed to negative influences in 2018. Individual approach to subcontractors, including accounting for the share of the currency component in the production cost. Control of foreign currency exposure.
	4.2	Risk of unfavorable changes of interest rates (percentage risk).	At the level of 2017	Due to the stable RF Central bank key rate, significant fluctuations of the currency rates were not observed within 2018.	Within the reporting period, the Engineering Division was not influenced by the risk.



Category	Risk No.	Name of risk (risk factor)	Trend	Trend justification	Key activities on risk management and response to risks emerged in 2018. Risk management results in 2018
	4.3	Risk of state funding availability decrease.	Reduction	Risk mitigants: <ul style="list-style-type: none"> The first 9 months of 2018 demonstrated a tendency towards growing prices of oil and gas; The RF sovereign credit ratings were raised by the international rating agencies. (S&P Global Ratings raised the RF sovereign credit ratings as follows: Long-term and short-term ratings for foreign currency obligations — from BB+/B to BBB-/A-3 and long-term and short-term ratings for national currency obligations — from BBB-A-3 to BBB/A-2. The rating forecast is “stable”. 	Within the reporting period, the Engineering Division was not influenced by the risk.
Project risks	5.1	The risk of non-fulfillment of contractual obligations for NPP construction in RF.	At the level of 2017	The risk management system is implemented in NPP construction projects in RF. Complicated issues of NPP construction are reviewed at joint meetings with the Customer, Rosatom State Corporation management and other project participants in the format of brief meetings, steering committee meetings, OBEYA meetings etc. which allows maintaining the risk control at the stable level.	<ol style="list-style-type: none"> Contractual obligations for NPP construction in RF are fulfilled in full scope. Commissioning of Rostov NPP Unit 4. Systematic work for implementation and practical application of: <ul style="list-style-type: none"> information management system for capital construction projects (ISUP KS); integrated cost and time management system for nuclear facilities construction — TOTAL COST MANAGEMENT of NUCLEAR CONSTRUCTION (TCM NC); functional and cost analysis of designed NPP units; making catalogues of design solutions, equipment, materials, civil erection technologies and works during designing and construction of NPPs with VVER reactors; typical technical requirements for equipment; audit of the data reliability of suppliers of products, works and services; industrial quality management system (UIS-Quality); unified industry procedure for non-conformance control.
	5.2	The risk of non-fulfillment of EPC contracts for NPP construction projects abroad.	At the level of 2017	Absence of factors in 2018 influencing the fulfillment of the Division's obligations under EPC-contracts for NPP construction abroad.	Strict fulfillment of contractual conditions for NPP construction abroad (see i. 3 of risk 4.1)
	5.3	Loss of contract, postponement of EPC-contract for NPP construction abroad.	At the level of 2017	Maintaining the risk at high level in 2018.	The risk was not realized in the Engineering Division's projects.
	5.4	Reduction of the customer's financing.	At the level of 2017	Political and economic stability on target markets.	Work for searching possibilities to finance prospective projects was carried out together with Rusatom Overseas JSC both by attracting RF credit resources, alternative sources and redistribution of free credit resources among projects.
Technological risks	6.1	Risk of decreasing of competitiveness of the developed technologies.	At the level of 2017	Growth factors: <ul style="list-style-type: none"> Growth of NPP operational costs. Prolongation of NPP construction time. Stricter NPP safety requirements. Development of new technologies in the conventional power industry and enhancement of the energy efficiency of production in the developed countries. 	Key works for risk management: <ul style="list-style-type: none"> Analysis of engineering solutions based on the open information about national and foreign technologies and NPP projects. Participation in IAEA projects in terms of review of efficiency of renewable power sources as compared to nuclear power.

Category	Risk No.	Name of risk (risk factor)	Trend	Trend justification	Key activities on risk management and response to risks emerged in 2018. Risk management results in 2018
	7.1	Risk of qualified staff shortage	At the level of 2017	Risk impact growth factors: <ul style="list-style-type: none"> The shortage / absence of specialists in the field of nuclear energy in the target countries for NPP construction. Shortage of blue-collar and engineering specialists in RF. 	<ul style="list-style-type: none"> A record growth of renewable sources of energy during the last year. Reduction factors: <ul style="list-style-type: none"> References exist for the majority of the offered products. Application of digital solutions as part of the Digitalization program for organization of works throughout the whole NPP lifecycle. Power shortage and interest in nuclear energy in the emerging countries.
Human resources					<ul style="list-style-type: none"> Continuous development of the system, structure and culture of the project activity in design and construction according to the design management standards, including IPMA. Improvement of design quality, cost reduction at all stages of NPP life cycle due to the use of BIM and Multi-D technologies. Evaluation of implemented projects at the pre-investment phase according to the criteria of novelty, cost and quality. Assisting the customer countries in developing their own nuclear infrastructure. Diversification of activities, product ranges and services taking into account the diversity of customer requirements. Development of new market segments. Package offers to consumers of products and services. Development of principles of standard technical solutions and equipment to reduce the design and procurement periods.
					Evaluation of competence and level of English knowledge, re-training. <ul style="list-style-type: none"> Employment from the labor market of specialists having competence in the area of international logistics and suppliers audit on international markets. Employment of specialists having competence in the area of international designing. Employment of graduates of the Higher Engineering School. Employment of graduates from RF higher educational institutions, MPhI, Master's Degree Program of the Russian Academy for Foreign Trade. Measures to reduce the impacts of risks in the Project Directorates: <ul style="list-style-type: none"> Rotation of experienced specialists from the Division (candidates' pool, employees with a high potential) to international projects — about 15%. Employment of specialists with competence in the field of international contracting (FIDIC standards), international supplies and logistics, quality management, licensing and audits of contractors accounts — closing 80% of the demand. Employment of graduates of MSCU, “Incubator” project (10%). Measures to reduce the impacts of risks in the Construction Branch Offices: <ul style="list-style-type: none"> Rotation to international projects of experienced Division's specialists and specialists from the completed construction projects in Russia, such as: Rostov NPP, Novovoronezh NPP-2, Belarus NPP — 10–20%of the demand. Employment of foreign experts from the labor market in the area of engineering policy, coordination and arrangement of the work of contractors, acceptance of the equipment — closing up to 35% of the demand. Employment of graduates of higher educational institutions in the relevant areas of expertise — 10%.
RISKS—OPPORTUNITIES					
IT	0.1	Transformation into a digital Company	At the level of 2017	Development of the digital economy in Russia, penetration of digital technology into all processes of operating activities.	Implementation of Data-oriented comprehensive digital management system. Digitalization of processes to improve the quality and speed. Updating the infrastructure to support digital transformation.
Human resources	0.2	Increase of the personnel efficiency under conditions of transition to a digital Company	At the level of 2017	Reducing transaction/time costs for processing information and making decisions. Increase of the personnel effectiveness through the use of information technologies.	Personal transformation of the staff, training of digital transformation leaders inside JSC ASE EC and supporting leaders on the outside. Formation of basic knowledge and skills that contribute to the development and implementation of projects within the framework of transition to a digital Company.

1.3

Corporate Governance

- 1.3.1. Corporate Governance System of the Engineering Division
- 1.3.2. Corporate Governance in the Engineering Division's Key Organizations



13

organizations within the Engineering Division management scope



4

industry's leading companies:
JSC ASE EC
JSC ASE
JSC "Atomenergoproekt"
JSC ATOMPPOEKT

1.3 Corporate Governance

GRI 102-10

Milestones 2018 in the field of corporate governance

- On 09.02.2018, NIAEP-Service LLC was liquidated and excluded from the Unified State Register of Legal Entities.
- On 17.04.2018, JSC ASE transferred the shares of METSAMORENERGOATOM JSC to Rusatom Energo International JSC (REIN JSC) on the basis of securities sale and purchase agreement dated April 13, 2018 No. 7756/172016.
- On 15.10.2018, a contract was concluded on the handover of powers of the sole executive body of SEZAM Joint-Stock Company between JSC ASE EC and SEZAM JSC (with the validity period from 17.10.2018 till 31.03.2019).
- On 07.12.2018, JSC ASE EC extraordinary shareholders' meeting elected Alexander Markovich Lokshin as President of JSC ASE EC from 08.12.2018.
- On 19.12.2018 and 25.12.2018, JSC ASE concluded share sale and purchase agreements on the basis of which it acquired 97.96% of SEZAM JSC voting shares on 20.12.2018 and 26.12.2018.

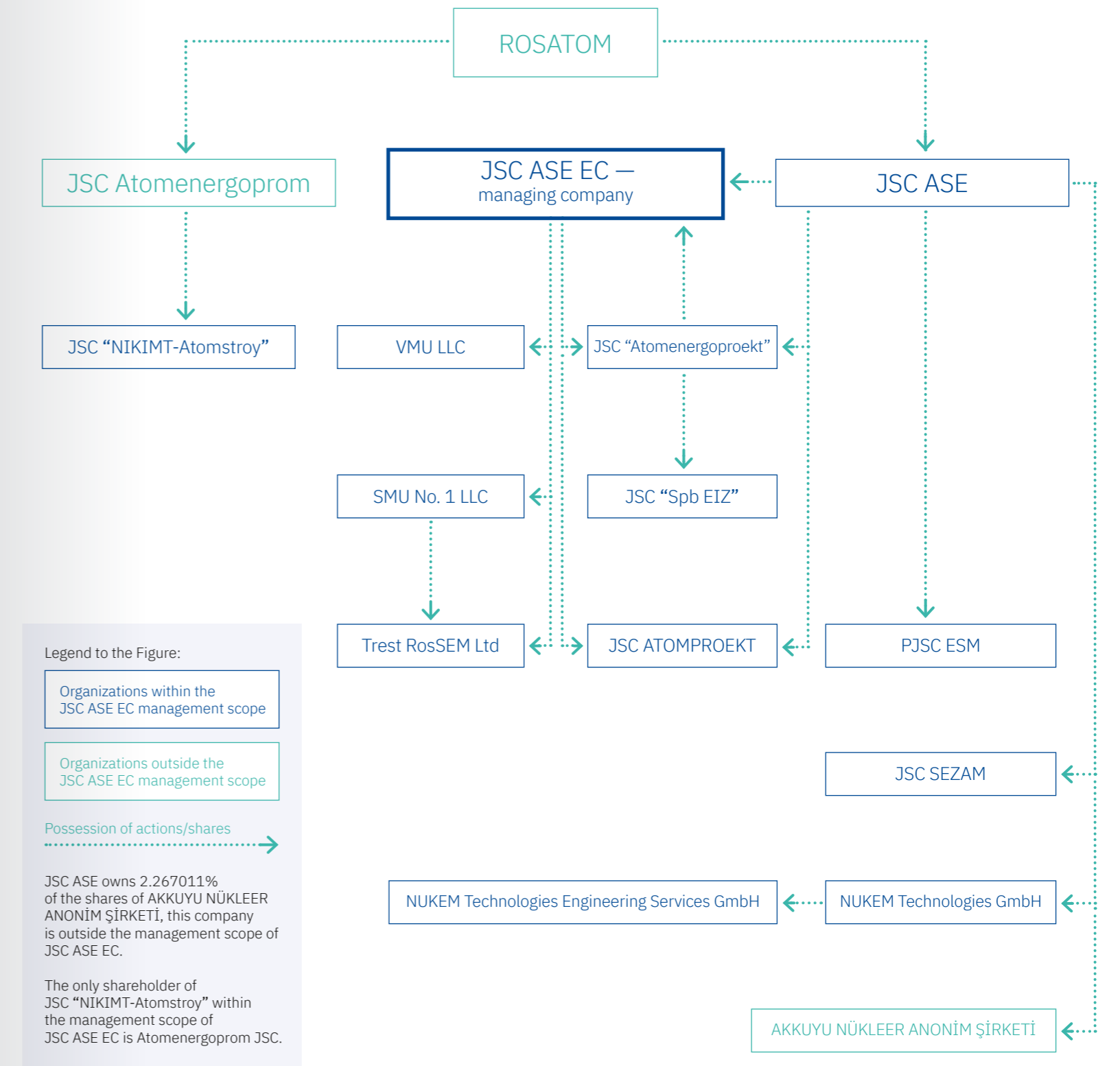
Basic principles of corporate governance of the Division's Joint-Stock companies include protection of shareholders' rights and interests, efficient management of the Board of Directors, transparency and objective disclosure of information about the companies' activities, legitimacy and ethics (see in more detail in the Annual Report of the Engineering Division for 2017).

Respecting the Corporate Governance Code

Individual standards of the Corporate Governance Code recommended by the Bank of Russia Letter No. 06-52/2463 dd.10.04.2014 are stipulated in a number of local regulations of the Division and are applied in practice, provided that most organizations within the management scope are non-public joint-stock companies and taking into account the specifics of the State Corporation Rosatom legal status, envisaged by the regulatory legal acts of the Russian Federation that ensure the uniform management of nuclear industry organizations.

1.3.1. Corporate Governance System of the Engineering Division

GRI 102-18



GRI 102-18, 102-19, 102-22, 102-23

1.3.2. Corporate Governance in the Engineering Division's Key Organizations



Members of the Board of Directors



VLASOV Alexander Vyacheslavovich

Chairman of the Board of Directors.
Deputy Director of International Business Department — Head of Rosatom State Corporation Department for Global Development and Strategic Partnerships.



PARAMONOV Dmitry Victorovich

Director of the Program — Head of Rosatom State Corporation Project Office for Product Development.



BAYDAROV Dmitry Yuryevich

Deputy Director of Development and International Business Unit — Head of New Business Support Division of Rosatom State Corporation.



LIMARENKO Valery Igorevich

President of JSC ASE EC (till December 07, 2018).



BORISOV Ivan Alexeevich

Senior Vice President for Development of JSC ASE EC (till September 18, 2018).

Joint-Stock Company ASE Engineering Company (JSC ASE EC) Corporate Governance

President of JSC ASE EC, Managing Company of JSC ASE, JSC "Atomenergoproekt", JSC ATOMPROEKT

Organizes execution of the management bodies' resolutions by issuing instructions, administrative and executive orders, delegating powers by means of powers of attorney.

Top managers and other employees

For monthly assessment of top managers' effectiveness, the assessment system of operative performance indicators is applied. The KPI system is applied as annual assessment of effectiveness (the KPI system is specified in detail in section "Human Capital"). For effectiveness assessment over one-year period, design and strategic bonus payment system with the relevant indicators is applied.

GRI 102-5

JSC ASE EC is a non-public Joint-Stock Company, nature of ownership — property of state corporations.

Decisions are taken by the management bodies as part of their competence according to the Federal Law "On Joint-stock Companies", the Company's Articles of Association (the competence of the shareholders' general meeting is stipulated by Article 12 of JSC ASE EC Articles of Association, the competence of the Board of Directors is stipulated by Article 13, the competence of the sole executive body is stipulated by Article 14 of the Company's Articles of Association).

There is no revision committee in the Company. The Company's management bodies arrange and carry out the internal control of actual business operations in accordance with internal documents and local regulatory acts of the Company.

JSC ASE EC Articles of Association are available at: www.e-disclosure.ru/portal/files.aspx?id=19054&type=2.

The activity of JSC ASE EC general shareholders meeting and the Board of Directors is aimed at ensuring efficient management of the Company and focused on high profitability and competitiveness of business, minimization of risks and possible negative consequences caused by the Company's economic activity, meeting the requirements of the RF legislation, international legal norms, legislation of the states in the areas of business operations.

Information about the work of special-purpose committees

Special-purpose Committees are not available in the JSC ASE EC Board of Directors, since decisions about their establishment that are in the competence of JSC ASE EC Board of Directors have not been taken.

According to i. 14.1 of JSC ASE EC Articles of Association, the President is the sole executive body of the Company, he administers the day-to-day operations of the Company. The President is subordinate to the Company's Board of Directors and the General Meeting of Shareholders.

The President shall be elected by the Company's General Meeting of Shareholders.

During the reporting period from 01.01.2018 to 07.12.2018, the authorities of JSC ASE EC sole executive body (President) were executed by Limarenko Valery Igorevich.

By the decision of the JSC ASE EC extraordinary shareholders' meeting dd. 07.12.2018 (Minutes of Meeting dd. 07.12.2018 No. 25), Lokshin Alexander Markovich was elected as President of JSC ASE EC from 08.12.2018.

Within the reporting period, no claims against the Company's sole executive body were made.

V.I. Limarenko and A.M. Lokshin neither owned JSC ASE EC shares nor committed any transactions on shares acquisition or selling in 2018.

Establishment of a collective executive board is not foreseen by the JSC ASE EC Articles of Association.

In the reporting period, there was no conflict of interests in JSC ASE EC.

Information about JSC ASE EC registrar

Joint-Stock Company "Independent Registrar Company R.O.S.T".

Abbreviated name of the registrar company: NRK — R.O.S.T. JSC.

Company location: bld. 13, 18, Stromynka str, Moscow.

No. of professional stock trader license to keep the register of holders of registered securities: No. 045-13976-000001.

License issued: 03.12.2002.

License validity: unlimited validity period.

License issued by: Federal commission of securities market (Russia's FCSM).

Share capital and securities

The Company has placed ordinary shares with the nominal cost of 1 (one) ruble each in the number of 500 001 877 (five hundred million one thousand eight hundred and seventy seven) pieces for a total amount of 500 001 877 (five hundred million one thousand eight hundred and seventy seven) rubles.

All shares of the Company are issued non-documentary and placed by means of closed subscription.

As of 31.12.2017, the charter capital of the Company amounted to 500 001 877 rubles.

According to the independent assessor's report as of 15.10.2018, the market value of one registered ordinary share amounted to 28 rubles 20 kopecks.

As of 31.12.2018, the Company's shares were distributed between shareholders as follows: JSC ASE owns 99.9999980% of shares, JSC "Atomenergoproekt" owns 0.0000020% of JSC ASE EC shares.

Dividend policy and report on payment of declared (accumulated) dividends within the reporting period

JSC ASE EC has no approved dividend policy.

The procedure of dividend payment in JSC ASE EC is regulated by Section 8 of the Articles of Association. In accordance with the Articles of Association, pursuant to the results of the first quarter, half-year period, nine-month period of the financial year and/or the financial year, the Company is entitled to make decisions on payment of dividends on the shares placed unless otherwise is specified by the Federal Law "On Joint-Stock Companies". The decision on payment of dividends pursuant to the results of the first quarter, half-year period, nine-month period of the financial year can be made within three months upon completion of the corresponding period. Decisions (announcement) on payment of dividends, including the decisions on the amount, procedure, form and terms thereof, are made by the general shareholders meeting. Besides, the amount of dividends cannot exceed the one recommended by JSC ASE EC Board of Directors.

According to decision of the JSC ASE EC general shareholders annual meeting of 25.06.2018, JSC ASE EC profits by the results of the 2017 reporting year shall not be distributed, dividends by the results of the 2017 reporting year shall not be announced and shall not be paid.

“ On 07.12.2018, JSC ASE EC extraordinary shareholders' meeting elected Alexander Markovich Lokshin as President of JSC ASE EC from 08.12.2018 ”

JSC ASE EC general shareholders meeting

According to i. 12.1 of Article 12 of the JSC ASE EC Articles of Association, the Company's supreme executive body is general shareholders meeting.

As of 01.01.2018, the shareholders of JSC ASE EC were Joint-Stock Company "Atomstroyexport" (JSC ASE) and Joint-Stock Company "Atomenergoproekt" (JSC "Atomenergoproekt").

JSC ASE EC general shareholders meeting takes decisions on the issues within its competence in accordance with Article 48 of the Federal law dd. 26.12.1995 No. 208-FZ "On Joint-stock Companies", chapter 4 part 1 of the Civil Code of the RF, cl. 12 of JSC ASE EC Articles of Association.

In 2018, the JSC ASE EC general shareholders meeting took decisions on the following issues:

- approval of JSC ASE EC Articles of Association in new revision No. 5;
- distribution of profits (including payment (declaration) of dividends) and losses of JSC ASE EC according to the results of the reporting year of 2017;
- election of the JSC ASE EC Board of Directors;
- premature cessation of authorities of the JSC ASE EC sole executive body and establishment of a sole executive body of JSC ASE EC.

Board of Directors of JSC ASE EC

According to i. 13.1 of Article 13 of JSC ASE EC Articles of Association, the Company's Board of Directors carries out general management of the Company's activities. The JSC ASE EC Board of Directors comprises 5 persons.

The Board of Directors takes decisions on the issues within its competence in accordance with cl.65 of the Federal law dd. 26.12.1995 No. 208-FZ "On joint-stock companies", chapter 4 part 1 of the Civil Code of the Russian Federation, cl. 13 of the Company's Articles of Association. The meetings of JSC ASE EC Board of Directors are held in absentia.

The Board of Directors' meetings are convened by Chairman of the Board of Directors upon his initiative, upon request of the BoD member, auditor or the sole executive body (President) with suggestion of issues on the agenda.

The members of JSC ASE EC Board of Directors neither have shares in the equity capital of JSC ASE EC nor own shares of JSC ASE EC; the members of the Board of Directors committed no transactions on shares acquisition or selling within the reporting period; KPI were not awarded, remunerations were not paid to the Board of Directors members within the reporting period.

During 2018, the structure of the Board of Directors changed based on decisions of the General Shareholders Meeting.

As of 01.01.2018, JSC ASE EC Board of Directors elected by the decision of the General meeting of shareholders dd. 26.06.2017 (Minutes of Meeting No. 19) included:

1. Barabanov Oleg Stanislavovich — Chairman of the Board of Directors, is not simultaneously the Company's Executive Director.
2. Arseev Boris Nikolaevich.
3. Vlasov Alexander Vyacheslavovich.
4. Limarenko Valery Igorevich.
5. Borisov Ivan Alexeevich.

According to the decision of the annual general shareholders meeting of 25.06.2018 (Minutes of Meeting No. 23), the following persons were elected as members of the Board of Directors:

1. Vlasov Alexander Vyacheslavovich — as Chairman of the Board of Directors, is not simultaneously the Company's Executive Director.
2. Baydarov Dmitry Yuryevich.
3. Paramonov Dmitry Victorovich.
4. Limarenko Valery Igorevich.
5. Borisov Ivan Alexeevich.

As of 31.12.2018, the membership of JSC ASE EC Board of Directors remained unchanged.

Report of JSC ASE EC Board of Directors on the activity results can be found in Appendix 9 of the Book of Appendices.

The information about major transactions and transactions with interest can be found in Appendix 10 of the Book of Appendices.

Short biography of the President of JSC ASE EC (since 08.12.2018)

LOKSHIN
Alexander
Markovich



Date and place of birth

A.M. Lokshin was born on October 11, 1957 in Chita.

Education

- In 1980, he graduated from the M.I. Kalinin Leningrad Polytechnic Institute, his major was thermal physics.
- In 2001, he graduated from the Academy of National Economy under the RF Government (President's program).

Job experience

- In 1980–1996 A.M. Lokshin held positions of engineer, senior engineer of the thermal testing laboratory, senior engineer for power unit control, inspection engineer on turbine equipment of the turbine workshop, shift supervisor of the turbine shop, shift supervisor of unit No. 2, shift supervisor of Smolensk NPP-1 (Desnogorsk of the Smolensk Region).
- In 1996–1998 — Deputy Head of General Directorate, Deputy Head of Commercial Department — Head of Information Analytical Department of the State Enterprise “Russian State Concern for Production of Electrical and Heat Energy and Nuclear Power Plants” (GP Rosenergoatom).
- In 1998–2001 — First Deputy Director for Marketing, Economy and Commerce of GP Rosenergoatom.
- In 2001–2006 — Acting Director, Director, Deputy Director General of the Federal State Unitary Enterprise “Russian State Concern for Production of Electrical and Thermal Energy at NPPs” (FSUE Rosenergoatom) — Director of Smolensk NPP — Branch of FSUE Rosenergoatom.
- In 2006–2008 — First Deputy Director General, Director General of FSUE Rosenergoatom.
- June 2008 — January 2010 — Deputy Director General of Rosatom State Corporation.
- February 2010 — April 2011 — Deputy Director General — Director of Directorate for Nuclear Power Complex of Rosatom State Corporation.
- April 2011 — November 2012 — First Deputy Director General — Director of Directorate for Nuclear Power Complex of Rosatom State Corporation.
- November 2012 till the present time — First Deputy Director General for Operations Management of Rosatom State Corporation.
- From December 2018 — President of JSC ASE EC. A.M. Lokshin combines this work with the duties of First Deputy Director General for Operations Management of Rosatom State Corporation.
- He is awarded the Order of Honor (2012), the 4th degree Order of Merit for Country (2018); he has the honorary title of “Honored Power Engineer of the Russian Federation” (2000), the honorable distinction mark “E. Slavsky” by Rosatom State Corporation (2017) and other industry awards.

Short biography of the President of JSC ASE EC (from 01.01.2018 to 07.12.2018)

LIMARENKO
Valery
Igorovich



Date and place of birth

V.I. Limarenko was born on October 19, 1960 in Kharkov.

Education

V.I. Limarenko graduated from Kharkov Aviation Institute with degree in liquid propellant jet engines, mechanical engineer.

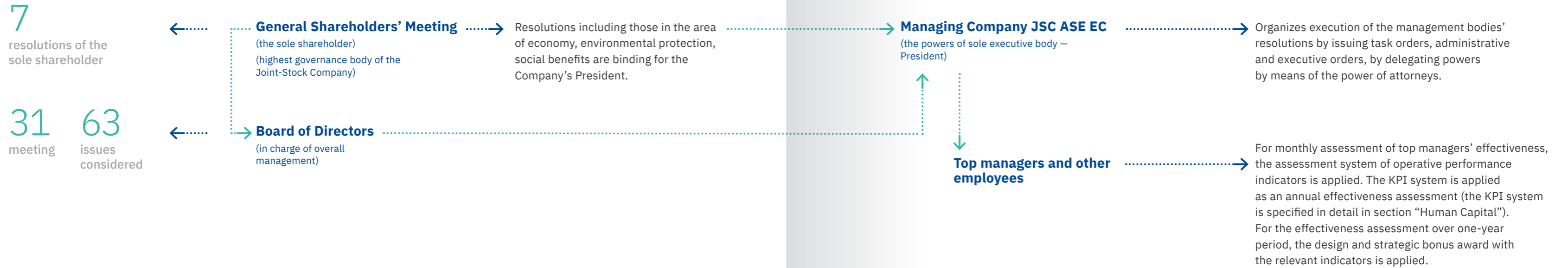
Job experience

- 1983–1996 — research activity in the Russian Federal Nuclear Centre — All-Russian R&D Institute of Experimental Physics (FSUE RFNC-VNIIEF), he was promoted from design engineer to Lead Research Engineer.
- 1996–2001 — V.I. Limarenko held positions of Deputy, the First Deputy Chairman of the Sarov Municipal Duma on Economy and Finance.
- 2001–2003 — V.I. Limarenko held position of minister for construction, housing and municipal infrastructure of the Government of Nizhny Novgorod region.
- 2003–2005 — V.I. Limarenko worked in Administration of RF President as plenipotentiary representative of RF President in Volga Federal District, Chief State Inspector of the Nizhny Novgorod region.
- 2005 — May 2007 — Deputy Governor, Deputy Chairman of the Government of Nizhny Novgorod region for construction, power industry, housing and municipal infrastructure and information technologies.
- In May 2007, V.I. Limarenko worked as Head of FSUE Nizhny Novgorod Research and Development Design Institute “Atomenergoproekt” (FSUE NIAEP).
- Starting from November 2012 V.I. Limarenko worked as President of JSC NIAEP (from 2012 — the managing company of JSC ASE, from 2014 — the managing company of JSC “Atomenergoproekt”, from 2015 — the managing company of JSC ATOMPROEKT). From July 2016 he was Head of the Engineering Division of Rosatom State Atomic Energy Corporation.
- From 06.12.2016 till 07.12.2018 he was President of JSC ASE EC.
- Since 07.12.2018 up to now he holds the position of acting Governor of the Sakhalin Region.
- Doctor of Economic Sciences.

Brief backgrounds of members of JSC ASE EC Board of Directors

	VLASOV Alexander Vyacheslavovich	LIMARENKO Valery Igorovich	BORISOV Ivan Alexeevich	BAYDAROV Dmitry Yuryevich	PARAMONOV Dmitry Viktorovich	BARABANOV Oleg Stanislavovich <small>(was a Board of Directors member until 25.06.2018)</small>	ARSEEV Boris Nikolayevich <small>(was a Board of Directors member until 25.06.2018)</small>
Date and place of birth	15.02.1985, Moscow	19.10.1960, Kharkov	21.04.1981, Leningrad	11.09.1966, Penza-19 of Penza region	03.08.1968, Moscow	17.12.1971, Moscow	22.09.1971, Sverdlovsk
Education	Higher, Moscow Engineering and Physical Institute, specialist in the field of international scientific and technical cooperation. Moscow State Institute of International Relations under MIA of Russia.	Higher, Doctor of Economics, Kharkov Aviation Institute.	Higher, St. Petersburg State University.	Higher, PhD in Law, Penza Polytechnic Institute. Penza State University. Moscow Financial College under the Ministry of Finance of Russia. The Academy of National Economy under the Government of the Russian Federation. People's Friendship University of Russia.	Higher, Doctor of Philosophy Moscow Aviation Institute; New Mexico University (Albuquerque, USA); New Mexico University (Albuquerque, USA); Pittsburgh University (Pittsburgh, USA).	Higher, PhD in Economics, S. Ordzhonikidze Moscow State Geological Survey Academy The Institute of Professional Accountants and Auditors. The Military University.	Higher, PhD in Technical Sciences, S.M. Kirov Ural Polytechnic Institute, C.M. Russian Presidential Academy of National Economy and Public Administration. B.N. Yeltsin Ural Federal University.
Job experience (latest 5 years)	October 2010 — September 2015 — Senior Manager of Regional Development and Strategic Partnership Office, International Business Department. September 2015 — September 2017 — Head of Regional Development and Strategic Partnership Office, International Business Department of Rosatom State Corporation. Since September 2017 — Deputy Director of International Business Department — Head of Global Development and Strategic Partnership Office of Rosatom State Corporation.	In May 2007, V.I. Limarenko took charge of FSUE Nizhny Novgorod Research and Development Design Institute Atomenergoproekt (NIAEP FSUE). Starting from November 2012, V.I. Limarenko worked as the President of JSC NIAEP (since 2012 — Managing Company of JSC ASE, since 2014 — Managing Company of JSC “Atomenergoproekt”, since 2015 — Managing Company of JSC ATOMPROEKT). From October 2014 — President of JSC NIAEP. December 2016 — 07.12.2018 — President of JSC ASE EC.	2011–2013 — Director for Development and Restructuring (Development and International Business Unit) of Rosatom State Corporation. 2013–2014 — Vice President for Development of JSC NIAEP. From 2014 — Vice President for Development of Public Company NIAEP. 17.08.2017–18.09.2018 — Senior Vice President for Development of JSC ASE EC.	D.Y. Baydarov has been employed in Rosatom State Corporation since April 2012 till the present time: 2012 — March 2015 — Deputy Director of Nuclear Weapon Complex Directorate. March 2015 — April 2018 — Head of Civilian Production Development Project Office. April 2018 — January 2019 — Head of New Business Implementation Division. Since January 2019 — Deputy Director of Development and International Business Unit — Head of New Business Support Division of Rosatom State Corporation.	October 2012 — April 2015 — Deputy Director General for Strategy and Science, Chairman of Scientific and Technical Research Council of JSC “Atomenergoproekt”. April 2015 — January 2017 — Director for Science and Innovations of JSC ASE EC. January 2017 — August 2017 — Deputy Director General for Strategy and Science of JSC “Atomenergoproekt”. Since August 2017 — Program Director — Head of NPP Product Development Project Office of Rosatom State Corporation.	July 2011 — July 2014 — Director of Rosatom State Corporation Treasury. July 2014 — March 2018 — Director for Development and Restructuring of Rosatom State Corporation. Since March 2018 — First Deputy Director General of Atomredmetzoloto Joint-Stock Company.	February 2010 — February 2013 — Engineering Director, Sales Director, Commercial Director, Acting Director General of JSC Atomenergomash. February 2013 — November 2013 — Executive Vice President of JSC Rusatom Overseas. February 2014 — November 2016 — Director of International Business and Development Department, Deputy Director General — Director for Business Development of JSC “Rosenergoatom”. Since November 2016 — Deputy Director of Development and International Business Unit — Head of International Business Department of Rosatom State Corporation.

**Joint-Stock Company “Atomstroyexport” (JSC ASE)
Corporate Governance**



Members of the Board of Directors



**ARSEEV
Boris
Nikolayevich**

Chairman of the Board.
Deputy Director of Development and International Business Unit – Head of International Business Department of Rosatom State Corporation.

**VLASOV
Alexander
Vyacheslavovich**

Deputy Director of International Business Department – Head of Global Development and Strategic Partnerships Office of Rosatom State Corporation.

**VIKHANSKY
Nikolay
Igorovich**

Vice President for Capital Construction of JSC ASE EC.

**BAYDAROV
Dmitry
Yuryevich**

Deputy Director of Development and International Business Unit – Head of New Business Support Division of Rosatom State Corporation.

**SAVUSHKIN
Vladimir
Nikolaevich**

Vice President – Director of JSC ASE EC Moscow Branch.

GRI 102-5

JSC ASE legal form is a non-public stock company.

Resolutions are taken by the management boards within their terms of competence according to the Federal Law “On Joint-Stock Companies” and the Company’s Articles of Association.

There is no internal audit commission in the Company. The management bodies of the Company arrange and carry out internal control of actual business operations in accordance with internal documents and local regulatory acts of the Company (i. 11.2 of JSC ASE Articles of Association).

General Shareholders’ Meeting (the sole shareholder) is highest governance body of JSC ASE. The Company’s Board of Directors carries out general management of the Company’s activity. The President is the sole executive body of the Company, which administers the day-to-day operations of the Company. The President is subordinate to the Board of Directors and the general shareholders’ meeting (sole shareholder) of the Company. In 2018, powers of the sole executive body of the Company were exercised by the Managing Company – JSC ASE EC based on resolution of the sole shareholder of JSC ASE No. 3 dd. 30.03.2017 and agreement on JSC ASE sole executive body powers transfer No. 7763/171268 dd. 31.03.2017, concluded between JSC ASE and JSC ASE EC.

JSC ASE Board of Directors does not have commissions and committees set up in its structure.

JSC ASE Articles of Association are available at: www.e-disclosure.ru/portal/company.aspx?id=36765.

Information about JSC ASE registrar

Registrar company STATUS, Joint-Stock Company.
Location: 23, bldg. 1, room 1, Novokhokhlovskaya str., Moscow 109052, Russian Federation.
PSRN: 1027700003924, TIN: 7707179242.
Phone: + 7 (495) 974-83-50.
Fax: + 7 (495) 678-71-10.
E-mail: office@rostatus.ru.
Web-site address: www.rostatus.ru.
The license for keeping the register of security holders No. 10-000-1-00304 is issued by the Federal Stock Market Committee (FSMC of Russia) on 12.03.2004.

“ On **19.12.2018** and **25.12.2018**, JSC ASE concluded share sale and purchase agreements on the basis of which it acquired 97.96% of JSC SEZAM voting shares on 20.12.2018 and 26.12.2018”

Share capital and securities

Charter capital of JSC ASE amounts to 350 044 835 15/91 rubles.

JSC ASE placed registered ordinary shares with the nominal cost of 10 90/91 rubles each in the amount of 31 854 080 pieces for a total amount at a nominal value of 350 044 835 15/91 rubles. Privileged shares were not placed. The shares are out of public float, their current market value has not been specified.

As of 31.12.2018, JSC ASE owns securities/shares in the charter capitals of the following commercial companies:

1. **Joint-Stock Company ASE Engineering Company (JSC ASE EC).**

JSC ASE share in the charter capital of JSC ASE EC amounts to 99.9999998% (100% minus 1 share). The amount of voting shares belonging to JSC ASE is 99.9999998% (100% minus 1 share).

2. **Joint-Stock Company “Atomenergoproekt” (JSC “Atomenergoproekt”).**

JSC ASE share in the charter capital of JSC “Atomenergoproekt” amounts to 99.99999935% (100% minus 1 share). The amount of voting shares belonging to JSC ASE is 99.99999935% (100% minus 1 share).

3. **Joint-Stock Company Scientific Research and Design Institute for Energy Technologies ATOMPROEKT (JSC ATOMPROEKT).**

JSC ASE share in the charter capital of JSC ATOMPROEKT amounts to 99.99999919% (100% minus 1 share). The amount of voting shares belonging to JSC ASE is 99.99999919% (100% minus 1 share).

4. **Public Joint-Stock Company Energospetsmontazh (PJSC ESM).**

JSC ASE share in the charter capital of PJSC ESM amounts to 99.9565% (100% minus 1 share). The amount of voting shares belonging to JSC ASE is 99.9565%.

5. **Joint-Stock Company SEZAM (JSC SEZAM).**

JSC ASE share in the charter capital of JSC SEZAM amounts to 97.87%. The amount of voting shares belonging to JSC ASE is 97.96%.

On 20.12.2018, JSC ASE purchased from JSC SEZAM 1 000 registered ordinary non-documentary shares of JSC SEZAM under the share sale and purchase agreement No. 7701/181060 dd. 19.12.2018 between JSC ASE and JSC SEZAM.

On 26.12.2018, JSC ASE purchased from AMINA Limited Liability Company (AMINA LLC) 113 012 649 registered ordinary non-documentary shares of JSC SEZAM under the share sale and purchase agreement No. 7701/181078 dd. 25.12.2018 between JSC ASE and AMINA LLC.

6. **NUKEM Technologies GmbH (Germany).**

JSC ASE share in the charter capital of NUKEM Technologies GmbH amounts to 100%.

7. **Atomstroyexport-Finance Ltd (ASE-Finance Ltd).**

JSC ASE share in the charter capital of ASE-Finance Ltd amounts to 100%.

8. **AKKUYU NÜKLEER ANONİM ŞİRKETİ (Republic of Turkey).**

JSC ASE share in the charter capital of AKKUYU NÜKLEER ANONİM ŞİRKETİ amounts to 2.267011%. The amount of voting shares belonging to JSC ASE is 2.267011%.

On 17.04.2018, JSC ASE transferred the shares of CLOSED JOINT-STOCK COMPANY METSAMORENERGO-ATOM (CJSC METSAMORENERGOATOM or CJSC MEA) (Republic of Armenia) to Joint-Stock Company Rusatom Energo International (JSC REIN) on the basis of securities sale and purchase agreement No. 7756/172016 dd. 13.04.2018.

Dividend policy and report on declared (accrued) dividends payment within the reporting period

Dividends payment procedure is regulated by Section 8 of JSC ASE Articles of Associations. There was no accrual and payment of dividends in 2018.

“ On **17.04.2018**, JSC ASE transferred the shares of CLOSED JOINT-STOCK COMPANY METSAMORENERGOATOM (CJSC METSAMORENERGOATOM or CJSC MEA) (Republic of Armenia) to Joint-Stock Company Rusatom Energo International (JSC REIN) on the basis of securities sale”

JSC ASE shareholders' general meeting

According to i. 12.1 of the Company's Articles of Association, shareholders' general meeting (the sole shareholder) is the highest governance body of the Company.

In 2018, 7 resolutions of the sole shareholder of JSC ASE were taken regarding the following issues:

- on approval of JSC ASE Articles of Association in new revision No.13;
- on election of the Board of Directors of JSC ASE;
- on distribution of JSC ASE profit based on the results of 2017;
- on consent to major transactions.

JSC ASE Board of Directors

According to i. 13.1 of the Company's Articles of Association, the Company's Board of Directors carries out general management of the Company's activities. The membership of the Company's Board of Directors is 5 (five) persons.

During 2018 the membership in the BoD was as follows:

I. The membership of the Board of Directors that was elected by the Company's sole shareholder's resolution No. 5 dd. 14.06.2017 acted within the period from 01.01.2018 to 27.06.2017:

- Barabanov Oleg Stanislavovich;
- Arseev Boris Nikolaevich;
- Vlasov Alexander Vyacheslavovich;
- Podorov Nikolay Grigorievich;
- Savushkin Vladimir Nikolaevich.

O.S. Barabanov was elected as the Chairman of the mentioned Company's Board of Directors.

II. The membership of the Board of Directors that was elected by the Company's sole shareholder's resolution No. 3 dd. 27.06.2018 acted within the period from 27.06.2018 to 31.10.2018:

- Arseev Boris Nikolaevich;
- Baydarov Dmitriy Yuryevich;
- Vlasov Alexander Vyacheslavovich;
- Podorov Nikolay Grigorievich;
- Savushkin Vladimir Nikolaevich.

B.N. Arseev was elected as the Chairman of the mentioned Company's Board of Directors.

III. The membership of the Board of Directors that was elected by the Company's sole shareholder's resolution No. 6 dd. 31.10.2018 acted within the period from 31.10.2018 until the end of the reporting period:

- Arseev Boris Nikolaevich;
- Baydarov Dmitriy Yuryevich;
- Vikhansky Nikolay Igorevich;
- Vlasov Alexander Vyacheslavovich;
- Savushkin Vladimir Nikolaevich.

B.N. Arseev was elected as the Chairman of the mentioned Company's Board of Directors.

According to i. 12.1.14 of JSC ASE Articles of Association, resolutions on payment of remuneration and/or compensation to the members of the Company's Board of Directors are within the competence of the shareholders' general meeting (sole shareholder). There were no resolutions regarding payment of remuneration and/or compensation to the members of the Company's Board of Directors in 2018. During implementation of their functions, members of Board of Directors neither owned any JSC ASE shares nor performed any transactions with the Company related to JSC ASE shares acquisition or selling.

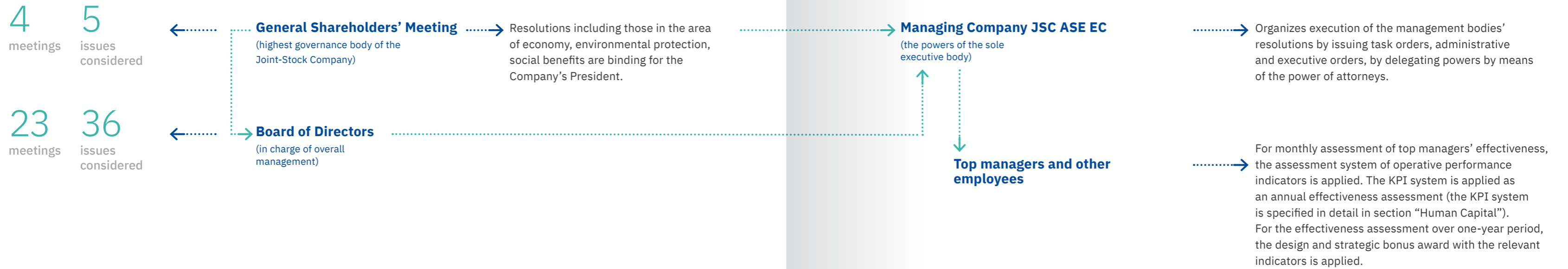
Report of JSC ASE Board of Directors on the activity results can be found in Appendix 9 of the Book of Appendices.

The information about major transactions and transactions with interest can be found in Appendix 10 of the Book of Appendices.

Brief backgrounds of members of JSC ASE Board of Directors

	ARSEEV Boris Nikolayevich	VLASOV Alexander Vyacheslavovich	SAVUSHKIN Vladimir Nikolaevich	BAYDAROV Dmitry Yuryevich	VIKHANSKY Nikolay Igorovich	BARABANOV Oleg Stanislavovich (was a Board of Directors member until 27.06.2018, Chairman of the Board)	PODOROV Nikolay Grigorievich (was a Board of Directors member until 31.10.2018)
Date and place of birth	22.09.1971, Sverdlovsk	15.02.1985, Moscow	23.05.1954, Moscow	11.09.1966, Penza-19 of Penza region	01.01.1984, Schelkovo, Moscow region	17.12.1971, Moscow	19.06.1967, Gorky
Education	Higher, PhD in Technical Sciences. S.M. Kirov Ural Polytechnic Institute, Russian Presidential Academy of National Economy and Public Administration. B.N. Yeltsin Ural Federal University.	Higher, Moscow Engineering Physical Institute. Moscow State Institute of International Relations under MIA of Russia.	Higher, Moscow Mechanical Institute. The All-Union Order of People's Friendship Academy of Foreign Commerce.	Higher, PhD in Law, Penza Polytechnic Institute. Penza State University. Moscow Financial College under the Ministry of Finance of Russia. Academy of National Economy under the Government of the Russian Federation. People's Friendship University of Russia.	Higher, Lomonosov Moscow State University.	Higher, PhD in Economics. S.Orzhonikidze Moscow State Geological Survey Academy. Institute of Professional Accountants and Auditors. Military University.	Higher, N.I. Lobachevsky Nizhny Novgorod State University.
Job experience (latest 5 years)	February 2010 – February 2013 – Engineering Director, Sales Director, Commercial Director, Acting Director General of Atomenergomash JSC. February 2013 – November 2013 – Executive Vice President of Rusatom Overseas JSC. February 2014 – November 2016 – Director of International Business and Development Department, Deputy Director General – Director for Business Development of JSC “Rosenergoatom”. Since November 2016 – Deputy Director of Development and International Business Unit – Head of International Business Department of Rosatom State Corporation.	October 2010 – September 2015 – Senior Manager of Regional Development and Strategic Partnership Office, International Business Department. September 2015 – September 2017 – Head of Regional Development and Strategic Partnership Office, International Business Department. Since September 2017 – Deputy Director of International Business Department – Head of Global Development and Strategic Partnership Office of Rosatom State Corporation.	In 2007–2011, V.N. Savushkin worked in JSC ASE: Head of Administration of President (2007–2008); Vice President (2008–2010); First Vice President (2010–2011). He has been working as Vice President of JSC ASE since August 2013 as second employment. Since 2012, V.N. Savushkin has been head of Moscow Branch Office of JSC ASE EC: First Deputy Director – Director of Moscow Branch Office (till November 2012); Senior Vice President – Director of Moscow Branch Office (November 2012 – September 2018); Vice President – Director of Moscow Branch Office of JSC ASE EC (since September 2018).	D.Y. Baydarov has been employed in Rosatom State Corporation since April 2012 till the present time: 2012 – March 2015 – Deputy Director of Nuclear Weapon Complex Directorate. March 2015 – April 2018 – Head of Civilian Production Development Project Office. April 2018 – January 2019 – Head of New Business Implementation Division. Since January 2019 – Deputy Director of Development and International Business Unit – Head of New Business Support Division of Rosatom State Corporation.	December 2011 – July 2012 – Deputy Director General for Development of EnergoStreamService LLC. September 2012 – November 2012 – Deputy Head of Division of AESK JSC. November 2012 – June 2015 – Deputy Head of Division – Head of Office for Investment Programs Generation and Interaction with FEA and Power Engineering Entities of State Capital Investment Division of Rosatom State Corporation. June 2015 – December 2016 – Deputy Director for Development of Capital Construction Industry Center, Private Institution of Rosatom State Corporation. December 2016 – August 2018 – Deputy Director for Capital Investments – Head of Division of Rosatom State Corporation. August – September 2018 – Director for Capital Investments, State Construction Supervision and State Expertise of Rosatom State Corporation. Since September 2018 – Vice President for Capital Construction of JSC ASE EC.	July 2011 – July 2014 – Director of Rosatom State Corporation Treasury. July 2014 – March 2018 – Director for Development and Restructuring of Rosatom State Corporation. Since March 2018 – First Deputy Director General of Atomredmetzoloto Joint-Stock Company.	N.G. Podorov has been employed in JSC ASE EC since April 2011 till the present time: April 2011 – November 2012 – Head of Chief Financial Economic Division. November 2012 – January 2014 – Director for Economy and Finance – Head of Division. January 2014 – December 2014 – Director for Economy, Planning and Finance. December 2014 – December 2015 – Vice President for Economy and Finance. December 2015 – September 2018 – Senior Vice President for Economy and Finance. Since September 2018 – Senior Vice President for Corporation Functions.

Joint-Stock Company “Atomenergoproekt” (JSC “Atomenergoproekt”) Corporate Governance



Members of the Board of Directors



EGOROV Leonid Valentinovich

Chairman of the Board. Executive Director of JSC "Atomenergoproekt".



AKSENIN Eduard Alexandrovich

Deputy Director for Foreign Projects Cost Management of JSC ASE EC.



POLYAK Igor Efimovich

Deputy Head of Capital Construction Division of JSC ASE EC.



DMUKHA Olga Evgenyevna

Administrative Director of JSC "Atomenergoproekt".



SINIT SIN Vladimir Victorovich

Director for Economy and Finance of JSC "Atomenergoproekt".

GRI 102-5

JSC "Atomenergoproekt" legal form is a non-public stock company.

According to the Articles of Association of JSC "Atomenergoproekt", management bodies of the Company are as follows: General Shareholders' Meeting; Board of Directors; sole executive body (Director General).

Powers of the Director General are exercised by the Managing Company — JSC ASE EC.

General Shareholders' Meeting is the highest governance body of the Joint-Stock Company, it gives assignments to the Board of Directors or the executive body regarding solution to issues, including economic, environmental and social problems. The executive body arranges for implementation of resolutions of the highest governance bodies (shareholders' general meeting and Board of Directors) by delegating to the Company's top managers and other employees according to Articles 185-189 of the Civil Code of the RF by means of power of attorneys.

No special-purpose committees have been established at the Board of Directors. There are no plans for their establishment.

There is no internal audit commission in JSC "Atomenergoproekt". The management bodies of the Company shall arrange and carry out the internal control of actual business operations in accordance with internal documents and local regulatory acts of the Company.

JSC "Atomenergoproekt" Articles of Association are available at: www.e-disclosure.ru/portal/files.aspx?id=19524&type=1.

Information about JSC "Atomenergoproekt" registrar Independent Registrar Company R.O.S.T., Joint-Stock Company.

Abbreviated name of the registrar: IRC-R.O.S.T. JSC. Registrar's location: 18, bld. 13, Stromynka str., Moscow 13. No. of professional stock trader license to keep the register of holders of registered securities: No. 045-13976-000001. License issued: 03.12.2002. License validity: unlimited validity period. License issued by: Federal Stock Market Committee (FSMC of Russia).

“ In 2018 the Board of Directors decided to open Bangladesh Branch Office of JSC “Atomenergoproekt”

Share capital and securities

The value of the Company's charter capital is 1 547 504 159 rubles.

JSC “Atomenergoproekt” has placed ordinary registered non-documentary shares at the nominal value of 1 (one) ruble each at par in the amount of 1 547 504 159 pieces for the total amount at a nominal value of 1 547 504 159 rubles. Privileged shares have not been floated. The shares are out of public float, their current market value has not been specified.

JSC ASE (100% minus 1 share, which is 99.99999935%) and JSC ASE EC (1 share, which is 0.00000065%) are shareholders of JSC “Atomenergoproekt”.

As of 31.12.2018, JSC “Atomenergoproekt” owns securities of the following companies:

1. Joint-Stock Company “Lenatomenergostroy Specialized Construction and Erection Company”, JSC “Atomenergoproekt” share amounts to 99.999%.
2. Joint-Stock Company “Saint Petersburg Research and Survey Institute “Energoiziskanya”, JSC “Atomenergoproekt” share amounts to 100%.
3. Joint-Stock Company ASE Engineering Company, JSC “Atomenergoproekt” share amounts to 0.000002%.

Dividend policy and report on declared (accrued) dividends payment within the reporting period

Dividends policy regulations have not been developed and approved in JSC “Atomenergoproekt”.

Procedure for dividend payment in JSC “Atomenergoproekt” is regulated by Section 8 of the Company's Articles of Association (revision of 28.08.2017, state registration date is 10.10.2017).

No dividends on shares were announced or paid in the reporting period.

JSC “Atomenergoproekt” general shareholders' meeting

 [GRI 102-25](#)

Information on the controlling shareholder is disclosed in the lists of affiliates and in the annual report of JSC “Atomenergoproekt”.

 [GRI 102-29, 102-30](#)

Competence of the general shareholders' meeting includes the most important and significant issues. Upon the results of Company's activities for the year, the annual shareholders' general meeting identifies economic, environmental and social impact, risks and possibilities for their management, whereupon it assigns the Board of Directors or the Company's executive body to solve specific issues. The executive body arranges for implementation of resolutions of the Company's highest governance body by issuing orders, ordinances, giving assignments.

Board of Directors of JSC “Atomenergoproekt”

The following membership of the Board of Directors that was elected by the extraordinary general shareholders' meeting on 25.10.2017 (minutes of the extraordinary shareholders' general meeting No. 5 dd. 25.10.2017) and annual general meeting of the Company's shareholders on 21.06.2018 (minutes of the annual general meeting of the Company's shareholders No. 9 dd. 21.06.2018) acted within the period within 2018:

- Egorov Leonid Valentinovich (Chairman of Board);
- Sinitsin Vladimir Victorovich;
- Dmukha Olga Evgenyevna;
- Aksenin Eduard Alexandrovich;
- Polyak Igor Efimovich.

 [GRI 102-24](#)

Procedure for nomination and selection of candidates for membership in the highest governance body and its committees, as well as criteria used for nomination and selection of the highest governance body members are established in accordance with the current legislation and JSC “Atomenergoproekt” Articles of Association (revision of 28.08.2017, state registration date is 10.10.2017) without consideration of independence factor. The key factors for selection of candidates are professional qualification and experience in the economic, environmental and social areas. Candidates for the Board of Directors are nominated by the Company's shareholders.

 [GRI 102-26](#)

In accordance with sub-item 1 of item 14.2 of JSC “Atomenergoproekt” Articles of Association (revision of 28.08.2017, state registration date is 10.10.2017), determination of priority areas of the Company's activities is within the competence of the Company's Board of Directors. Company's objectives, its values and mission, as well as strategy, policy and tasks regarding the economic, environmental and social impact are developed during strategic sessions, where the Company's top managers and CEO of the Managing Company participate. After discussion of these issues, the Company's objectives, its values and mission, as well as strategy, policy and tasks regarding the economic, environmental and social impact are accumulated in the Company's annual report which shall be approved by the Company's Board of Directors.

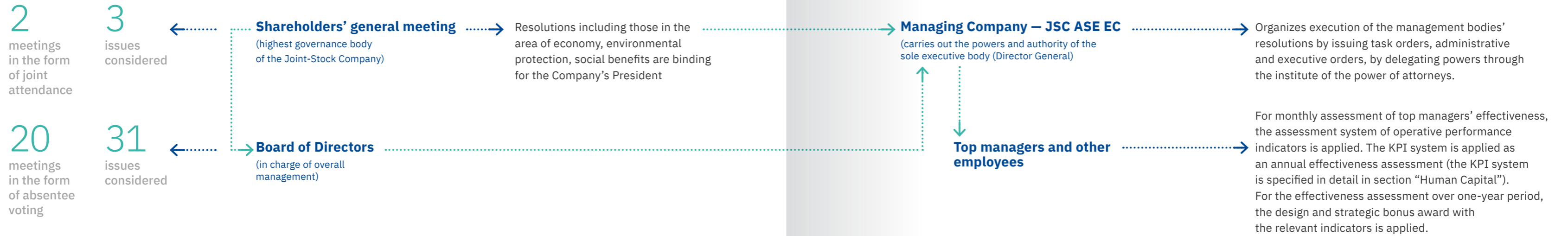
JSC “Atomenergoproekt” Board of Directors Report on the results of activity can be found in Appendix 9 of the Book of Appendices.

The information about major transactions and transactions with interest can be found in Appendix 10 of the Book of Appendices.

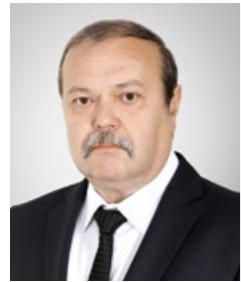
Brief backgrounds of members of JSC “Atomenergoproekt” Board of Directors

	EGOROV Leonid Valentinovich	SINIT SIN Vladimir Victorovich	DMUKHA Olga Evgenyevna	AKSENIN Eduard Alexandrovich	POLYAK Igor Efimovich
Date and place of birth	Chairman of the Board. Executive Director of JSC “Atomenergoproekt” 1956, Kirov	Director for Economy and Finance of JSC “Atomenergoproekt” 1961, Nagorye village of Nagorye district, Yaroslavl region	Administrative Director of JSC “Atomenergoproekt” 1983, Zhukovsky, Moscow Region	Deputy Director for Foreign Projects Cost Management of JSC ASE EC 1960, Moscow	Deputy Head of Capital Construction Division of JSC ASE EC 1958, settlement Shalakushi of Nyandomsky district, Arkhangelsk region
Education	Higher, Kirov Polytechnic Institute.	Higher, PhD in Economics. Moscow Order of Lenin Institute of Geodetic, Aerial Survey and Map-Making Engineers, Academy of National Economy under the Government of the Russian Federation.	Higher, Russian State Humanitarian University.	Higher, Moscow Mining Institute.	Higher, Togliatti Polytechnic Institute.
Job experience (latest 5 years)	2010–2012 — Director General of JSC “Atomenergoproekt”. August 2012 — September 2012 — Counselor of the Director General of JSC “Atomenergoproekt”. Since September 2012 — First Deputy General Director of JSC “Atomenergoproekt”.	2012–2015 — Vice President of JSC “Atomenergoproekt”. Since April 2015 — Deputy Director General for Economy and Finance of JSC “Atomenergoproekt”.	2012–2014 — Director of Administrative Department of JSC “Atomenergoproekt”. Since August 2004 — Administrative Director.	2012–2015 — Director for Economy of JSC “Atomenergoproekt”. Since April 2015 — Deputy Director for Foreign Projects Cost Management of JSC ASE EC.	2007–2015 — Head of Capital Investment and Accounting Division. Since February 2015 — Deputy Head of Capital Construction Division of JSC ASE EC.

Joint-Stock Company Scientific Research and Design Institute for Energy Technologies ATOMPROEKT (JSC ATOMPROEKT) Corporate Governance



Members of the Board of Directors



BUZHAROV
Nikolay
Alexandrovich

Deputy Director for Economics of JSC ASE EC – Chairman of the Board.



KAZARIN
Alexander
Mikhailovich

Deputy Director for Design of JSC ASE EC.



NOVIKOVA
Olga
Konstantinovna

HR Director of JSC ATOMPROEKT.



ILYINSKY
Konstantin
Mikhailovich

Director of St. Petersburg Design Institute JSC ATOMPROEKT.



SHAFALOVICH
Natalia
Borisovna

Vice President for HR and Internal Communication of JSC ASE EC.

GRI 102-5

JSC ATOMPROEKT – the form of ownership is private property. The legal form is a non-public stock company. General shareholders' meeting is the highest governance body.

The Board of Directors carries out general management of the Company's activity.

Powers of the sole executive body of JSC ATOMPROEKT have been transferred to the Managing Company – JSC ASE EC. Director General (Managing Company) is subordinate to the Board of Directors and shareholders' general meeting of JSC ATOMPROEKT.

Competence of JSC ATOMPROEKT management bodies is specified in the constituent documents of JSC ATOMPROEKT.

Management bodies' competence is specified in the constituent documents of the key companies of Rosatom State Corporation Engineering Division.

In accordance with Federal Law No. 208-FZ dd. 26.12.1995 "On Joint-Stock Companies", the highest governance body of a Joint-Stock Company is the general shareholders' meeting which gives instructions to the Board of Directors (in case of its absence – to the Company's executive body directly) or the Company's executive body to solve issues, including economic, environmental and social ones. The executive body arranges for implementation of resolutions of the Company's highest governance bodies by delegating to the Company's top managers and other employees according to Articles 185–189 of the Civil Code of the RF by means of power of attorneys.

There is no internal audit commission in JSC ATOMPROEKT. JSC ATOMPROEKT management bodies shall arrange and carry out the internal control of actual business operations in accordance with internal documents and local regulatory acts of JSC ATOMPROEKT.

JSC ATOMPROEKT Board of Directors does not have committees and commissions set up in its structure.

Company's Articles of Association are available in the Internet at: www.e-disclosure.ru/portal/files.aspx?id=20205&type=1.

Information about JSC ATOMPROEKT registrar

Independent Registrar Company R.O.S.T., Joint-Stock Company.

Abbreviated name of the registrar: IRC-R.O.S.T. JSC.

Registrar's location: 18, bld. 13, Stromynka str., Moscow.

No. of professional stock trader license to keep the register of holders of registered securities: No. 045-13976-000001.

License issued: 03.12.2002.

License validity: unlimited validity period.

License issued by: Federal Stock Market Committee (FSMC of Russia).



Leningrad NPP-2 (Russia)

Share capital and securities

Charter capital of JSC ATOMPROEKT amounts to 1 233 576 578 (One billion two hundred thirty three million five hundred seventy six thousand five hundred seventy eight) rubles, consisting of 1 233 576 578 registered ordinary non-documentary shares at the nominal value of 1 ruble each.

As of 31.12.2018, the number of issued and fully paid shares is 1 233 576 578 registered ordinary non-documentary shares at the nominal value of 1 ruble each.

JSC ATOMPROEKT shares are not traded. The Company's shareholders are Joint-Stock Company "Atomstroyexport" (1 233 576 577 registered ordinary non-documentary shares, 99.999999919% of the charter capital) and Joint-Stock Company ASE Engineering Company (1 registered ordinary non-documentary share, 0.000000081% of the charter capital).

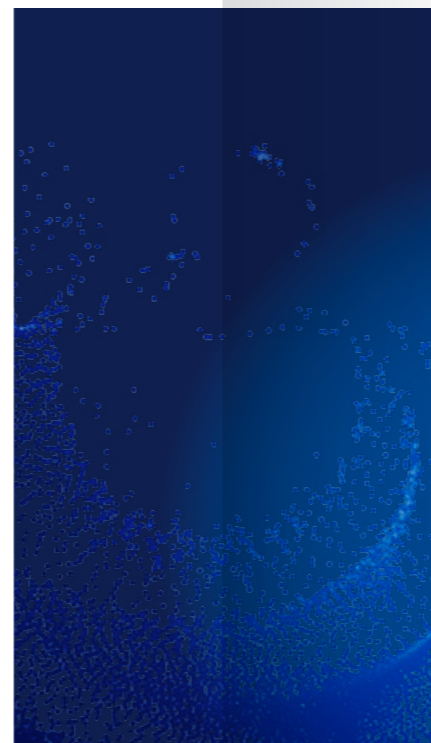
Dividend policy and report on declared (accrued) dividends payment within the reporting period

No dividend payment policy has been approved in JSC ATOMPROEKT.

Procedure for dividend payment in JSC ATOMPROEKT is regulated by Section 8 of the Company's Articles of Association, pursuant to which, based on the results of the first quarter, half-year period, nine-month period of the reporting year and/or the reporting year, the Company is entitled to make decisions on payment of dividends on the shares placed unless otherwise is specified by Federal Law "On Joint-Stock Companies". The decision on payment of dividends based on the results of the first quarter, six months and nine months of the reporting year can be made within three months upon expiration of a corresponding period. The decision on payment (announcement) of dividends shall determine the amount of dividends for each category (type) of shares, form of their payment, procedure for dividend payment in non-monetary form, record date. In doing so, decision on the record date shall be made upon the proposal of the Company's Board of Directors only. The amount of dividends based on the results of the reporting year may not exceed the amount of dividends recommended by the Company's Board of Directors.

No dividends were accrued or paid based on the results of 2018.

There were no resolutions regarding payment of remuneration to the members of the Board of Directors in 2018.



Shareholders' general meeting of JSC ATOMPROEKT

Within the reporting year of 2018, the highest governance body — General Shareholders' Meeting held 2 sessions in the form of joint attendance, including the annual general shareholders' meeting, to make decisions on the issues related to the competence of JSC ATOMPROEKT highest governance body.

JSC ATOMPROEKT Board of Directors

Functions and duties of JSC ATOMPROEKT Board of Directors are regulated by Federal Law "On Joint-Stock Companies" and the Company's Articles of Association. KPIs of JSC ATOMPROEKT Board of Directors are not applied.

The following membership of the Board of Directors (elected by resolution of JSC ATOMPROEKT sole shareholder No. 238 dd. 26.12.2017, re-elected by the resolution of the annual shareholders' general meeting on 29.06.2018, Minutes No. 1) acted within the period during 2018:

- Buzharov Nikolay Alexandrovich,
- Kazarin Alexander Mikhailovich,
- Novikova Olga Konstantinovna,
- Ilyinsky Konstantin Mikhailovich,
- Shafalovich Natalia Borisovna.

Members of JSC ATOMPROEKT Board of Directors neither have owned nor own any shares in the Company's charter capital, the amount of Companies' ordinary shares belonging to them is 0%. KPI was not established for the Board of Directors members. No remuneration has been paid to the Board of Directors members within the reporting period. No transactions related to the Joint-Stock Company shares acquisition or selling were performed by the members of JSC ATOMPROEKT Board of Directors within the reporting period.

JSC ATOMPROEKT Board of Directors does not have committees and/or commissions set up in its structure.

JSC ATOMPROEKT Board of Directors Report on the results of performance can be found in Appendix 9 of the Book of Appendices. The information about major transactions can be found in Appendix 10 of the Book of Appendices.

Brief backgrounds of members of JSC ATOMPROEKT Board of Directors

	BUZHAROV Nikolay Alexandrovich	KAZARIN Alexander Mikhailovich	NOVIKOVA Olga Konstantinovna	ILYINSKY Konstantin Mikhailovich	SHAFALOVICH Natalia Borisovna
	Deputy Director for Economics of JSC ASE EC — Chairman of the Board	Deputy Director for Design of JSC ASE EC	HR Director of JSC ATOMPROEKT	Director of St. Petersburg Design Institute JSC ATOMPROEKT	Vice President for HR and Internal Communication of JSC ASE EC
Date and place of birth	25.02.1957, Kalinin	31.05.1961, Leningrad	11.06.1971, settlement Kuzmolovsky of Vsevolozhsk district, Leningrad region	24.09.1978, Ust-Kamenogorsk, Kazakhstan	15.09.1973, Krasnokamsk, Perm region
Education	Higher, G.V. Plekhanov Leningrad Mining Institute.	Higher, M.I. Kalinin Leningrad Polytechnic Institute.	Higher, V.I. Ulianov (Lenin) St.-Petersburg State Electrical Engineering University.	Higher, St. Petersburg State Electronic Technical Institute.	Higher, Perm State Medical Academy.
Job experience (latest 5 years)	2011–2012 — Counselor of the Director General of Lead Research Institute JSC VNIPIET. 2011–2012 — Counselor of JSC ATOMPROEKT Director. 2012–2013 — Deputy Director for Economy and Finance of JSC ATOMPROEKT. 2013–2014 — Financial Director of Lead Research Institute JSC VNIPIET. July 2014 — September 2014 — Deputy Director for Economy and Finance of JSC ATOMPROEKT Branch Office (second employment). 2014–2016 — Deputy Director General — Financial Director of JSC ATOMPROEKT. Since April 2016 — Deputy Director for Economy of JSC ASE EC. Director for Economy and Finance of JSC ATOMPROEKT (second employment).	2011–2013 — Director for Design of JSC ATOMPROEKT. 2013–2014 — Deputy Director General — Branch Office Director. Branch Office of Lead Research Institute JSC VNIPIET SPb AEP. 2014–2015 — Deputy Director General — Director of VVER Technology Department of JSC ATOMPROEKT. 2016–2016 — Deputy Director General — Production Director of JSC ATOMPROEKT. 2016–2018 — Director of JSC ATOMPROEKT. Since February 2018 — Deputy Director for Design of JSC ASE EC.	2011–2013 — HR Deputy Director of JSC ATOMPROEKT. 2013–2014 — HR Director of Lead Research Institute JSC VNIPIET. July 2014 — September 2014 — HR Deputy Director of JSC ATOMPROEKT Branch Office (second employment). Since October 2014 — HR Director of JSC ATOMPROEKT.	2011–2013 — Head of JSC ATOMPROEKT Bureau of Technical Solutions of Nuclear Island. 2013–2014 — Head of JSC ATOMPROEKT Office for Nuclear Island Integrated Design. 2014–2017 — Head of Technological Division of JSC ATOMPROEKT. 2017–2018 — First Deputy Director of JSC ATOMPROEKT. Since February 2018 — Director of ATOMPROEKT St. Petersburg Design Institute JSC ATOMPROEKT.	2011–2015 — Head of Training and Development Directorate Project of EurazHolding LLC. 2015–2017 — HR Director of JSC Science and Innovations. Since September 2017 — HR and Organizational Development Director of JSC ASE EC.

Chapter 2

Key Performance Results

- 2.1. Financial Capital
- 2.2. Intellectual Capital
- 2.3. Manufactured Capital
- 2.4. Human Capital
- 2.5. Natural Capital
- 2.6. Social and Relationship Capital



29.6

bln RUR
Gross profit



3.85

mtn RUR / person
Labor productivity
(in terms of proper revenue)



Senior Vice President for Corporate Functions

Nikolay Podorov

– How would you evaluate the main results of the last financial year?

I am glad to say that the consolidated revenue of the Division reached 202 billion rubles, which is 15.2% higher than the last year value. The share of overseas revenue for 2018 increased and amounted to 80% of the total value. **We are the global leaders in the NPP construction**, in 2018 our project portfolio amounted to 77 billion USD.

The Company's development is going on, we have been recognized on the global market due to state-of-the-art technologies and high quality of our products. In 2018, the amount of investments was 7.7 billion rubles, which exceeds the value of 2017 three times. The main areas of investment are mechanization of Russian and the CIS sites (Kursk NPP, Belarus NPP), overseas sites (first of all, Rooppur NPP) and infrastructure development (the one of head and branch offices).

By 2017, we managed to achieve growth in terms of one of the most important indicators of operations – EBITDA, which was possible thanks to efficient cost management processes and restraining of management expenses. In 2018, the positive dynamics was also observed for another indicator of operating efficiency, which is labor productivity.

– What is the impact of the Division's transformation on the Company's operating efficiency?

Transformation is a program which is aimed, first of all, at the enhancement of the Division's competitiveness and enhancement of the internal efficiency is an important part of it. From the point of financial results, this program influences

such indicators of the Division, as: adjusted free cash flow, compliance with the timeframe and cost of NPP construction in Russia and abroad, consolidated marginality of NPP construction project portfolio, labor productivity.

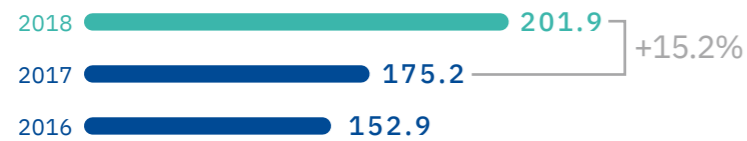
It is planned to achieve results within the transformation program due to the following measures: reduction of process time, digitalization, improvement of the organizational structure and management system. Meanwhile, the main focus of the program is on reduction of **the NPP construction time and cost**.

“ Financial capital is a reserve of resources that is employed by the Company for the use during production of goods (rendering of services) that are produced as a result of commercial and investment activities and received through financing (debt or stock capital). Financial capital management is an efficient use of all financial tools to implement the Division's strategic goals”

2.1.1. Economic Performance

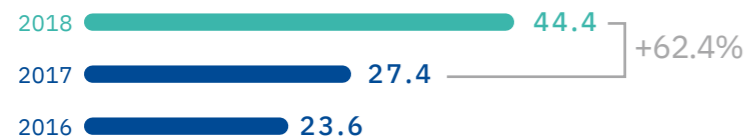
GRI 102-7

Revenue, bln RUR



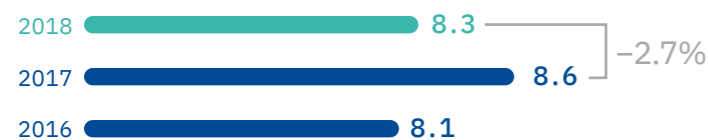
In 2018, the revenue amounts to 202 billion rubles. The indicator growth against 2017 is 15.2%. The scope of Construction Management (construction and erection works) and Equipment businesses accounts for the most substantial share of the revenue structure.

Manufacturing costs, bln RUR



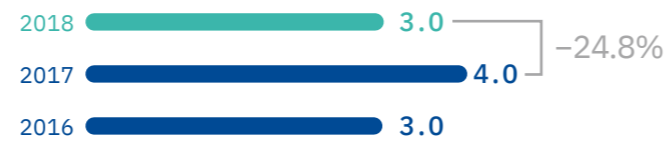
The growth of actual costs in 2018 is related to the active construction phase or mobilization on the sites of Belarus NPP, Kudankulam NPP (India) — Units 3 and 4, Rooppur NPP (Bangladesh), Kursk NPP.

Management costs, bln RUR



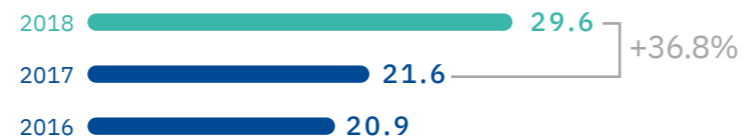
The indicator decrease is caused by restraining of the administrative and management personnel number, optimization of the current expenses.

Commercial costs, bln RUR



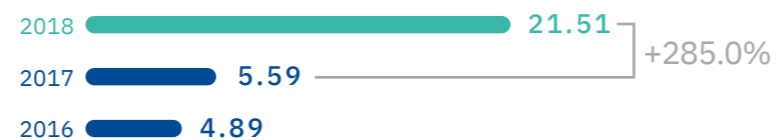
The main factor of change in the commercial costs is the change of production program and its structure.

Gross profit, bln RUR



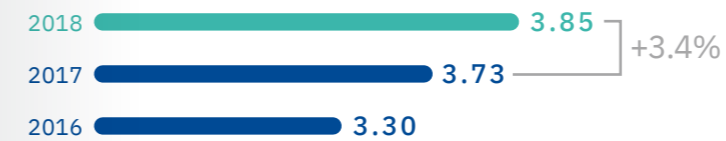
The profit growth in 2018 is caused by an increase in the scope of construction, implementation of measures to enhance the efficiency of main operating processes, introduction of time and cost management projects at capital construction facilities in the industry (cost management automation).

Net profit, bln RUR



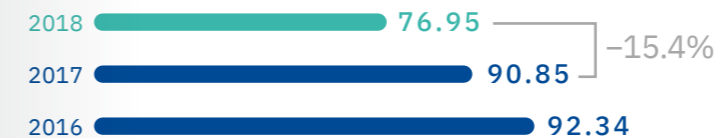
Reasons for net profit growth against the fact of 2017 by +16 billion rubles are related to the increase in the scope of construction, exchange revaluation, profit growth caused by implementation of measures to enhance the efficiency of main operating processes, introduction of time and cost management projects at capital construction facilities in the industry (cost management automation).

Labor productivity (in terms of proper revenue), mln RUR/pers.



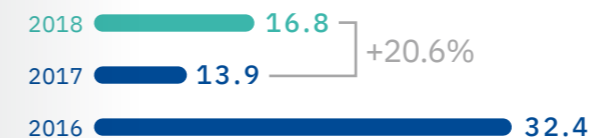
Measures aimed at the enhancement of main operating processes efficiency ensure a sustainable growth of labor productivity.

Foreign projects portfolio, bln USD



Dynamics of the project portfolio is related to the change in the portfolio structure and implementation of contracts.

Earnings before interest, taxes, depreciation and amortization (EBITDA), bln RUR



In 2016, the court awarded compensation for Belene NPP, which influenced this indicator value. EBITDA growth in 2018 is related to efficient building of cost management process and restraining of management costs increase.



Start of the foundation slab concreting in the reactor building at Kursk NPP-2 Unit 1 (Russia)



Tianwan NPP (China)

Introduction of digital technologies into the economic efficiency management process – Project “Information Management System of Capital Construction Projects” (ISUP KS)

In 2018, works on implementation of ISUP KS project, the results of which have an impact on the whole industry, continued as planned.

Within the project of ISUP KS, a Corporate Financial Template has been implemented for the first time in the industry on a new software platform SAP S/4 HANA with new functions for the Engineering Division:

- Profit tax;
- Value added tax;
- Records on the fixed assets;
- Records on special clothing and personal protective equipment (PPE);
- Records on funds of asset contribution (budget financing);
- In-house settlements;
- Records on the activities of overseas branch and representative offices;
- Records on settlements with the personnel.

The foundation for transfer of accounting and analytical functions under capital construction projects into a digital business model has been established:

- Future of S/4 HANA: a strategic direction for SAP and new generation of ERP range;
- Up-to-date approaches to building a corporate landscape of information systems;
- New possibilities for the developer of business process models;
- A leap into the future: groundwork is laid for using machine learning and artificial intelligence;
- Basis for introduction of the latest solutions on S/4 HANA;
- New industrial opportunities and functions;
- New scenarios for interaction with Rosatom State Corporation systems and seamless integration with design systems.

2 basic KPI are established for ISUP KS system:

1. The number of users working actively in the new information system. The assessment will be done upon the completion of replication process at the Engineering Division enterprises in 2019.
2. Fast closure of the reporting period in the system not later than on the 7th (seventh) business day of the following calendar month. KPI is achieved according to the results of the first 6 months of 2018.

The main effect of the process is that automated end-to-end processes of DSW, CEW and PCW management have been implemented for the first time in the industry, from design demand formation to work handover to the Customer – JSC “Rosenergoatom”:

- Master system of SPF design product cards;
- There is Administrative Record Keeping of DD cards in ISUP KS.
- The Administrative Record Keeping is based on 3 types of MSR elements (CCE, Schedule, CFT);
- Automated issue of work acceptance certificates (KC2, KC3);
- Integration with JSC “Rosenergoatom” systems and Electronic Archive of Accounting Documents;
- Accounting documents (accounting entries) are generated automatically;
- Process input data is a consolidated cost estimate down to LCE/LE items;
- Subcontracts are generated on the basis of LCE/LE items – a split sheet is formed;
- Registration of works performed by subcontractors is based on the data of split sheets;
- Upon the registration of KC-2, basic prices are recalculated into current ones with control over non-exceeding of the budget limit;
- Accounting entries are generated automatically based on administrative record keeping documents.

Contribution to the digital economy development in the RF

Within the framework of the development of state program “Digital Economy in the Russian Federation”, the following works were performed in 2018:

- Section “Assurance of Transfer to Information Modeling Technologies when Managing Residential Buildings, Industrial and Infrastructure Facilities of Smart Cities” of “Smart City”, Russian Ministry of Construction’s project related to digitalization of municipal facilities and services, was developed.
- Elaboration of datasheet of “Smart City”, Russian Ministry of Construction’s project (order of Russian Ministry of Construction No. 695/ПР dd. 31.10.2018) related to digitalization of municipal facilities and services, was ensured.
- Section “Use of Information Modeling Technologies to Create Information Models of Houses, Cities, Settlements and Territorial Entities” of “Digital Construction” departmental project of Russian Ministry of Construction, was developed.
- The departmental project of Russian Ministry of Construction, “Digital Construction” was launched.

2.1.2. Financial Capital Management

During its financial activities, the Company is guided by federal laws, provisions of the tax, administrative and civil legislation, accounting policy, local regulatory and legal acts of Rosatom State Corporation, procedural instructions, as well as internal regulations, standards and orders of the industry and the enterprise.

Basic functions of the Treasury:

- Arrangement of payments and cash management;
- Management of the Division's structures liquidity (assurance of uninterrupted functioning of payment system, timely elimination of cash deficiencies, arrangement of intra-group loans, excess funds allocation on fixed deposits);

- Financial risks assessment and monitoring, foreign exchange risk hedging;
- Interaction with outside financial and credit, control and auditing institutions (banks, Federal Treasury, etc.);
- Currency exchange regulation;
- Financial expert review of guarantor banks regarding securities granted to suppliers/contractors;
- Records on received and granted securities;
- Arrangement and support of payroll card programs.

Table 2.
Interpretation of interest receivable and payable, mln RUR

Name of the company	2016			2017		
	% to be received	% to be paid	Balance, %%	% to be received	% to be paid	Balance, %%
JSC ASE EC	76	28	48	99	631	-533
JSC ASE	1,634	2,979	-1,344	3,376	1,339	2,038
JSC "Atomenergoproekt"	211	974	-763	94	1,203	-1,110
JSC ATOMPROEKT	17	213	-196	16	534	-518
JSC "NIKIMT-Atomstroy"	47	5	43	13	103	-89
Trest RosSEM Ltd	2	0	2	8	0	8
PJSC ESM	20	143	-124	27	12	14
NUKEM Technologies GmbH, NUKEM Technologies Engineering Services GmbH	0	1,067	-1,067	0	597	-597
TOTAL IN THE DIVISION (minus %% on intra-group loans)	943	4,325	-3,382	1,028	1,816	-788

The balance of interest receivable/payable has been growing sustainably over the last 3 years. Multidirectional dynamics of the change in flows is obvious: the interest payable is decreasing annually while the interest receivable is growing smoothly.

In 2018, the balance of interest became positive. It means that within the reporting year the Division received more interest from debt financing and allocation of temporarily free funds on deposits than it paid under the obtained loans.

Current liquidity ratio

Current liquidity ratio of the Engineering Division for 2016–2018 is within the range of 1.4–2.0 while the criterion value of the indicator shall be not less than 1. It indicates that within the short-term period (up to 1 year) the Company does not face a risk of losing the possibility to fulfill the current obligations to creditors; moreover, there is a required safety margin maintained at the sufficient level. Such ratio is achieved due to maintenance of the optimal balance structure, use of recurring advances and obtaining of long-term loans.

	2018 (plan)			2018 (fact)			2018 (aberration)		
	% to be received	% to be paid	Balance, %%	% to be received	% to be paid	Balance, %%	% to be received	% to be paid	Balance, %%
	129	348	-220	161	951	-791	32	603	-571
	1,779	2,138	-359	4,598	532	4,066	2,820	-1,605	4,425
	62	1,797	-1,735	40	683	-643	-23	-1,115	1,092
	12	271	-259	13	731	-718	1	460	-459
	0	132	-132	17	193	-175	17	61	-44
	2	52	-50	8	51	-42	6	-2	8
	0	129	-129	12	131	-119	12	2	10
	0	345	-345	8	689	-681	8	344	-336
	76	3,303	-3,226	1,504	614	889	1,427	-2,689	4,116

Such growth is a consequence of credit portfolio optimization, as well as efficient management of the Division's liquidity and financial and credit risks management.

2.1.3. NPP Construction Cost Management

In 2018, work on the improvement of cost management system continued in JSC ASE EC.

In particular, cooperation of Cost Management Unit (hereinafter — CMU) with Rosatom State Corporation and PI Rosatom Capital Construction Industry Center (CCIC) continued regarding Rosatom State Corporation's program of integrated cost and time management Total Cost Management Nuclear Construction (TCM NC). Procedural guidelines were elaborated and agreed with the direct involvement of Cost Management Unit, e.g. Unified Industry Procedure for Monitoring of Construction Resource Prices for the Facilities Implemented outside the Russian Federation was approved (Rosatom State Corporation Order No. 1/1032-P dd. 14.09.2018).

In order to control and enhance the efficiency of expenditure for overseas projects:

- Regulations of process “Limits and Reserves Management in Overseas NPP Projects” were approved;
- financial estimates (FE) were approved with breakdown by cost items, in the format of Standard Structure and within the target price. The information was submitted to the financial and economic unit with a purpose of budgets generation for the entire period of projects implementation.

For the purposes of cost control and forecasting, as well as forming of low-level reserves (reserves of the Engineering Division funds for operative project management):

- limits with breakdown by cost items were approved;
- Resolutions on low-level reserves use according to the results of contract conclusion fact analysis were approved;
- FE of contracts, limits for direct and associated costs are downloaded into the Resources Information Management System (RIMS). Items of calendar plans and contractor agreement, supply contract specifications are linked to rationing units, data on the associated costs actually used is imported from accounting systems;

- monthly signing of certificates on the RIMS status, including information on the limit control and forecasting under the project, was arranged for the project managers. These certificates are signed with EED of Rosatom State Corporation on a quarterly basis.

Achievement of 2018:

commissioning of Unit 4 of Rostov NPP

The level of the construction limit price was determined for the project. During the entire period of power unit construction, Cost Management Directorate was forecasting the price of construction and updating it annually based on the change in the data of detailed design documentation issued, actual implementation and contracting, observance of the construction schedule, valid pricing indices. Estimated forecasting cost of construction was compared with the established limits, deviations were identified and analyzed.

Compliance with the established limits was taken into account during procurement procedures and conclusion of equipment and long manufacturing cycle equipment supply contracts. Actual cost of performed construction and erection works, as well as other works, was also monitored for compliance with the limits.

The established procedure of forecasting cost monitoring allowed developing and implementing the corrective measures timely (within the General Contractor's responsibility) in order to comply with the established limit price of the construction.

The construction cost management system developed by JSC ASE EC and implemented during the construction of Unit 4 of Rostov NPP should be considered as successful.

“With a purpose to introduce the principles and uniform methodology of TCM NC, Project Office was set up in the Engineering Division for TCM NC introduction and optimization of construction management processes, whose include organization of interaction between structural subdivisions of the Engineering Division and TCM NC methodologists — CCIC of Rosatom State Corporation»

Introduction of digital technologies in cost management process — Total Cost Management Nuclear Construction (TCM NC) Program

In 2018, active introduction of NPP construction cost management system TCM NC was arranged in the Engineering Division. Generation of detailed budgets of NPP construction projects on the horizon of implementation is planned for the first time. Budgets elaborated by the Engineering Division of Rosatom State Corporation were used as a basis for project budgets in other divisions of Rosatom State Corporation. This management tool allows evaluating the decisions made dynamically, from the point of impact on the project cost and timeframe of its implementation, enhances efficiency of the Company's funds use. Generation of project budgets is one of the key phases of NPP construction cost management system TCM NC introduction process.

Cost Management Unit took part in practical work within TCM NC. To evaluate the cost of Akkuyu NPP construction project in Turkey with accuracy class 3, input data was collected (regarding selection of similar and equivalent equipment) and its price estimate was made (including other equipment). In 2018, the prototype of TCM NC information system, which was launched within CostOS and EcoSys, allowed the employees of multiple subdivisions to undergo training and become familiar with the work in these modules.

In 2018, the following major results were achieved in the course of Program implementation:

1. The main guidelines describing the processes of project cost parameters evaluation and management were elaborated, updated and approved;
2. The individual project cost was evaluated with accuracy class 3 (Phase 1);
3. TCM NC IS was put into trial operation in pilot projects;
4. The expert board approved budgets (production programs) of NPP construction projects within the business plan for 2019–2023, considering the relation between the work schedule and cost.

With a purpose to introduce the principles and uniform methodology of TCM NC, Project Office was set up in the Engineering Division for TCM NC introduction and optimization of construction management processes, whose include organization of interaction between structural subdivisions of the Engineering Division and TCM NC methodologists — CCIC of Rosatom State Corporation, as well as introduction of processes, methodology and implementation of the Engineering Division's information systems integration with TCM NC IS.

To optimize the processes of capital construction management, unified information space development and unification of accounting and administrative record keeping processes, information system ISUP KS (I) on SAP S/4HANA platform was introduced in the pilot project of Kursk NPP-2 in 2018. Initial integration with ERP-system of the Customer (JSC “Rosenergoatom”) was held.

2.1.4. Investment Management

System of investment and investment decision-making management in the Engineering Division of Rosatom State Corporation.

The investment activities management process in the Division is arranged in accordance with regulatory documents and standards of Rosatom State Atomic Energy Corporation and local regulatory acts of the Engineering Division of Rosatom State Corporation.

The primary internal regulatory document that governs investment activities of the Engineering Division and determines the uniform rules for cooperation between the Division's subdivisions when making and implementing investment decisions is STO 8841271.011-2017 "Investment Management".

Basic parameters of investment program of the Engineering Division of Rosatom State Corporation are determined by decisions of the Investment Committee of Rosatom State Atomic Energy Corporation.

The Investment Committee of JSC ASE EC, ASE JSC, JSC "Atomenergoproekt" and JSC ATOMPROEKT is the authority that makes investment decisions in the Engineering Division of Rosatom State Corporation. This is a collegial body that implements principles of the unified industry investment policy of Rosatom State Atomic Energy Corporation and its companies within the authority delegated by a superior company.

To ensure the continuity of the principles of the industry investment policy, the Investment Committee of the Engineering Division of Rosatom State Corporation includes representatives of Rosatom State Atomic Energy Corporation.

The Division has a Task Group of the Division's Investment Committee intended to improve the efficiency of investment activities and control the implementation of investment decisions.

Information on the investment management system impact on suppliers' selection and activities

Being guided by Rosatom State Corporation's scenario provisions for leasing, the Engineering Division has to acquire on lease the capital assets related to "Machines and Equipment" and "Vehicles" groups, with the useful lifetime exceeding 3 years (depreciation group 3-10) and minimum procurement price of 10 million rubles. This condition binds the suppliers to conclude a trilateral sale and purchase agreement with participation of the lessor.

Leasing mechanism will allow improving the flexibility of financial planning and reducing the amount of funds drawn away by the Division to purchase the basic assets.

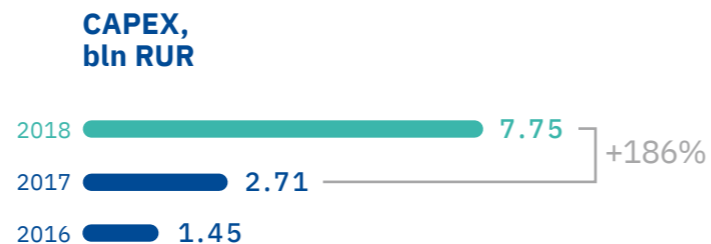
Implementation of plans to improve investment activities within the reporting period and mid-term plans

The following measures were implemented within the reporting period:

- technical and economic analysis methodology was being improved;
- equipment sample/example base was processed;
- investment project administrators are being trained in Project Management School of Rosatom State Corporation;
- key performance indicators of investment project portfolio were achieved;
- Maturity enhancement program of investment project management is being implemented;
- a standard list of equipment and construction machines used during the NPP construction was developed. The list will be used when planning the investment budget of prospective projects related to construction sites mechanization.

In the mid-term perspective, it is planned to implement the following initiatives regarding the investment management:

- to develop motivation principles for the companies of the Engineering Division of Rosatom State Corporation in order to identify and implement investment projects for new business lines of the Engineering Division;
- to develop the institute of technical and economic analysis (TEA), including the establishment of the industry experts team, regular training for investments initiators;
- project management maturity enhancement in the investment activities.
- generation of adapted template for downloading of plan-fact reports on the investment activities in ISUP KS.



Information on the main financing sources for investment activities of the Engineering Division

In accordance with the main areas of activity, the Division's investment portfolio consists of projects, the purpose of which is to support implementation of NPP design and construction projects within the framework of participation in Rosatom State Corporation's investment and construction projects.

The priority task in the implementation of investment projects to equip construction sites is to meet production needs for the timely execution of contracts for the construction of Belarus NPP, Kursk NPP, Rooppur NPP, Akkuyu NPP and other facilities constructed as part of the implementation of investment and construction projects of Rosatom State Corporation.

IT projects implementation aims to upgrade the key assets, in particular, electronic computing equipment and provide production processes with automation and software tools.

Infrastructural investments provide the necessary renewal of fixed assets and the required level of safety.

Financing of investment projects in 2018 was implemented at the expense of the internal sources and external financing.

Investment efficiency

The overall effect of investments for the Division consists in the assurance of upward trend of financial and economic performance indicators and the growth of labor productivity in the Division companies.

The main indicator established by Rosatom State Corporation for monitoring the efficiency of the investment program is the integral investment performance indicator (IIPi), with account for the compliance of the estimated return profitability of the project portfolio with the planned one, as well as the achievement of the milestones of investment projects under implementation, established for the current year.

The value of the Division's IIPi based on 2018 results amounts to 103.1% (with the target level being 100%).

2.1.5. Control of Financial and Economic Activity

GRI 102-25

JSC ASE EC Order No. 40/1124-P dd. 08.08.2016 approves the Procedure for Taking Measures to Prevent Possible Occurrence of Conflict of Interest by Employees of JSC ASE EC, JSC ASE, JSC "Atomenergoproekt" and JSC ATOMPROEKT.

According to the above procedure, in case of a potential conflict of interest, an employee shall submit to the Company's President a notification of personal interest occurrence while executing his/her job duties, which results or may result in a conflict of interest, once the employee becomes aware of it.

Based on the results of review of the above notification, the Company's commission for compliance with official behavior requirements and settlement of the conflict of interests shall make a decision ruling out the conflict of interest.

The method of hidden conflict of interest revelation is a campaign to collect income details, which is held in the Engineering Division on the annual basis.

Any employee of the Engineering Division is also entitled to address the security service for a consultation on ethical and law-abiding behavior and on the issues related to unfairness manifestations in the Company.

Rosatom State Corporation Order No. 1/186-P dd. 20.02.2018 approves the Unified Industry Procedure for working with hot line messages in Rosatom State Corporation and its companies. This Procedure was adopted for guidance in accordance with JSC ASE EC Order No. 40/359-P dd. 05.03.2018.

NIAEP JSC Order No. 40/938-P/007/262-P dd. 20.07.2015 approves Regulations on the work of "Trust Boxes" for written applications of the Company's employees, contracting parties and other persons regarding cases of corruption offenses.

GRI 102-17

Within the framework of the above local and regulatory acts implementation, the employees of the Company were informed of the possibility to inform publicly or anonymously regarding the facts of corruption and other offenses under "Hot Line" channels of specialized communication or by electronic mail to the address of JSC ASE EC asset security subdivision, as well as in writing through the "Trust Boxes" located in central offices, branch offices and representative offices of the Engineering Division of Rosatom State Corporation. Any employee of the Engineering Division, as well as representative of another organization is provided with a possibility to inform of any data regarding corruption activities, namely:

- cases of employees being tempted to commit corruption offenses;
- cases of corruption offenses committed by other employees, agents of the Company or other persons;
- the employee's conflict of interest that has arisen or is likely to arise.

Internal control system

Internal control system of the Engineering Division is an interrelated integral combination of organizational structures, processes, rules of their implementation and features of company management system, being a part of it, which executes the internal control function on a permanent basis or occasionally and ensures achievement of internal control goals. The purpose of its functioning is to provide guarantees of the Engineering Division’s goals achievement with unconditional compliance with safety requirements, provisions of the legislation and international treaties.

The basic document regulating the functioning and development of internal control system of the Engineering Division is the Policy in the field of internal control of Rosatom State Corporation and its companies approved by Rosatom State Corporation Order No. 1/1143-P dd. 28.12.2011 and adopted for guidance by NIAEP JSC and JSC ASE Order No. 40/854-P/007/286-P dd. 11.09.2013.

One of internal control system subjects is Internal Control and Audit Service of JSC ASE EC (IC&A) acting on the basis of Regulations on the Service of 19.06.2018.

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

The primary area of IC&A activity is a constant improvement of efficiency and reliability of the internal control system in the Company and Rosatom State Corporation companies, in relation to which IC&A carries out control according to requirements of the legislation of the Russian Federation, regulatory state authorities and international standards.

Process groups “Internal Control and Internal Audit” function in accordance with the chart approved by the President of JSC ASE EC on 10.05.2018.

Internal Control and Audit Service executes the following functions in the field of internal audit:

- internal control system efficiency;
- risk management system efficiency;
- financial reports internal control system efficiency;
- correctness and completeness of use of regulations, standards and other administrative documents in the fields of financial and economic activities, public reports generation;
- budget generation and implementation;
- procurement control system efficiency;
- information systems use efficiency (IT-audits);
- other business processes (operating activities);
- elaboration of recommendations to enhance efficiency and effectiveness of activities, corporate management improvement, risk management process efficiency in JSC ASE EC, its subsidiaries and companies within its scope of management, based on the results of audits (assessments) conducted;

- submission of reports on the results of conducted internal audits (assessments) to the President of JSC ASE EC;
- consulting the managers of JSC ASE EC, its subsidiaries and companies within its scope of management on the issues of internal audit and risk management, including ones related to implementation of corrective actions based on the results of conducted internal audits;
- control over the implementation of recommendations issued based on the results of conducted internal audits.

Accounting Office of JSC ASE EC and IC&A act as the subjects of control within the system of financial and economic activities control. The tasks of Accounting Office in this area include:

- control over the correct spending of funds and material values of JSC ASE EC, JSC ASE, JSC “Atomenergoproekt” and JSC ATOMPROEKT;
- observance of the established rules for documenting the acceptance and release of commodities and materials of JSC ASE EC;
- control over correct spending of funds on business travel expenses of JSC ASE EC;
- arrangement of control over payroll accounting processes in accordance with the terms and conditions of agreement concluded between JSC ASE EC, JSC “Atomenergoproekt”, JSC ATOMPROEKT and JSC Greenatom;
- control over accounting and fiscal record-keeping in branch and representative offices, subsidiaries and companies within JSC ASE EC scope of management;
- arrangement and support of improvement of Financial Reports Internal Control System of JSC ASE EC, JSC “Atomenergoproekt” and JSC ATOMPROEKT.

Improvement of internal control and audit system in 2018:

- main processes included in MPG “Internal Control and Internal Audit” (internal audit, auditing activities, expert analytical measures, consideration of procurements from the sole supplier conducted using special authority of the CEO of a nuclear industry company, as well as carried out upon the decision of the customer’s CEO based on the results of canceled competitive procurement) were regulated;
- timeframe of complaints review by the Arbitration Committee of JSC ASE EC and issue of resolutions (conclusions) based on the results of their review was reduced on a regulatory basis.

Number of CA taken by Internal Control and Audit Service within the reporting period



Number of assignments taken by Internal Control and Audit Service within the reporting period

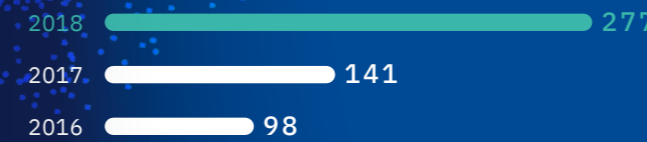


Table 3. Cases of disciplinary measures application

Name of the company	2016	2017	2018	(2018-2017)/2017, %
JSC ASE	11	0	1	100
JSC ASE EC	56	7	7	0
JSC “Atomenergoproekt”	3	2	3	50
JSC ATOMPROEKT	0	0	4	400
Trest RosSEM Ltd	13	4	1	-75
JSC “NIKIMT-Atomstroy”	6	2	11	450
PJSC ESM	0	2	0	-200
JSC “Spb EIZ”			1	100
TOTAL IN THE ENGINEERING DIVISION	89	17	28	65

Table 4. Number of procurement activities audits conducted in 2016–2018

Name of the company	2016	2017	2018 plan	2018 fact	(2018-2017)/2017, %
JSC ASE	1	4	3	7	133
JSC ASE EC	2	8	2	12	500
JSC “Atomenergoproekt”	3	4	2	8	400
JSC ATOMPROEKT	3	1	2	5	150
SMU No. 1 LLC	1	2	1	1	-50
VMU LLC	1	1	1	1	0
Trest RosSEM Ltd	1	2	1	2	100
JSC “NIKIMT-Atomstroy”	0	1	2	2	0
PJSC ESM	0	2	1	1	0
JSC “Spb EIZ”				2	
TOTAL IN THE ENGINEERING DIVISION	12	25	15	41	173



In 2018, IC&A carried out 42 control activities, based on the results of which 277 recommendations and assignments were issued, including 159 with due date in 2018, out of which 145 (91%) were executed.

Increase in the number of assignments given is due to improved quality of issues elaboration in audit programs.

Disciplinary measures include the types of disciplinary punishments stipulated by the Labor Code of the RF: admonition, reprimand, termination of employment according to the appropriate grounds.

The dynamics results from various subjects of audit in different reporting periods, issues audited.

Based on the results of control activities carried out by Internal Control and Audit Service, no disciplinary responsibility cases were recorded in other companies within the Division’s scope of management.

Increase in the number of audits conducted in the field of procurement results from the interest of the Division’s management in reducing the timeframe of this business process, getting an increased economic effect and in reducing reputation risks related to potential violations in the field of procurement, completion of Competition Policy Control Office separated in the service in 2017 and development of procurement online monitoring mechanism.

In November 2018, there was an IC&A meeting to enhance the efficiency of process group “Internal Control and Internal Audit” in the Engineering Division, as a result of which a list of measures aimed at improvement of internal control systems quality was drawn up and accepted for execution. Thanks to application of intradivisional interaction principles and participation of JSC “Rosenergoatom” in the planning session of IC&A, the best practices of related divisions’ IC&A were adopted for work.

2.2

Intellectual Capital

2.2.1. Management at the Designing Phase

2.2.2. Innovative Projects, Patenting of Intellectual Activity Results



112

national and regional applications for inventions were submitted, based on the results of 2018



12

Certificates for computer software and databases were submitted, based on the results of 2018



First Vice President — Director of Joint Design Institute

Ruben Topchiyan

— What are the objectives and tasks of Joint Design Institute establishment? What are the results of the Institute's activity and prospects of its development?

First of all, establishment of the Joint Design Institute is a response to current challenges that the Engineering Divisions of Rosatom State Corporation faces. Considering the need for parallel execution of several orders simultaneously, possibility of labor resources operative management is essential. It should be possible to redistribute the work and involve the necessary experts quickly. In this regard, establishment of the Joint Institute enhances efficiency and removes barriers compared with the situation when all design institutes are separate legal entities. Apart from the formal side, Joint Design Institute means a different philosophy, uniform rules and standards which, in essence, make smooth redistribution of the scope of work possible. Among other things, this is, if you like, a restoration of historical records when in the Soviet Union we, the designers, worked in a single big institute.

— How would you evaluate the influence of digital technologies, including Multi-D, on designing in the mid- and long-term?

It is obvious now that digital technologies are changing our lives. This, in particular, makes efficient work in one team possible, despite the location of the project participants. Working in the unified information space is a trend. And, in the mid-term, we will see a several-fold increase in the efficiency of interaction both with our contractors and customers. As for the long-term perspective, I think that, first of all, we are talking about various auxiliary systems for the designers and computer-aided design systems which will allow using the accumulated experience in the most efficient way and enhancing the labor productivity by means of standard solutions application.

— What is the competitive advantage of the Engineering Division in NPP designing?

This is a blend of experience and drive to be on the advance, using state-of-the-art technologies. It is our designers who became the authors of the first power unit of Generation III+ in the world. Besides, when a customer signs a contract with us, it will get all the advantages that the Russian Rosatom State Corporation can provide. This is establishment of the entire nuclear infrastructure, if necessary, provision of fuel for the whole lifecycle of NPP, plant maintenance and repair.

“ The intellectual capital includes intangible assets, such as knowledge, technologies and intellectual property and has a primary importance for innovation and achievement of the Division's strategic goals. The intellectual capital management describes contribution to the development of new technologies and upgrading of the existing ones, preservation and accumulation of the cumulative professional knowledge, innovation solutions, R&D and licensing of R&D products”

2.2.1. Management at the Designing Phase

For design institutes of the Division, the year 2018 marks a beginning of a new phase — establishment of the joint design institute. Thus far, unified structures responsible for technical support, budget, development and information technologies of the institutes have been formally established. Uniform processes are being built, the uniform production is actually operating.

Within the implementation of re-engineering and design processes digitalization program, a range of projects were being implemented in 2018. First of all, the projects were aimed at the following:

- transfer to design on the basis of reference books elaborated based on unification and standardization of equipment and design solutions;
- development and enhancement of efficiency of quality assurance systems for the design products release and design technologies development;
- creation of efficient resource management system in the design institutes;
- development of solutions for integration between the industry and divisional information systems;
- improvement of 3D-modeling processes.

Within the program on NPP products creation, works related to unification of equipment and standardization of design engineering solutions were performed.

A tool for generation and storage of standard technical requirements for the equipment and generic design engineering solutions was developed on the basis of technical solution using the functionality of SmartPlant Foundation information platform.

As a result of this work, the basis was laid for creation of unified reference books, use of which will allow enhancing the efficiency of design processes significantly and reducing the timeframe of design and detailed design documentation.

Within the activities under the project “NPP Product Integration”, work on the target architecture development for the integration of information systems of main NPP construction participants was performed regarding assurance of digital exchange of information on the movement of the equipment used in the NPP construction projects at all phases of NPP construction projects lifecycle.

Results of this work were used as a basis for preparation of the plan of measures to integrate industry and divisional information systems of Rosatom State Corporation.

Regarding the development and enhancement of efficiency of quality assurance systems for the design products release and design technologies development, the following RPS projects were implemented in 2018:

- implementation of tools and IT-services ensuring quality control at all stages and phases of I&C documentation development in a pilot overseas project of NPP construction;
- quality improvement of design and detailed design documentation to prevent re-occurrence and reduce the number of non-conformances in the design products.

Results of these projects implementation are, for instance, the elaborated and enforced “Procedure for I&C Development in the Overseas NPP Construction Project Based on the Quality by Design Concept” which ensures control of work performance quality at all stages, phases, processes and procedures of documentation development, as well as “Regulations on “Design Fault” Non-conformance Management during CEW and PCW” at a Russian NPP construction site.

Efficiency of using these regulations is supported by the fact that the share of documentation returned by the Customer on the grounds of standard comments in SPF in the pilot project did not exceed 12%, which complies with the target value of RPS project.

In 2018, works on the development of design quality management methodology using quality gates were performed.

As a result of these works, Methodology of Quality by Design of JSC ASE EC, which formalizes the arrangement of quality assurance processes, was elaborated and put into effect.

Plan of measures to continue these activities in 2019 was prepared. It includes solutions to the following tasks:

- reorganization of design quality service in JSC ASE EC;
- full-scale implementation of the developed methodology for quality by design;
- arrangement of quality control under checklists with uniform evaluation criteria;
- development of means for quality control processes automation.

Regarding assurance of functionality of information systems of TCM NC program (<http://tcmnc.ru>) in terms of providing these systems with the required scope of data, works were performed in 2018 to form digital bills of quantities and specifications for equipment and materials.

The main result of these works performance is development of the following:

- methodology for formation of digital bills of quantities and specifications for equipment and materials;
- standard unified reference books on works and materials;
- prototype of information system for formation of digital bills of quantities and specifications for equipment and materials based on the functionality of SmartPlant Foundation information platform.

“ In 2018, 3D-modeling processes improvement resulted in 3D-models developed for the pilot overseas construction project:

- 150 buildings and structures
- 1,500 process systems
- 1,000,000 items of equipment
- 5,000,000 elements in the model
- 50,000,000 attributes of the elements»

Within pilot testing of the results of this work, materials on digitalization of bills of quantities and specifications for equipment and materials in the formats agreed with these systems were elaborated and handed over for use in information systems of TCM NC program.

In 2018, a large scope of works was in the area of 3D modeling processes improvement.

As a result of work performance, dozens of methodological, organizational and administrative documents were issued. Development of 3D-model and design documentation reached a conceptually new level.

In 2018, these works resulted in 3D-models developed for the pilot overseas construction project:

- ~ 150 buildings and structures;
- ~ 1,500 process systems;
- ~ 1,000,000 items of equipment;
- ~ 5,000,000 elements in the model;
- ~ 50,000,000 attributes of the elements.

Development of design technologies in this direction will ensure in the future real prospects in efficiency enhancement:

- design solutions verification;
- calculations of building structures;
- calculations of pipelines;
- safety analysis and assessment;
- cost estimate;
- arrangement of graphic documentation issue.

Based on the analysis of the results of IT-projects implementation in 2018, a roadmap “Digitalization of NPP Construction Processes” was formed which includes development of improvement areas for the design processes started in 2018 and new areas identified as a result of analysis of materials obtained at the stage of examination of design processes conducted in 2018.

Consideration of customers' requirements and previous experience during NPP design

Requirements of Customers, which are stated in contracts, are transferred into terms of reference that are subsequently submitted to Responsible Employees for execution.

To consider the previous experience, there is a documented “Procedure for Consideration of other Projects Experience When Developing the NPP Design Documentation” developed in JSC ATOMPROEKT. In order to establish uniform requirements for the process “Consideration of NPP Design, Construction and Operation Experience”, the relevant regulations are being developed in JSC ASE EC.

Currently, AtomExpert information system is undergoing trial operation in JSC ASE EC. Its introduction will allow improving the quality of documentation issued by ruling out replication of errors from the previous projects. The developed system establishes the feedback from the project implementation to its developers.

Within 2017-2018, non-conformances submitted to Technical Division from JSC “Rosenergoatom”, nuclear power plants and AtomExpert information base were analyzed. The comments were systemized, corrective and preventive measures were determined and communicated to responsible employees with a purpose of their consideration during the development of design documentation on other facilities, including overseas ones.

Innovative design technology: virtual NPP



Technology specifics:

- Use of advanced supercomputer technologies for the analysis of a wide range of processes at an NPP unit, applying related detailed models, 1D-codes of improved estimate and 3D engineering calculation codes.
- Mathematical models of NPP systems and equipment with a various degree of detail are used for substantiation and verification of technical and process solutions, as well as safety of the NPP being designed.
- Use and development of a unique software and hardware complex “Virtual NPP Power Unit” (SHC VPU) allows creating and using Virtual Power Units (VPU) for integrated verification of NPP designs. Besides, high quality of verification is achieved owing to a realistic representation of NPP systems and equipment, elements of main control room and automatic equipment, as well as description of NPP processes on the basis of improved estimate codes, which sets the complex apart from a full-scale simulator.
- Highly visualized and clear process outlook and visual expression of VPU control are ensured due to interactive tools based on multi-touch panels and control software SimInTech.



Fields of application:

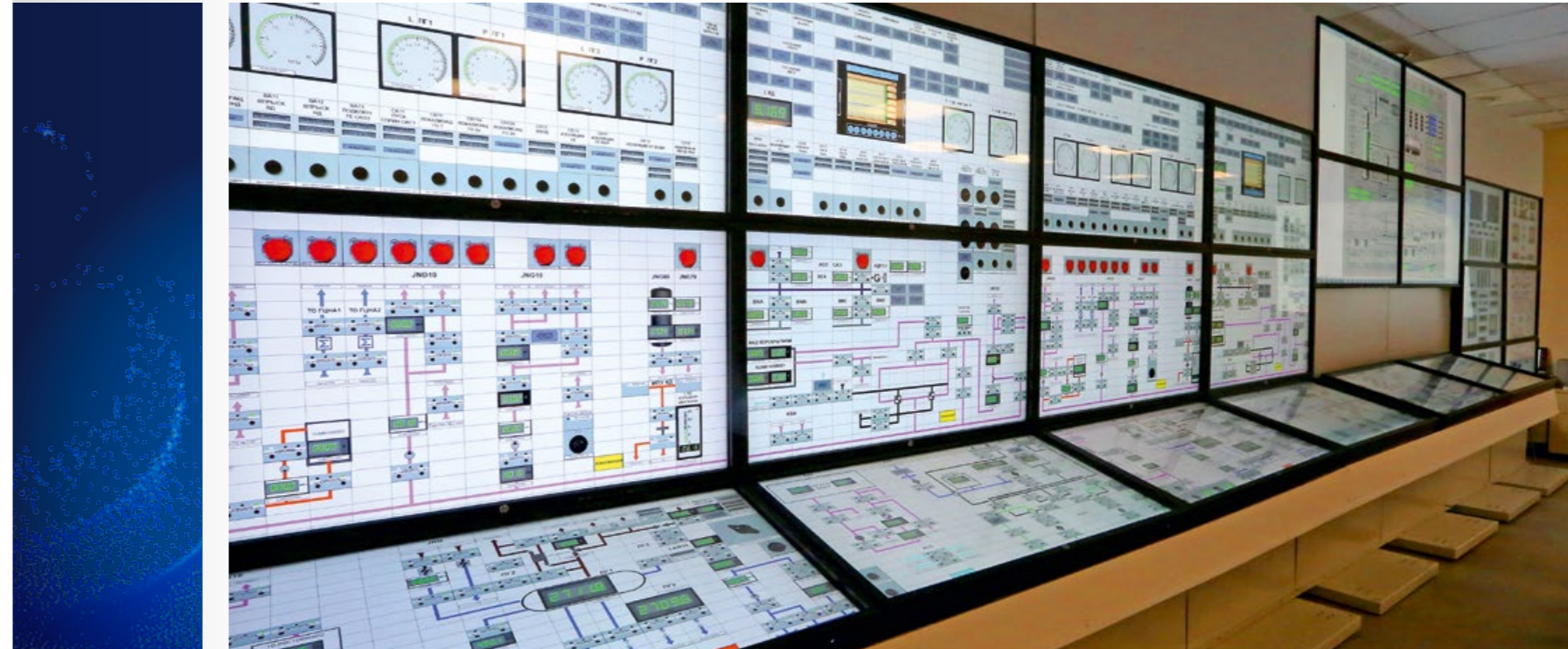
- Use of supercomputer technologies for justification of technical solution and safety of facilities being designed.
- Design solutions verification at the Virtual Power Unit*.



Prospect of VPU use:

- Use in pre-commissioning works;
- As an application to projects created for operating organizations;
- Processing and verification of operators’ instructions, including those at operating power units;
- As a simulator and a learning tool.

* At present, the above technology is used for verification of AES-2006 designs. The results obtained will be replicated to all NPPs constructed under the generic design.



Virtual NPP



Basic effects of technology application:

- Reduced number of non-conformances in the designs of equipment, process systems, electrical systems and I&C systems, renunciation of excess conservatism of the design solutions.
- Availability of detailed research models which allow verification of various technical solutions and obtaining justification and clear understanding of processes in NPP systems and equipment for different situations (improvement of technical and economic performance indicators).
- Optimization of expensive experiments number and enhancement of projects competitiveness on the global market.
- Assurance of compliance with IAEA requirements and European requirements EUR(D) regarding the use of engineering simulators, which NPP VPU are in essence.



Effects of technology introduction at the commissioning and operation phases:

- Visual representation of processes in the NPP systems under different modes of a power unit operation, considering mutual influence of the systems.
- Visual representation and possibility to test the main control room elements prior to creation of a full-scale simulator, including a possibility of training.
- Reduction of power units commissioning timeframe due to introduction of an efficient calculation toolbox, which allows speeding up the process of individual systems adjustment and integrated testing, as well as a preliminary check of PCW programs.
- Determination of a potential effect of power unit systems upgrade.

“Based on the results of work in Digital technologies implementation in designing in 2018, managers for each area were determined, detailed roadmaps were drawn up, works on implementation of schedules started actively”

Digital technologies implementation in designing

At the end of 2018, Rosatom State Corporation developed the Unified Digital Strategy (UDS) in order to ensure digital transformation.

Within the UDS, program “Re-engineering and Digitalization of NPP Construction Processes” was drawn up and approved. The objective of the program is implementation of integrated digital solutions to ensure quality, time and cost of NPP construction, as well as for the NPP standardization and unification.

Projects included in the program are aimed to solve the main business task — timely construction of nuclear facilities (NF) with the set budget and quality parameters.

There are 4 main areas defined within the program:

- Design quality assurance;
- Digitalization of end-to-end cross-functional and intradivisional production chains;
- Construction time and cost management;
- Development of Multi-D digital platform.

Based on the results of work in 2018, managers for each area were determined, detailed roadmaps were drawn up, works on implementation of schedules started actively.

Regarding digitalization of designing, Cluster 1 of “Design Quality Assurance” Program was formed.

It includes 3 projects:

- Update of design IT-architecture;
- Development of design management system on the basis of functional and cost-oriented approach;
- Development of unified industry system of RRI.

Lean Engineering

A project of NPP construction time and cost reduction. The main purpose of the Division is to increase projects competitiveness by means of including the motivation tools to reduce the cost and time in the Design business process.

The Division implements the system of investment and construction projects motivation, the purpose of which is creation of conditions that contribute to reducing the cost and time of the facilities construction. The motivation system is aimed at forming the conditions for the material and non-material interest of the designer to reduce the timeframe of design, the duration and cost of construction while ensuring high technical and economic indicators of the facility being designed, reducing operating costs. The system has an individual focus, provides the formation of incentives for the adoption of design solutions for each designer, regardless of the position held. At the same time, the designer develops an awareness of the importance of adopting efficient design solutions.

2018 results:

- increase in the weight of the indicators aimed at achieving the goals in terms of time and cost when forming KPI maps of the responsible managers for 2018;
- optimization of the cost reduction proposals submission and evaluation process within the Division;
- training course “Design Economics” was conducted for the Division’s employees involved in the CRP submission process;
- additional training in the use of agile-methods in project management was conducted to expand the application of agile practices in the work of the design unit employees.

Use of Multi-D digital platform in the nuclear industry

A distinctive feature of business of the Engineering Division of Rosatom State Corporation is a continuous improvement of management technologies and upgrade of production processes. Among the main developments, there is introduction of a unique Multi-D technology which allows constructing complex engineering facilities within the established time and at a fixed price.

This digital platform is an integrity of business process methodology, models, databases, software solutions which allow solving the tasks related to management of the complete lifecycle of a capital construction facility.

The digital platform is a unified information space for algorithm-type interaction of experts involved in the processes of design, construction and operation of capital construction facility with roles taken by them and distribution of responsibilities. Such platform ensures creation and filling of digital model of a capital construction facility and, by means of it, ensures control and possibility to manage the Project progress. This function can be implemented both using any set of instruments and due to information import from information means (resources) of the Facility Customer or its contractors.

Creation of digital industrial and technology digital platform will ensure creation of the added cost (for goods and services) within the framework of the digital economy and cost reduction by means of modeling and optimization of design, construction and managerial solutions; use of reference standard solutions, transfer of routine works to smart computer programs, reduction of production operations time period and minimization of errors and remakes.

Besides, the creation of digital industrial and technology digital platform will allow the industry to get the following benefits:

- industry digitalization;
- enhancement of efficiency of industry specialization and cooperation based on digital platform solutions and end-to-end digital links;
- diversification;
- advance digitalization of capital construction and other segments of the real sector of economy;
- reduced dependence on the import into CAD and other software.

Projects in the field of automation and digitalization of NPP operation processes

The reporting year saw continuation of earlier started works on the creation of Multi-D national platform: works on the creation of NPP operation process management system (Multi-D Operations subsystem) including several systems integrated between themselves:

- operation management system based on IBM Maximo for Nuclear Power;
- information model for operation (unified platform containing all information on the plant, including 3D-model, smart diagrams of processes, electrical circuits, general layout, calculation results, documents).

This system will provide for collection of all information required for operating and maintenance personnel of the NPP to determine the current status of equipment, storage of the results of equipment walk-downs and repair, scheduled dates of repair works, types of repair works, as well as information on the required materials, tools, personnel and duration of repair.

Implementation of this project as a generic replicated solution related to NPP equipment maintenance and repair management for JSC “Rosenergoatom”, ensuring generation of the source of information on operation to improve design solutions and design quality, paves the way for creating references at Russian NPPs and forming proposals on the use of this solutions for foreign Customers of NPP construction projects.



Director for Science and Innovations

Sergei Egorov

– Which areas of advanced research and development are relevant for the Engineering Division now?

First, there are system-related works in the management of complex engineering facilities construction projects to form an aspect-oriented approach which is a blend of technologies for information management of NPP construction and system engineering;

Second, it is a systematic elaboration and forming of process clusters which ensure increased quality of construction and provide for optimization of the most important project parameters: time and cost.

Third, applied avant-projects and investment projects aimed at solving specific applied tasks of the Division and the industry are being implemented.

– What is the impact of transformation and digitalization process on the science and innovation unit?

The science and innovation subdivisions became part of Design Unit in the organizational structure, thus, research and break-through technologies will be significantly closer to direct design production.

As regards digitalization of production processes and digital economy products, we are working on activity systematization aspects, forming the standards for NPP information models creation.

“ As regards digitalization of production processes and digital economy products, we are working on activity systematization aspects, forming the standards for NPP information models creation ”

2.2.2. Innovative Projects, Patenting of Intellectual Activity Results

2.2.2.1 Activities in the field of science and innovation

In 2018, a new division executing the functions of HOS (head organization for standardization), related to siting, survey and design of nuclear facilities for peaceful use and submission of work results to Rosatom State Corporation, was established on the basis of Science and Innovation Unit of the Engineering Division. It is planned that the HOS functions will be executed by the existing structural subdivisions of the Engineering Division with the involvement of methodological support organizations (MSO) and, if necessary, outside designated companies from the nuclear industry.

Work of Unified Scientific and Technical Research Council (USTRC) of JSC ASE EC was expanded. Open discussion platform of the scientific and technical community gathers experts from enterprises of the Engineering Division, Rosatom State Corporation, outside designated companies, authorities supervising nuclear and radiation safety.

USRTC held meetings on the following topics:

- Engineering solutions on the NF sites with a high seismic activity (NUVIA Group, TsKTI-Vibroiseism Ltd.);
- Technical diagnostics in the NPP designs with VVER (DSTC JSC);
- Arrangement of cast-in-situ structures concreting technology;
- Relevant issues of calculation codes development (Vedeneev VNIIG, Orgenergostroy Institute JSC);
- Standardization of LBB (leak before break) concept requirements for pipelines of NPP reactor coolant circuit (Rostekhnadzor, TC-322 Nuclear Engineering, SEC NRS), etc.

The year 2018 saw the start of a project on replacement of traditional assortment of pipelines for NPP safety classes 2–4 with the unified assortment based on up-to-date design approaches and materials ensuring maintenance-free service life of 60 years.

New design approaches are based on the use of method of pipeline system elements calculation with regard to demand (necessary pressure, temperature, safety class, water chemistry for a given system), further conversion of calculated elements in the 3D-model using Smart 3D and assembly of ready-made pipeline system.

Such solution improves the facility safety owing to application of stronger materials which reduce the pipeline system weight simultaneously. Besides, the calculation made for the selection of pipeline system main dimensions and based on the specific operating conditions provided a precise determination of necessary materials and dimensions of pipeline details for their operation during 60 years. These solutions are stipulated by the R&D that have been carried out. The results are accepted by SEC NRS, TC-322, JSC VO Safety, JSC “Rosenergoatom”, STC of Rosatom State Corporation. This assortment was also accepted as the generic one for all NPP with the service life over 60 years by Rosatom State Corporation’s decision.

As the main and primary developer of design and technical requirements for the NPP facility in general, the Engineering Division creates demand for new scientific and innovative values and has a necessary database of requirements for projects at all their phases.

With a purpose to form a plan of advanced research and development, a competition for avant-projects selection started in Rosatom State Corporation at the end of 2017.

The objective of the competition was to select the most prospective and efficient projects for implementation at the R&D phase in 2018. The key part of an avant-project is a report on analytical studies which justifies the expediency and possibility of R&D. Rosatom State Corporation appointed JSC ASE EC as the responsible Customer for eight avant-projects.

The following was implemented and prepared for avant-projects implementation:

- patent research into the status of a selected scientific and technical area, including issues related to creation, production and market of prospective products, technologies, services;
- search reports, analytical note on the patent research into benchmarking of R&D results, scientific novelty, relevance, practical significance;
- analytical reviews of the problem being solved, solution, scientific and technical novelty, relevance, technological practicability, practical significance, economics and the market, preliminary structure of expenses for performance of works, annotation on the content of first-stage works.

“As the main and primary developer of design and technical requirements for the NPP facility in general, the Engineering Division creates demand for new scientific and innovative values and has a necessary database of requirements for projects at all their phases”

The final reporting scientific and technical documentation was prepared:

- terms of reference;
- calendar plan;
- structure of expenses;
- report on analytical studies;
- presentation.

All avant-projects, which the Engineering Division was the Customer of, were successfully implemented in 2018. In the future, Rosatom State Corporation intends to hold such competitions annually.

Avant-project “Justification of Works on the Creation of Conceptual (Generic) Solution for NPP with VVER-1200 and VVER-TOI Based on Seismic Isolating Systems (SIS) for Areas of High Seismic Activity” was implemented.

Plans to achieve technical leadership of the Engineering Division

The Engineering Division of Rosatom State Corporation deals with the development and implementation of technical programs aimed at the achievement of technical leadership over the main competitors in the industry. Thus, in the 4th quarter of 2018, large-scale work was completed to develop and approve three individual Key Technology Programs necessary for the development of VVER technology in the long-term:

- R&D subprogram “Technology Development for Pressurized Power Reactor with Coolant Supercritical Parameters”;
- subprogram “Development of VVER Spectral Regulation Technologies” to solve the tasks related to achievement of conceptually new operating qualities of VVER technology and assurance of the highest safety level;

- subprogram “Improvement of Design Solutions for VVER Traditional Technology” to solve the tasks related to assurance of unconditional competitiveness of domestic NPP designs in terms of specific technical and economic indicators and the most fundamental technical solutions. Commencement of works is scheduled for 2019, work planning horizon is 3 years.

Justification and preparation for implementation of R&D projects (starting from 2019) aimed at the formation of regulatory and technical base for introduction of industry product solutions to polymer composite materials (PCM) application at nuclear capital construction facilities into the design production were completed:

- R&D project “Development of the Library of Regulatory and Technical Documentation (RTD) Regulating the Design of Temporary Roads at NPP Construction Sites and Application of New PCM in the Road Building”;
- R&D project “Development of the Library of Regulatory and Technical Documentation (RTD) for Use of Equipment and Pipelines in Polymer Structural Materials in the NF Projects”.

Elaboration of basic procedure for development and improvement of systematic work in the Engineering Division related to identification, initiation, preparation and implementation of R&D works aimed at scientific and technical support of processes of the NPP construction in 33 countries (Egypt, Bulgaria, Hungary, Bangladesh, China, etc.) was completed.

Implementation of a range of R&D aimed at the improvement of VVER technology.

Creation of integrated package of regulatory, technical and methodological documentation regulating the following areas:

- digitalization of construction processes and technologies;
- generation of bases of the data/knowledge on technologies and aspects of use at NPP construction sites (potential sites);
- elaboration of standard documentation on the use of work results.

In 2018, a prototype of NPP information model (NPP IM) was created on the basis of WEB-3.0 technologies. This technology is Semantic Web (W3C.org).

A specific feature of the technology is use of ontology* as the means of describing metadata* and subject-matter area. The ontology is also a key to integration with other similar systems, i.e. using the ontological approach.

In 2018, the NPP ontology was developed. The NPP ontology has mapping (references) to similar concepts in European ontologies SAREF4BLD and IFC-OWL. The NPP IM prototype is implemented as a portal, is platform-independent, does not use proprietary software (PS)* (based on OpenSource and Russian developments). It does not license limitations to the number of workplaces (number of users). It is provided with the maximum possible data-centric architecture* and unification of concepts used.

Results of the Intellectual Activity (RIA)

Development of the innovative potential is the key factor for technical leadership of the Engineering Division on the international market of construction of NPP with VVER reactor. The Division’s management pays special attention to intellectual capital increase, development of knowledge management system and assurance of key products and technologies legal protection in the RF and abroad.

Within the framework of international patenting of technologies of the NPP with VVER reactor, the Division is implementing 3 (three) investment projects related to legal protection of RIA of the companies within its overseas scope of management for the period until 2022.

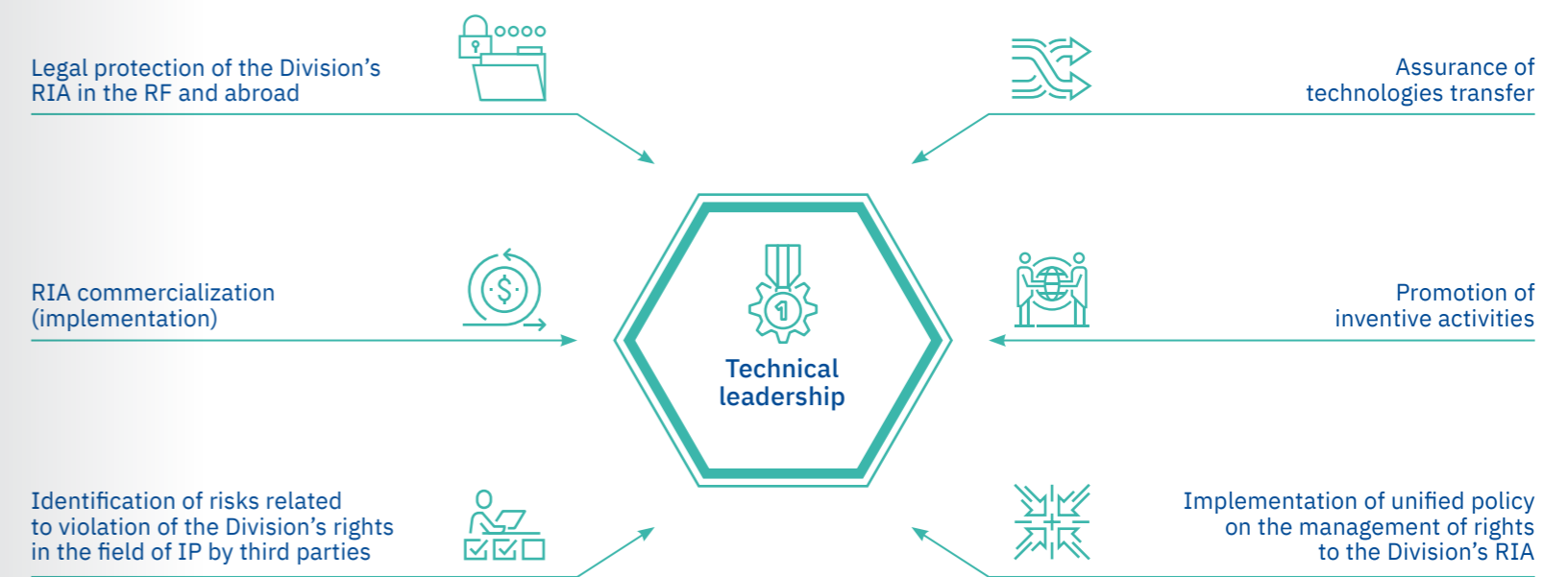
Based on the results of 2018, 112 national and regional applications for inventions were submitted in 30+ countries.

Starting from 2017, the basic trend in the Division’s patent policy is an increase in the scope of patenting of identified protectable solutions which can be protected as inventions and useful models, as well as the growth of international patenting related to the implementation of overseas NPP construction projects.

Table 5. Results of intellectual property objects patenting and registration in 2016-2018 in the RF and abroad

APPLICATIONS IN THE RF	2016	2017	2018
Submitted applications for receipt of RF patents for inventions, useful models	3	13	26
Submitted applications for state registration of computer software and databases	23	20	7
INTERNATIONAL APPLICATIONS			
Submitted national and regional applications (30+ countries)	20	106	112
Submitted international applications in accordance with PCT procedure (Patent Cooperation Treaty)	3	10	6
RECEIVED PROTECTION DOCUMENTS			
RF patents for inventions, useful models	8	5	15
Certificates for computer software and databases	39	26	12
Foreign states’ patents, including decisions to issue patents	—	—	11

Basic tasks of the Engineering Division in the management of rights to the results of intellectual activity (RIA)



2.3

Manufactured Capital

- 2.3.1. Construction Phase Management
- 2.3.2. Rosatom Production System
- 2.3.3. Center of Technologies Transfer in Nuclear Facilities Capital Construction
- 2.3.4. Procurement Activity





Vice President for Capital Construction

Nikolay Vikhansky

— What is the difference between the requirements for NPP construction process, set by the customers on different markets? Are they getting more stringent?

The trends and problems related to the Customers' requirements for NPP construction process on overseas markets can be conventionally divided into two types: organizational and technical ones.

Among the main organizational problems, I can distinguish the current sanctions regime for the RF, which shall be taken into account when preparing and concluding contracts for NPP construction.

The basic trends for change of organizational requirements differ in principle for the countries already having the experience of NPP construction and for the newcomer countries:

- the primary trend in the organization of NPP construction process in the countries having the construction experience is a significant reduction in the scope of Russian party's obligations. Thus, for NPPs in China and India the scope of the Contractor's obligations is limited to design and supply of equipment for the NPP, for Chinese NPP project it is in essence the nuclear island only. Therefore, the primary task for implementation of such contracts is optimization of NPP costs.

The basic trends for implementation of NPP construction projects in the newcomer countries are as follows:

- transfer of all responsibility for the construction process to the Contractor, including responsibility for creation of the external infrastructure necessary for the NPP construction, as well as design and construction of physical protection system;
- requesting the maximum involvement of local construction and erection companies in the construction process (requirement for initial level of localization is 25-30%).

Such requirements with the Contractor's general responsibility for the NPP construction result in the necessity of a detailed study of the Customer's country market prior to concluding a contract, analysis of potential vendors' experience and qualification, analysis of construction materials and equipment market in the Customer's country.

The general trend in the change of technical requirements for NPP is more stringent requirements for the NPP safety, including requirements for consideration of Fukushima lessons and a large commercial aircraft crash in the NPP design.

In this respect, several groups of countries where the above trend is manifested in a different way can be distinguished:

- the first group includes European countries already having the construction experience and guided by the EUR requirements. Among the main problems for implementation of new projects in such countries (e.g. Hungary, Finland), one can point out differences in the requirements for classification, which results in the necessity to adapt the equipment manufacturing process in the RF enterprises to these requirements. In its turn, it affects significantly the processes of equipment engineering, manufacturing and acceptance at manufacturing plants;
- the second group may refer to newcomer countries, this is the primary NPP construction market nowadays, these countries start implementing the nuclear power program. They are guided by the EUR requirements (as a rule, they hire consultants guided by these requirements). Such countries may include Egypt, Uzbekistan;
- the third group may refer to countries with the developed nuclear infrastructure (e.g. China, India), setting their own requirements for safety from the internal regulator, which are more or less different from the EUR requirements (e.g. regarding the requirements for aircraft parameters, equipment classification, etc.).

— What is the impact of the Engineering Division's transformation on the processes related to capital construction?

The Division's transformation is in its active phase and this is proven by my transfer from Rosatom State Corporation to JSC ASE EC and concentration of capital construction functions under my control.

At the end of 2018, we proceeded with implementation of the Integrated Cost and Time Management System for NPP Construction Projects (TCM NC) in the Engineering Division. The system objectives are to increase the planning accuracy and effectiveness of NF construction and operation time and cost control, as well as reduction of risks related to exceeding of the target cost of the facilities construction. First of all,

capital construction processes are changing in terms of monitoring resources in the countries of construction, project cost estimate and budgeting, which will allow generating the budget for each construction project in the shortest time possible. Such budget will make it possible to evaluate the decisions made and their impact on the project timeframe and cost upon its completion dynamically.

In the course of transformation, Center of Technology Transfer in Nuclear Facilities Capital Construction was incorporated in the Engineering Division. This is an active efficient tool for the search, selection of global innovative solutions at the phase of high technological availability and their fast promotion in capital construction projects. Use of such solutions at an early phase of new construction projects development minimizes technological risks and ensures reduction of construction costs.

— How would you evaluate the importance of safety culture for safety assurance of processes related to the NPP construction and upgrade?

The importance of safety culture cannot be overestimated. This is an unconditional priority. The safety culture is an inseparable element of personal qualities of managers at any level and processes within their scope of responsibility. A manager of any rank who is related to the NPP construction and upgrade is a leader in safety aspects.

The direct impact of high safety culture on the NPP construction consists in identification of problems directly reducing the power unit safety in the course of analysis of the results of adjustment, start-up and trial commercial operation. One of the key tasks is prevention of identified problems replication in the NPPs under construction, which is solved by means of improving the system of NPP construction and operation experience consideration in TCM NC Program.

“ The manufactured capital is a value reserve that the Company has for using in the production of goods/ services, the main components of which are buildings, equipment, infrastructure. Manufactured capital management is an efficient use of all productive assets to implement the Division's strategic goals ”

2.3.1. Construction Phase Management

Construction of high-power NPP (core business). NPPs abroad

Tianwan NPP (China)

Customer – Jiangsu Nuclear Power Corporation (JNPC).

Reactor type
VVER-1000

I stage (Units 1, 2)

2 x 1000 MW
were put into commercial operation in 2007.

II stage (Units 3, 4)

2 x 1000 MW
were put into commercial operation in 2018.

IV stage (Units 7, 8)

2 x 1200 MW
General Contract for the construction of Units 7, 8 was signed in March 2019.



in the province of Jiangsu, Lianyungang city

2018 Key Results

- Putting Unit 3 into commercial operation;
- Physical start-up of Unit 4;
- Putting Unit 4 into commercial operation.

Plans for 2019

- Ensuring conditions for provisional acceptance of Unit 4 within our area of responsibility.



Kudankulam NPP (India)

Customer – Nuclear Power Corporation of India Ltd. (NPCIL).



Construction on the terms of the EP-Contract



The Multi-D digital platform is used

Reactor type
VVER-1000



in southern India, in Tamil Nadu state

I stage (Units 1, 2)

2 x 1000 MW
were connected to the grid, Unit 1 is accepted by the Customer, Unit 2 is put into the warranty operation.

II stage (Units 3, 4)

2 x 1000 MW

III stage (Units 5, 6)

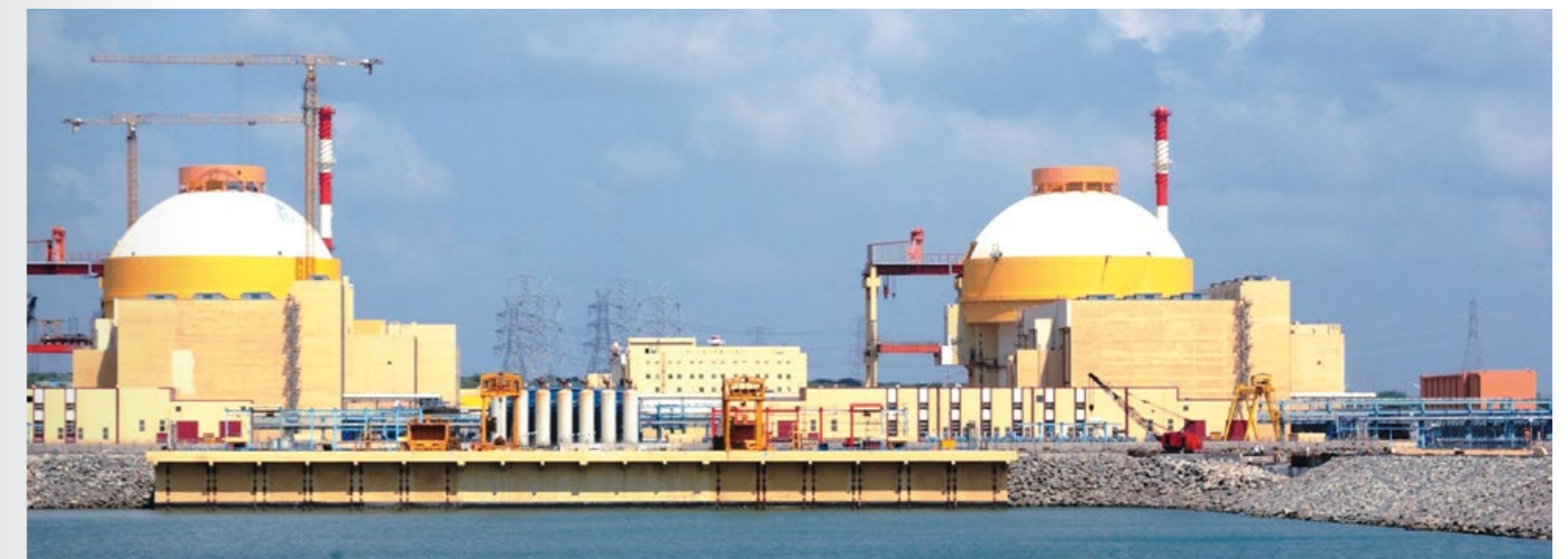
2 x 1000 MW

2018 Key Results

- Release of the detailed design documentation is provided for commencement of earthworks and excavation of pits for main buildings of Unit 5;
- Shipment of the equipment to the Customer is performed, which consists of five shipload lots, with the total volume of 32 300 m³, including the long manufacturing cycle equipment: installation of the molten corium trap, reactor, turbine, turbine-generator and four steam generators for Unit 3, as well as turbine generator for Unit 4.

Plans for 2019

- Works on implementation of the main contracts signed with the Customer;
- Fulfillment of contractual obligations in terms of manufacturing and supply of the long manufacturing cycle equipment and other equipment for Units 3 and 4;
- Fulfillment of contracting schedule on the long manufacturing cycle equipment for Units 5 and 6.



Rooppur NPP (Bangladesh)

Customer – Bangladesh Atomic Energy Commission (BAEC).



Reactor type

VVER-1200

Safety generation III+



Construction on the terms of the EPC-Contract



The Multi-D digital platform is used



The project implements Rosatom Production System

I stage (Units 1, 2)

2 x 1150 MW

2018 Key Results

- Starting of the foundation slab reinforcing for Unit 1 turbine building;
- Obtaining the construction license for Unit 2;
- Commencement of works on the foundation slab concreting for Unit 1 turbine building;
- Starting of the foundation slab concreting for Unit 2 reactor building;
- Shipment of the air-lock (standby) for the personnel of Unit 1 to the Customer.

Plans for 2019

- Construction and erection works at Units 1 and 2 according to the construction schedule.



Akkuyu NPP (Turkey)

Customer – AKKUYU NÜKLEER ANONİM ŞİRKETİ.



Reactor type

VVER-1200

Safety generation III+



The Multi-D digital platform is used



The project implements Rosatom Production System

I stage (Units 1, 2, 3, 4)

4 x 1200 MW

The project of Akkuyu NPP is a generic project of a new-generation nuclear power plant with improved technical and economical parameters, up-to-date safety and reliability indicators and optimization of capital investment in the NPP construction.

Akkuyu NPP contributes significantly to the improvement of local, regional and national economics both during the NPP construction and operation.

During the construction, the project provides for large-scale involvement of local companies in the NPP construction, provision of manpower, construction materials and equipment and other services rendering.

Apart from workplaces created during the NPP construction, additional services will develop, such as stores, banks, hospitals, etc. This all will create additional opportunities for employment.

2018 Key Results

- The license of Turkish Atomic Energy Authority (TAEK) for construction of Unit 1 was obtained;
- “First concrete” pouring in the foundation slab of Unit 1 reactor building was implemented;
- The limited license of Turkish Atomic Energy Authority (TAEK) for construction of Unit 2 was obtained;
- Manufacturing of Unit 1 reactor pressure vessel commenced.

Plans for 2019

- Completion of foundation slab concreting for Unit 1 reactor building;
- Ensuring performance of design and survey works, construction and erection works according to the Integrated Schedule of Akkuyu NPP Construction Project (Units 1, 2, 3, 4) within the area of JSC ASE responsibility.



El-Dabaa NPP (Egypt)

Customer – Nuclear Power Plants Authority of the Arab Republic of Egypt.

Reactor type

VVER-1200

Safety generation III+



Construction on the terms of the EPC-Contract



The Multi-D digital platform is used



The project implements Rosatom Production System

60 years

NPP design lifetime

I stage (Units 1, 2, 3, 4)

4 x 1194 MW



Russian-Egyptian cooperation in the nuclear field has a history of 50+ years. In 1961, the first research reactor in Egypt was built on the basis of Soviet technologies. It marked the beginning of Egypt's long way in nuclear technologies mastering. Construction project of the first Egyptian El-Dabaa NPP is intended to become a new page in our countries' cooperation and a driver of Russian-Egyptian relations.

The NPP construction will have a positive impact on the industrial development of Matruh region and the entire Egypt and will have a significant effect on the country's GDP. The positive result will be

achieved both due to the direct influence of the project – proceeds of local subcontractors and indirect impact of multiplying effect: growth of "allied industries" orders (suppliers of materials, construction machines, providers of utilities and other services to direct project contractors ("indirect effect"); growth of the population's purchasing power and, consequently, growth of orders for industries servicing the consumer demand ("induced effect"). Besides, additional workplaces will be created in construction and machine-building industries in the course of project implementation.

2018 Key Results

- Completion of the 4th stage of the engineering survey on the construction site and in the Mediterranean Sea waters adjacent to it;
- Preparation of the documents for obtaining of the license for construction of Units 1, 2 (PSA, PSAR and parts of the Basic Design);
- Preparation of the first-priority detailed design documentation on construction and erection works of the preparatory period.

Plans for 2019

- Continued elaboration and review of El-Dabaa NPP basic design;
- Preparation for commencement of construction and erection works on the construction site.

Reference NPP

Leningrad NPP-2 constructed in Russia in accordance with AES-2006E design. Its Unit 1 was accepted for commercial operation in 2018.



Hanhikivi-1 NPP (Finland)

Customer – Fennovoima Oy (Owner).
General Contractor – RAOS Project Oy.
General Designer – JSC ATOMPROEKT.

Reactor type

VVER-1200

Safety generation III+



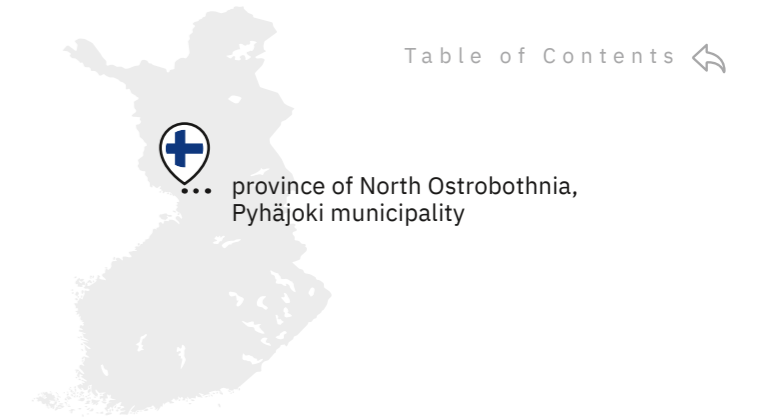
The Engineering Division is commissioned to develop the design documentation and detailed design documentation of Nuclear Island buildings and structures.



The Multi-D digital platform is used

I stage (Units 1)

1 x 1265 MW



2018 Key Results

- Development of design and licensing documentation and its consistent agreement with the Owner (Fennovoima Oy) are continued;
- Highly detailed 3D-model of the NPP was developed.

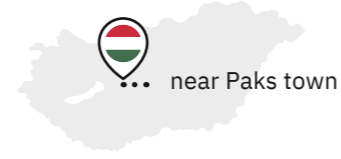
Plans for 2019

- Continued works of the preparatory stage.



Paks II NPP (Hungary)

Customer – MVM Paks II (since 06.11.2017, known as Paks II Nuclear Power Plant Private Company Limited by Shares).



Reactor type
VVER-1200
Safety generation III+

- Construction on the terms of the EPC-Contract
- The Multi-D digital platform is used
- The project implements Rosatom Production System

I stage (Units 1, 2)
2 x 1198 MW

2018 Key Results

- Signing of the Supplement to the EPC Contract allowing to commence the CEB construction;
- A part of Site 1 has been received from the Hungarian Party for construction of the first stage of the Construction and Erection Base buildings;
- Signing of the contract for manufacturing and supply of the package of the automated process control system;
- Nuclear evaluation of the turbine hall equipment supplier;
- Tendering procedures for the Construction and Erection Base buildings have been organized;
- Conclusion of the contract for manufacturing and supply of the nuclear steam generating plant;
- Audit of the nuclear qualification of JSC Atomenergomash, nuclear steam generating plant supplier.

Plans for 2019

- Generation of documentation for Application for project implementation license;
- Start of construction of the first administrative and amenity building of the Construction and Erection Base.



Belarus NPP

Customer – Belarus Nuclear Power Plant RUE.



Reactor type
VVER-1200
Safety generation III+

- Construction on the terms of the EPC-Contract
- The Multi-D digital platform is used
- The project implements Rosatom Production System

I stage (Units 1, 2)
2 x 1150 MW

Construction of Belarus NPP is the largest infrastructure project which provided about 2400 workplaces, both at the NPP and in the servicing companies. Currently, over 30 local companies are involved in the NPP construction. Diversification of urban community economics provides for siting of new high-tech enterprises producing radio, TV and

communication instruments, machines and equipment for public and consumer services. As a result, occupation in technological industries will increase nearly 11-fold.

2018 Key Results

- Works on welding of the main coolant pipeline of Unit 2 were completed;
- Works on the reactor assembly of Unit 1 were commenced;
- Putting of GIS-330 kV into operation;
- The activities within the framework of “Green Square” Project were implemented.

Plans for 2019

- Unit 1:**
 - First connection of the Unit to the grid.
- Unit 2:**
 - Auxiliary power supply through a design circuit;
 - Start of safety systems flushing to an open reactor.



Russian NPPs

Rostov NPP

Customer – JSC “Rosenergoatom”.

Reactor type

VVER-1000



Construction on the terms of the EPC-Contract



The Multi-D digital platform is used



The project implements Rosatom Production System

I stage (Units 1, 2, 3, 4)

4 x 1000 MW were put into commercial operation

Within the construction period, over 200 representatives of student brigades actively participated in the construction of Rostov NPP.

For the construction of Unit 4, 40+ construction and erection companies with over 3.3 thousand people on their staff list were involved and more than 1400 workers took part in core operations.

Plans for 2019

- Securing guarantee obligations to eliminate non-conformances revealed during the guarantee period.

2018 Key Results

- Power start-up of Unit 4 of Rostov NPP;
- Commissioning of Unit 4 of Rostov NPP.



Kursk NPP-2

Customer – JSC “Rosenergoatom”.

Reactor type

VVER-TOI



Construction on the terms of the general contractor contract for Kursk NPP-2 construction



The Multi-D digital platform is used



The project implements Rosatom Production System

I stage (Units 1, 2)

2 x 1255 MW

Kursk NPP-2 is being constructed in order to replace the decommissioned units of the operating Kursk NPP with RBMK-1000 reactors. Commissioning of the first two units of Kursk NPP-2 is planned to be synchronized with the decommissioning of Units 1 and 2 of the operating plant.

Additional tax deductions from implementation of Kursk NPP-2 construction project come to the regional budget.

Besides, over 5 thousand people will be involved in the construction of Kursk NPP-2 in the nearest years. Their presence will give development to associated supplementary business of services which will be provided by local enterprises and companies.

2018 Key Results

- Start of the foundation slab concreting for Unit 1 reactor building;
- Start of the foundation slab concreting for Unit 1 turbine building;
- Start of the foundation slab reinforcing for Unit 2 reactor building;
- The molten corium trap (“core catcher”) was installed in the designed position at Unit 1.

Plans for 2019

- Installation of the molten corium trap at Unit 1 has been completed;
- Completion of the foundation slab concreting for the unit reactor building;
- Start of the installation of the molten corium trap body at Unit 2.



Novovoronezh NPP-2

Customer – JSC “Rosenergoatom”.

Reactor type

VVER-1200

Safety generation III+



Construction on the terms of the EPC-Contract



The Multi-D digital platform is used



The project implements Rosatom Production System



I stage (Units 1, 2)

2 x 1200 (1198) MW

Totally in 2018, 40 contractor companies were involved in the construction of Novovoronezh NPP-2, including 12 companies registered in the area of Novovoronezh town and Voronezh region. Average annual number of the main construction and erection personnel from our own resources and contractor companies, involved in the construction, amounts to 3000 people.

Considering revenue from contractor companies and subcontractors involved in the erection of the new unit, the local structure of JSC “Rosenergoatom” is the leader in payments into the consolidated budget of Voronezh region.

2018 Key Results

- Commencement of the stage of cold and hot functional tests of the reactor plant at Unit 2.
- Completion of cold and hot functional tests of the reactor plant at Unit 2.
- Revision of the reactor plant main equipment began.

Plans for 2019

- Start of the physical start-up of Unit 2.
- Start of the power start-up of Unit 2.
- Completion of Unit 2 trial and commercial operation.
- Obtaining the commissioning permit for Unit 2.



Leningrad NPP-2

Customer – JSC “Rosenergoatom”.

Reactor type

VVER-1200

Safety generation III+



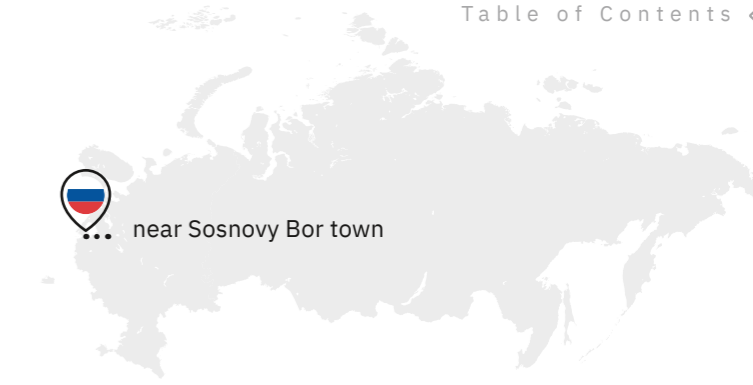
Construction on the terms of contracts for engineering survey, development of basic and detailed design documentation, designer's supervision



The Multi-D digital platform is used



The project implements Rosatom Production System



I stage (Units 1, 2)

2 x 1198 MW

LNPP-2 design meets the up-to-date international safety requirements. It applies 4 active (redundant) channels of safety systems, the molten corium trap, passive heat removal system

removing heat from beneath the reactor containment and passive heat removal system removing heat from steam generators.

2018 Key Results

- Power start-up of Unit 1;
- Putting Unit 1 into commercial operation.

Plans for 2019

- Testing and trial run of Unit 2 equipment;
- Testing of Unit 2 tight containment.



2.3.2. Rosatom Production System

The implementation of RPS at NPP construction sites is aimed at increasing the controllability of construction process on the basis of uniform standards, reduction of costs, elimination of losses, enhancement of labor safety and productivity.

The RPS program includes five main stages — training, analysis, implementation, audit and involvement, and covers all stages of NPP construction from signing a contract for NPP construction to putting thereof into commercial operation.

The following areas at the construction sites are covered by the production system:

- production control and work performance analysis by contractor companies;
- optimization of CEW performance;
- work planning in terms of daily, weekly and monthly assignments;
- premises handover;
- as-built documentation preparation and handover;
- supply and storage of materials and equipment.

Results of RPS implementation within the reporting period:

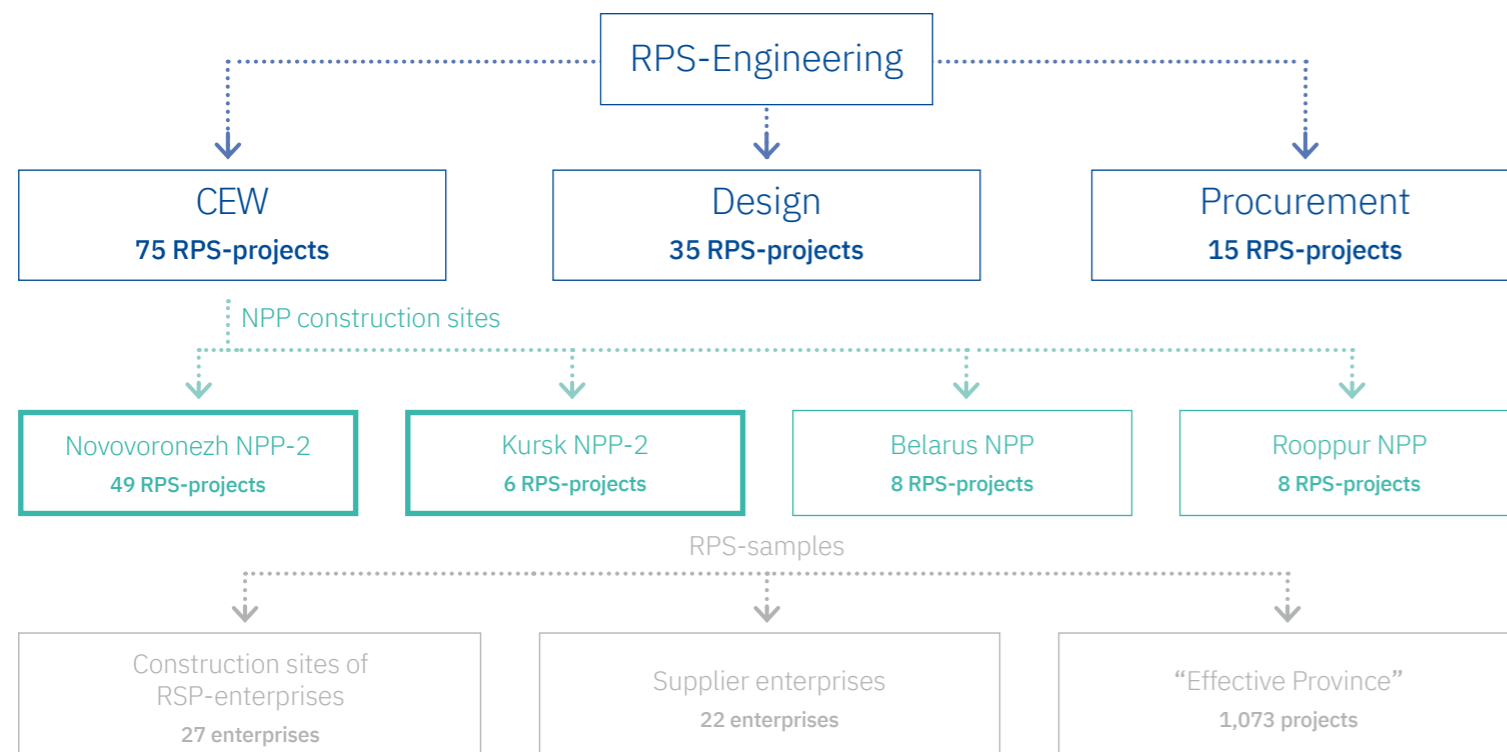
- reduction of construction timeframe, reduction of expenses and other mid-term plans.

Totally in 2018, over 75 RPS-projects were implemented at NPP construction sites with the overall economic effect about 100 million rubles. The Division’s employees introduced 500+ proposals on the improvement (PI).

Training for the employees of RPS-enterprises

According to the decision of the RPS Management Board of Rosatom State Corporation, standards of RPS-engineering shall be applied at all RPS-enterprises of the industry, which have construction sites. The training was conducted by employees of Production System Methodology and Training Division at three construction sites of the Engineering Division: Novovoronezh NPP-2, Kursk NPP-2, Belarus NPP. In total, 108 persons were trained.

Rosatom Production System (RPS) in the Engineering Division of Rosatom State Corporation. Systems and processes where the RPS has been and is planned to be implemented



“According to the decision of the RPS Management Board of Rosatom State Corporation, standards of RPS-engineering shall be applied at all RPS-enterprises of the industry, which have construction sites”

Development of mobile process factories

Experts of JSC ASE EC and JSC “NIKIMT-Atomstroy” started using process factory “The Last Planner” in the training of site managers and workers, which allows the participants to immerse in the construction process, trying various roles from a worker to a contractor company's director. In the game, it is suggested to build a specific facility on the NPP territory within a short period of time, establishing cooperation between suppliers of materials and equipment and construction workers, providing the works with necessary documentation, qualified staff and protection means.

Having tried various roles, the participants get a chance to understand in detail the process of construction site management and work out optimum approaches to necessary decision-making.

Participation in RPS Leaders' contest

In 2018, the Engineering Division’s employees took part in the final of the annual industry contest of improvement proposals and RPS-projects within the framework of RPS Leaders forum.

The winner in nomination “Best RPS-Project Aimed at Labor Productivity Increase” was Sergey Nikolaevich Lebedev, Deputy Director for Production of Trest RosSEM Ltd.

RPS-samples

According to the ordinance of Rosatom State Corporation, samples of best practices for replication of accumulated experience at other enterprises were created in 2018 at the enterprises implementing the RPS. Apart from accomplishing the quality indicators of the production system implementation, the focus was on the achievement of milestones, CI implementation, accident frequency rate (LTIFR/CHT).

The sites of Novovoronezh NPP-2 and Kursk NPP-2 became the RPS-samples in the Engineering Division.

Work with contractors

Based on the results of the workshop on contractor companies development, cooperation agreement was signed with 13 contractor companies in the RPS field.

Work with suppliers

Within the reporting period, Rosatom State Corporation implemented pilot projects on the introduction of lean production tools at enterprises not being part of the nuclear industry. Based on successful results of these projects implementation, a decision was made to establish the relevant center of competencies in the Engineering Division of Rosatom State Corporation and RPS implementation division was created in the supplier companies, whose main function will be work with non-industry partner enterprises in order to ensure timely supply of equipment to NPP construction sites.

“Effective Province”

“Effective Province”, the joint project of Rosatom State Corporation and the Government of Nizhny Novgorod region, implying implementation of lean technologies in the industry, agriculture, healthcare, education, social security and state administration, started in 2018.

The employees of Production System Methodology and Training Division held specialized educational courses for employees of local authorities, educational institutions and the management of Nizhny Novgorod region. In total, 300+ persons were trained.

In the Engineering Division, there is RPS-engineering competencies center and a special RPS unit which deals with implementation of lean production tools in Nizhny Novgorod region.

Table 6.
Consolidated number of projects opened and implemented within the framework of “Effective Province” Project

Area or industry of regional economy	Total number of improvement projects implemented in 2018	Total number of projects completed in 2018
State administration (administration of the region and districts)	74	43
Municipal administration	126	58 (1 prototype)
Healthcare	256	232 (4 prototypes)
All types of industry	21	5 (3 prototypes)
Housing maintenance and utilities, transport	18	10
Multifunctional centers	11	11 (1 prototype)
Education (from kindergarten to school)	73	31 (8 prototypes)
Education (Higher and specialized secondary)	36	27
Social sphere, Culture, Sport	432	304 (3 prototypes)
Other	3	1 (1 prototype)
Agriculture	12	0
Construction (including road building)	11	5 (1 prototype)
TOTAL	1,073	727 (22 prototypes)
		1
Projects implemented with the support of CPC		697
Process factories created		5
Persons trained at process factories		416

“ In 2018, 135 new prospective technologies in the field of industrialized construction were reviewed at the stage of preliminary selection for the RTD Base; 51 development passed the preliminary selection”

2.3.3. Center of Technologies Transfer in Nuclear Facilities Capital Construction

Considering the importance of the task to maintain the leadership of Rosatom State Corporation on the nuclear power market and successful implementation of NPP power units new construction projects, a decision was made in July 2018 to assign the industry Center of Technology Transfer in Nuclear Facilities Capital Construction (CTT) to the Engineering Division. The key tasks of CTT is active search, selection, expert review and prompt implementation of innovative technologies and global solutions at the phase of high technological availability in new construction projects with a purpose to reduce the construction time and cost. CTT executes the function of corporate accelerator, works under the model of open innovations based on the best available technologies (BAT) and ensures quick enhancement of skills with minimum capital expenditures and risks.

Register of innovative solutions, technologies, products, goods, materials (RTD Base*) recommended for wide usage in the capital construction of nuclear industry was generated in 2016 and is being supplemented annually. Technologies are selected in two stages. The first stage is preliminary and implemented by the CTT experts, the second one takes place at the meeting of high professional expert council. Currently there are 11 implemented technologies out of 81 included in the RTD Base. Access to the RTD Base is provided to all experts of Rosatom State Corporation in the Unified Information Space.

The activities of CTT are focused on integrated implementation of technologies with the maximum economic effect and speeding up of works being on the critical path by means of establishing technological alliances and consortiums. The work is performed in wide cooperation with state development institutions (National Association of Technology Transfer, Skolkovo Fund, Technological Development Agency, ROSNANO, Innovation Promotion Fund, SME Corporation), specialized research and development institutes (Stroitelstvo SRC, Vedeneev VNIIG), universities (MSCU, MSU, MIPT, SPPU, SkolTech, SUSU), associations

* See Glossary.

(Builders of Russia Union, RUIE, MSPP, NACEC, ASKAO, National Association of Designers and Surveyors (NOPRIZ), National Association of Construction Materials, Goods and Structures Manufacturers (NOPSM), Research and Production Institute, etc.) with participation of small high-tech enterprises.

With a purpose of standardization and wide usage in the industry of integrated break-through technologies, work on the preparation and approval of basic organizational and technical solutions (BOTS) and creation of centers of competencies is under way:

- On high-speed technology on cast-in-situ, massive, densely reinforced structures concreting with high units based on self-compacting concrete mixtures (height of tiers increases from 4.6 to 10 meters, the timeframe of concreting reduces from 45 to 15 days);
- On pressure self-stabilizers for damping of induced pressure oscillations and hydraulic shocks in pipelines (enhancing reliability and safety of NPP process systems operation);
- On new-generation reinforcement technology with four-row screw-type shape, integrated with an automatic line of spot welding of wide and heavy reinforcement mesh ALIX (metal intensity reduced to 30%, work productivity increases 17-fold, the construction time and cost reduce 2.5 times).

In 2018, 135 new prospective technologies in the field of industrialized construction were reviewed at the stage of preliminary selection for the RTD Base; 51 development passed the preliminary selection. At the Expert Council’s meeting on 18.12.2018, 23 of 35 technologies submitted were included in the RTD Base. These are developments of both domestic companies and leading companies from France, Germany, Switzerland, Finland, the UK, which localized their production in Russia.

Vice President for Procurement and Supply

Andrey Medvedev

– What should one do to become a nuclear industry supplier?

To become our supplier, first of all, you should have a high-quality product demanded on the market of nuclear industry equipment and services.

There is a uniform and transparent system of regulated procurement procedures built in Rosatom State Corporation, which are aimed at extension of the range of suppliers and establishment of fair competition: all information on procurements in the industry is published on the specialized procurement website: zakupki.rosatom.ru. There you can also study the basic document on procurement in the nuclear industry – Unified Industry Procurement Standard (Procurement Regulations) of Rosatom State Corporation (hereinafter – UIPS).

The absolute majority of procurements is currently held on the following electronic trading platforms (hereinafter – ETP):

- Unified electronic trading platform www.roseltorg.ru;
- Fabrikant ETP www.fabrikant.ru;
- B2B-Center ETP www.b2b-center.ru.

This implies registration of all bidders on these ETP.

To get feedback from the suppliers, forums are held regularly, e.g. Atomexpo, where everyone who wishes to do so can ask their questions addressing the booth of a relevant company directly.

We are open for cooperation and welcome the suppliers' initiative for maximum development of competitive environment.



– Are there any differences in the procurement procedure for Russian and overseas suppliers? Are there any preferences?

One of the primary purposes of the Engineering Division's procurement activities is to expand the opportunity to participate in procurement for the maximum number of bidders and to develop competition.

The procurement activities are regulated by Federal Law No. 223-FZ dd. 18.07.2011 "On Procurement of Goods, Works, Services by Certain Legal Entities" and UIPS.

During the procurements, which are followed by contracts executed on the territory of a foreign state, the Division's companies also apply UIPS provisions in the part not contradicting the national legislation requirements of the state, on the territory of which products supplied under the contract will be used.

Procurement procedures are conducted in accordance with the procedure established by the law, UIPS, taking into account provisions of general contracts signed with foreign customers and imply for participation of both the residents of the Russian Federation and non-residents (foreign bidders/suppliers).

Documentation on procurements where participation of foreign bidders is anticipated is published in two languages (Russian and English).

Draft contracts stipulate terms and conditions both for the residents and non-residents of the Russian Federation.

Bidders' applications may be accepted in a foreign language if the published procurement documentation provides for it.

To confirm compliance with the requirements established in the procurement documentation, foreign bidders shall submit documents similar to the ones established for Russian bidders, provided that there are no contradictions with the legislation provisions of such bidder's country of registration.

The Division does not provide any preferences to suppliers depending on the supplier's locality in respect of the region of operations. The choice of suppliers can be decided upon only by the supplier's meeting requirements and criteria stipulated in the procurement documentation.

Companies of the Engineering Division, which are guided by Law No. 223-FZ, apply in their procurement activity the RF Government Resolution No. 925 dd. 16.09.2016 "On the Priority of Goods of Russian Origin, Works and Services Performed and Rendered by Russian Entities in Relation to Goods Originating from a Foreign Country, Works, Services Performed and Rendered by Foreign Entities".

– In what areas will the procurement activities be improved due to the Division's transformation?

First, it is suggested to create the Unified Functional Service as regards procurement activities planning, arrangement of procurement procedures, signing and administration of contracts concluded within the framework of implementation of general contracts for NPP construction.

Second, it is suggested to introduce a new approach to contract operations administration based on the principle Full Contract Management Lifecycle, including development of draft contracts, their administration and closure.

Implementation of these proposals, among other things, will make the following possible:

- Bringing the contractual work to a new level complying with the best global practice, using the contractual mechanisms which allow minimizing the Company's risks and forming commercially reasonable terms and conditions of contracts.
- Ensuring interrelation of the parties' contractual obligations with systematic contract administration of their proper fulfillment, which will allow reducing risks of a negative change in the time and cost significantly, preventing occurrence of disputes (mitigation), obtaining trustworthy information and responding to changes expediently.

“ One of the primary purposes of the Engineering Division's procurement activities is to expand the opportunity to participate in procurement for the maximum number of bidders and to develop competition ”

2.3.4. Procurement Activity

Electronic resources where information on procurements of companies within the Division's scope of management is published

From January 1, 2013, procurement of goods, works and services in JSC ASE, JSC ASE EC, JSC "Atomenergoproekt", JSC ATOMPPOEKT has been guided by Federal Law No. 223-FZ dd. 18.07.2011 "On Procurement of Goods, Works, Services by Certain Legal Entities" and Unified Industry Procurement Standard (Procurement Regulations) of Rosatom State Atomic Energy Corporation, approved by the Resolution of the Supervisory Council of Rosatom State Corporation No. 37 dd. 07.02.2012.

The official website of JSC ASE, JSC ASE EC, JSC "Atomenergoproekt", JSC ATOMPPOEKT for publication of information pursuant to Federal Law No. 223-FZ is the official state website zakupki.gov.ru and information on placement of orders for procurement of goods, works and services for Rosatom State Corporation's needs is also published at: www.zakupki.rosatom.ru.

Register of Plan-Schedules and procurement plans on the official state website: zakupki.gov.ru contains relevant information on procurements of JSC ASE, JSC ASE EC, JSC "Atomenergoproekt", JSC ATOMPPOEKT in the form of Goods (works, services) Procurement Plan on the relevant companies.

E-Catalogue

Unified Nuclear Industry Identification Catalogue of Equipment and Materials (Catalogue) was developed in JSC ASE EC as an electronic database on the material technical resources (MTR) for NPP construction facilities and is one of the basic elements of MULTI-D technology for complex facilities construction management.

Primary functions of the Catalogue include centralized collection, storage and use of product data for the needs of industry enterprises, execution of functions of administrator and operator of material and technical resources reference book on the basis of the Catalogue, execution of functions of data filling and verification center for the processes of NPP IM development.

Use of standardized, i.e. brought to uniform rules and forms, data of reference books and catalogues is the basis for business processes control, high-quality management analytics and implementation of integration processes between information systems. Regulatory and reference systems are used at industrial, divisional and local levels in various enterprise processes: planning, accounting, logistics, design and engineering, operation. As a rule, reference book keeping is based on international, federal and industry regulatory documents and standards. For qualitative filling of reference books, trained experts are assigned and guidelines for information submission and processing are determined.

To ensure completeness of descriptions and rule out duplication of material and technical resources items in procurement and accounting processes in Rosatom State Corporation, UIS RRI system has been created. The UIS RRI system is integrated with the industry procurement system, price database and targeted accounting ERP-systems (1C and SAP). The total number of system users is over five thousand, number of connected information systems is more than 160.

Catalogue and RRI Reference Book Division of JSC ASE EC executes two primary functions: of the industry Operator of UIS RRI MTR reference book and local RRI service ISUP KS (I).

In pursuance of the function of UIS RRI MTR reference book operator, 117 contracts were concluded and 176 million rubles was settled under certificates in 2018. The main criterion of service is timely fulfillment of terms and conditions of the contract with industry enterprises and meeting the deadlines for processing of received requests for record entry in the MTR reference book. No violations have been registered within the period of service rendering.

Regarding execution of reference book Operator's function, first-line support and updating of UIS RRI MTR catalogue structure took place. Within the framework of routine activities, works on preparation of the data structure of UIS RRI MTR reference book were performed for industry project "Electronic Store" upon the instruction of MTR reference book owner — Methodology and Procurement Arrangement Department of Rosatom State Corporation.

Amount of concluded contractual obligations, bln RUR with VAT

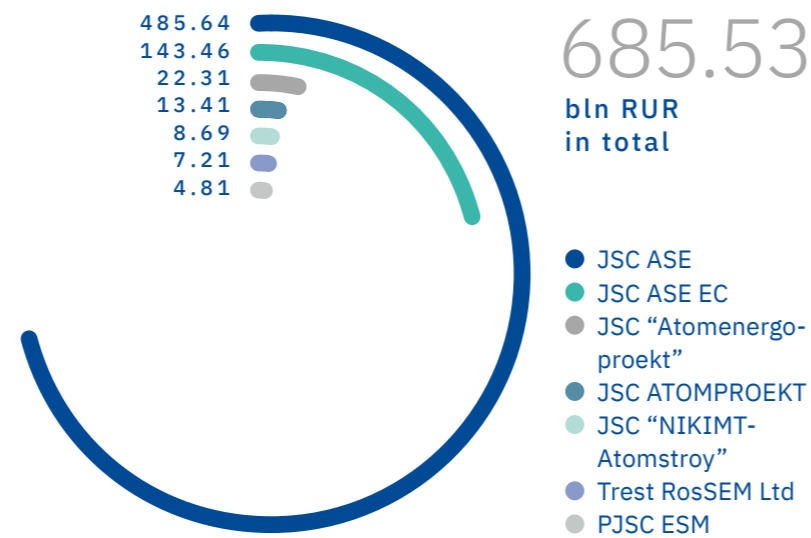


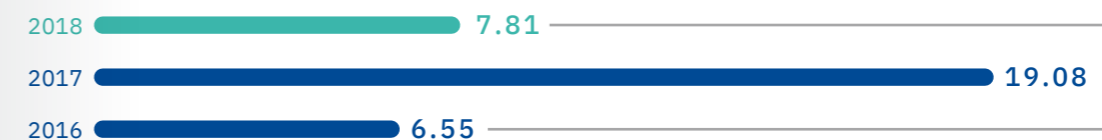
Table 7. Share of NPP equipment procurement from Russian and foreign producers (by the amount of concluded contractual obligations)

Name of the company	2016	2017	2018 (fact)	(2018-2017)/2017, %
JSC ASE EC				
from Russian producers	85	89	95	+104
from foreign producers	15	11	5	+57
JSC ASE				
from Russian producers	99	92	100	+112
from foreign producers	1	8	0	—
JSC "Atomenergoproekt"				
from Russian producers	86	86	97	+113
from foreign producers	14	14	3	+18
JSC ATOMPPOEKT				
from Russian producers	59	86	—	—
from foreign producers	41	14	—	—
JSC "NIKIMT-Atomstroy"				
from Russian producers	98	95	72	+76
from foreign producers	2	5	28	+545
PJSC ESM				
from Russian producers	96	93	84	+91
from foreign producers	4	7	16	+219
Trest RosSEM Ltd				
from Russian producers	67	8	—	—
from foreign producers	33	92	—	—
TOTAL IN THE ENGINEERING DIVISION				
from Russian producers	96	91	96	+105
from foreign producers	4	9	4	+46

Table 8. Share of goods procurement from small and medium-sized enterprises

Name of the company	2016	2017	2018
JSC ASE EC	—	91.78	98.50
JSC ASE	—	96.51	66.37
JSC "Atomenergoproekt"	87.16	76.33	91.17
JSC ATOMPPOEKT	69.74	100.00	67.61
JSC "NIKIMT-Atomstroy"	—	58.37	87.99
Trest RosSEM Ltd	—	—	—
PJSC ESM	92	38	93.19

Amount of funds saved as a result of open procurement procedures, bln RUR



33.44 bln RUR total for 3 years

At the end of 2018, work on annual approval of the Operator’s services price was performed.

Regarding execution of function of the Engineering Division’s local RRI service, a huge amount of work was performed to prepare, clean and standardize the data of historical accounting systems with a purpose of subsequent migration within the project of ISUP KS (I) replication. The division’s experts processed over 100 thousand of historical MTR items and over 10 thousand contracting parties. Work to extend SAP aspects was performed.

The division’s employees were awarded with Rosatom State Corporation diplomas for their conscientious work, significant achievements in professional activity and high personal contribution to the nuclear industry development.

In order to improve the quality of services and reduce cost price of the Operator’s function, work on restructuring of RRI keeping processes commenced, including one in the Engineering Division. Process of internal quality audit of the data started.

Training helps new suppliers adapt to the Catalogue better, understand the basic requirements set for the quality of information entered, which facilitates speeding up of the entry process and understanding the specifics of working in the Catalogue.

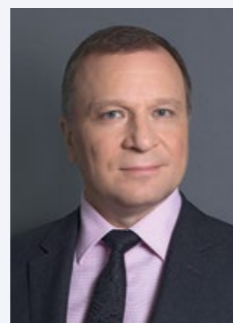
There is a trend for annual growth of the share of procurement from Russian producers. The exception is JSC “NIKIMT-Atomstroy” due to a supplementary agreement for refrigerators supply for the construction of Rooppur NPP Units 1 and 2 (78% of all the Company’s annual procurement from foreign producers).

Share of transparency (open procurements published on the ETP against the share of all competitive procurement) 95.35%.

Types of unified equipment procurements in 2018



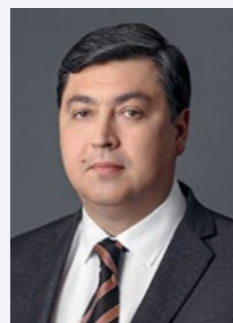
- Procurement based on STR for separate facilities
- Unified procurement based on ITR of similar projects
- Unified procurement on the basis of STR



Vice President for Procurement and Supply
Andrey Medvedev

“The choice of the contractual strategy at an early phase of project implementation will ensure integrated planning

of the entire lifecycle of NPP construction. It will allow synchronizing the processes of design and estimate documentation development with the tasks of timely procurement procedures, create conditions for early placement of an order for equipment and process materials, scheduled start and end of construction and erection works, ensure clear control of risks of changes in the NPP construction cost and time. Such approach to construction projects implementation will allow achieving the sustainable development of the Russian nuclear industry on international markets and creating competitive advantages for implementation of effective contacts and conclusion of new ones for NPP construction.”



Vice President – Director for El-Dabaa NPP Construction Project of JSC ASE EC
Grigory Sosnin

“The new strategy involves lotting by a vertical principle

and significant consolidation of lots. The number of lots per one unit reduces from 200–300 to 30. It is suggested to divide the total scope of works into five main packages: preparatory period; nuclear island; turbine island; balance of plant; off-site facilities and general construction buildings and structures. This will ensure budget saving at the expense of scope consolidation and competitive environment expansion.”



95.35%

Share of transparency (open procurements published on the ETP against the share of all competitive procurement)

Unification and standardization of equipment purchased

Procedure of equipment unification during procurement has been applied since 2010. From this time onward, “double” procurement is implemented in 100% of cases: one contract for supply of unified equipment to all units of one NPP construction site. The first application of this approach was “double” procurement for Units 3 and 4 of Rostov NPP. Later this approach was applied for Baltic NPP, Belarus NPP, Kudankulam NPP, Units 3 and 4, Kursk NPP-2, Akkuyu NPP, etc.

These are examples of the basic approach which logically developed into procurement for all four units of Kudankulam NPP, Units 3, 4, 5, 6, and the initial technical requirements (ITR) for procurements at Units 5 and 6 were the ITR developed for the reference unit — Units 3 and 4 of Kudankulam NPP.

In 2018, the basic approach was supplemented with unified procurement for several NPP construction sites on the basis of ITR and procurement based on standard technical requirements (STR). There were two types of procurement based on STR:

- unified procurement for several construction sites simultaneously;
- procurement for several construction sites based on unified STR.

In 2018, the design unit was developing standard technical requirements separately for the range of NPP designs by JSC “Atomenergoproekt” and the range of designs by JSC ATOMPROEKT. A prospective task is “cross-project” unification when unified equipment is purchased on the basis of standard technical requirements for all ranges of NPP designs.

The design and procurement units interacted in terms of standardization and unification according to the procedure established by regulatory documents of Rosatom State Corporation.

The effect of unification and standardization approaches implementation is, first of all, reduction of the number of procurement procedures and concluded supply contracts.

Unification of equipment makes it possible due to the following:

- advance procurement before the development of design and estimate documentation when basic parameters of the equipment do not vary from one NPP construction site to another;
- unification of procurements for several facilities into one procurement procedure;
- conclusion of long-term contracts which make it possible to execute a supplementary agreement to the contract already concluded for similar equipment for a new NPP construction facility.

Unification influences the quality issues positively: equipment already supplied is chosen as the input data for standardization of requirements at the phase of STR development, while at the procurement phase this approach involves reference manufacturers who supplied such equipment earlier in the definition of technical requirements. Signing of supply contracts with reference suppliers rules out the requirement for “prototype models” manufacturing. Lack of “prototype models” and use of reference technologies improve the quality of unified equipment manufacturing.

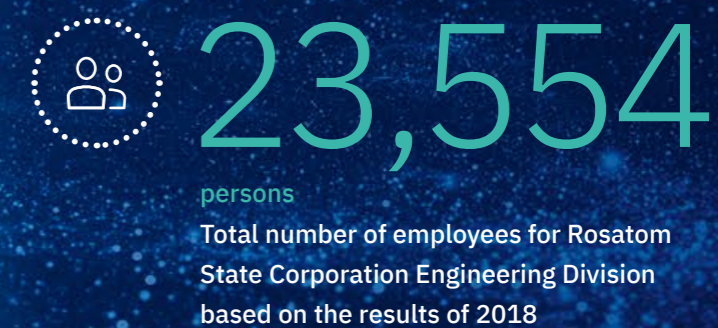
Besides, advanced procurements provide to the designer the design input data on time which is necessary for the development of detailed design documentation (DDD); this rules out changes in the DDD due to procurement of non-reference equipment.

In 2018, works on unification and standardization were performed based on the plan of technical requirements standardization, which was harmonized with the unified equipment procurement schedule and ensured supply of equipment to NPP construction sites in accordance with the erection deadlines.

2.4

Human Capital

- 2.4.1. Characteristics of Personnel
- 2.4.2. HR Policy Implementation
- 2.4.3. Social Policy and Results of its Implementation





Vice President for HR and Internal Communications

Natalia Shafalovich

— How does certification of employees help solve the tasks of safety assurance at the facilities under construction?

In the nearest 10 years, ASE is to build dozens of power units in different parts of the world: Bangladesh, Egypt, Hungary, China and many other countries. Naturally, we have to solve this large-scale task extending the existing “boundaries” of the Company, involving more experts (designers, BIM-managers, engineers, as well as highly skilled foremen and workers) and subcontracting part of the works to reliable partner companies. That is why the Company not only certifies its employees but also conducts integrated audits of subcontractor companies — we set the highest requirements for the quality of all types of works. Meanwhile, it is well known that real quality can be ensured by highly skilled personnel only. Comprehensive quality audits of suppliers are within the quality unit’s scope of responsibility while I will talk about the personnel certification in more detail.

There are mandatory requirements for professional and technical knowledge and skills (PTKS) for all categories of employees, so the abbreviation of PTKS is familiar both to the experts of HR unit and all employees who are undergoing the assessment. PTKS assessment of the Engineering Division’s employees is made on a regular basis, it is conducted by industry Qualification Assessment Centers (QAC) at least once a year or in accordance with the requirements of local regulatory acts. For instance, employees of HR unit are assessed on the basis of HR-scale of Rosatom State Corporation. Thus, in 2018, 11 managers and experts of HR management unit of JSC ASE EC and our subsidiary companies received certificates of completion of the HR-school course. Besides, all the

“ Human capital means the Company employees’ competences, their skills and experience. Human (HR) capital management includes: contributions to enhancing the employees’ skills, work with the candidates pool and the labor market, programs of personnel incentive and support programs. HR management system of the Engineering Division is based on the Company’s strategic goals and business priorities”

Division’s employees are assessed under the annual assessment system RECORD, which has been used in Rosatom State Corporation and at enterprises within its scope of management for more than 8 years. 100% of JSC ASE EC and JSC ASE personnel undergo RECORD assessment annually.

In addition, we single out several special categories of highly skilled employees in the Division, e.g. they include designers. Experts of Design Unit undergo not only the PTKS assessment but also certification confirming compliance with the occupied position. In total, 3 439 experts involved in designing took part in assessment procedures in 2018. The certification procedure was completed by 2019 designers, 2002 of them defended their status successfully. Based on its results, the average score is 94.2 points out of 100 possible. I consider this result as quite deserved. And if during the certification in 2017 we checked the knowledge of Russian regulations in the field of nuclear facilities (NF) design and construction, then in 2018 we tested how well the employees of design institutes know relevant foreign codes and standards, in particular, IAEA guides and foreign customers’ requirements.

Speaking of how the certification of designers influences the safety of facilities under construction, there is a direct relation: **the NPP design of III+ generation consolidated the best active and passive safety systems.** But life does not stand still, codes and standards in the countries of Rosatom State Corporation presence are updated and revised quite often, so it is essential for any designer and builder to stay on alert, and the expression “Knowledge is power” is still relevant.

— What is the employees’ attitude to changes stipulated by transformation of the Engineering Division?

The significantly increased scale of project portfolio defined the necessity to build a new structure for the Division and revise the key processes related to design, project time and cost management, procurement quality assurance and other aspects important for observance of construction schedules.

When changes are implemented, companies always face resistance to the necessity of change. So we adopted a model of sequential actions regarding transformation. First, we deem essential to involve the employees in discussion of complicated tasks and problematic issues we are solving nowadays in order to seek and find the optimum solutions. With this purpose, various working groups are set up in the Company and intradivisional meetings are held, which present an opportunity to exchange experience with other industry companies already having similar experience. We get a lot of support from CST — change support teams. This is a new initiative which emerged in Rosatom State Corporation and was actively supported by the Engineering Division: there are 10 change support teams formed in JSC ASE EC and subsidiary structures and about 100 persons involved therein. Generally, they are young employees who are ready to become agents of transformation, leaders of change, primary mediators on this subject.

Second, we place a stake on open communication with employees as we are convinced that an open dialogue, detailed clarification of work objectives and plans will facilitate enhancement of the Company’s activities efficiency in general. We practice such formats understandable for setting and clarifying the objectives as KPI sessions. The events of Information Day and Director Day cover 3–3.5 thousand employees (totally there were 4 of them in 2018) and we held multi-stage Information Days and Director Days in the subsidiaries. We arrange regular meetings between the heads of NPP construction projects and functional units. In addition, we have a new communication format which appeared thanks to the KPI creativity — this is a format of meetings with the heads of functional units, “Open Dialogue”. In 2018, we held the first “Open Dialogue” with Nikolay Vikhansky, Vice President for Capital Construction of JSC ASE EC. All of these events are aimed at building up optimum horizontal relations in the Division — this is the only way to actually increase our efficiency.

In general, I would point out that the entire year of 2018 passed under the sign of transformation. We held an extensive clarification campaign. All of this allowed us to reduce the risk of misunderstanding and distrust in the team and, on the opposite, to increase the employees' involvement in transformation processes. Now we are fine-tuning all processes — from the construction management to corporation functions.

And a lot of specific steps are estimated by the employees in a very positive way. For instance, this is the transformation program, where new tools for motivation of the designers and builders emerged from. They are aimed to focus all the attention of employees on the result, so that the employees understand clearly that the more effectiveness they achieve, the higher their level of salary is.

— How does transformation of the Engineering Division influence the key priorities in HR management?

Undoubtedly, the HR management unit is one of the primary agents of transformation. For instance, there is a new function singled out in the HR management which appeared in 2018. This is resource planning. Considering the scale of our portfolio and diversity of projects, our planning horizon is at least 10 years. For the correct forecasting, we analyze in detail which production capacities are required at every phase of project implementation (from design documentation development to putting the unit into commercial operation) and calculate the number of employees necessary for them, their qualification and competence. **One of the key tasks in this area is to forecast how the external resources and resources inside the Division will be used.**

“Meanwhile, it is well known that real quality can be ensured by highly skilled personnel only”

Another priority in the work of HR unit in 2018 was recruitment — we hired 1,903 highly skilled experts and managers. Due to the deployment of NPP construction projects, the number of staff in NPP construction project directorates and branch offices shall grow by 60%, so we are enhancing internal competencies in terms of recruitment, including use of the best international practices and headhunting platforms.

Definitely, we go on working on various personnel motivation and training programs. An important component of the motivation is non-material incentives, e.g. assurance of training and development. Here we intend to pay a lot of attention to the development of continuity in our Division, use different sorts of career “elevators” — for instance, use such a tool as contests more widely. The primary purpose is to open the talents of our employees as much as possible, to create a favorable environment for accelerated development of professional and management skills. As we are planning that a lot of new people will join the Company in next few years, we highlight the task of their correct adaptation, so that they would absorb the corporate culture of Rosatom State Corporation rather quickly, start sharing our values sincerely, feel as a part of the large and versatile nuclear industry where the absolute priority is safety.

2.4.1. Characteristics of Personnel

Priority goals in work with personnel for the next 3–5 years consist in ensuring their safety, providing social guarantees and creating possibilities for development and enhancement of qualification.

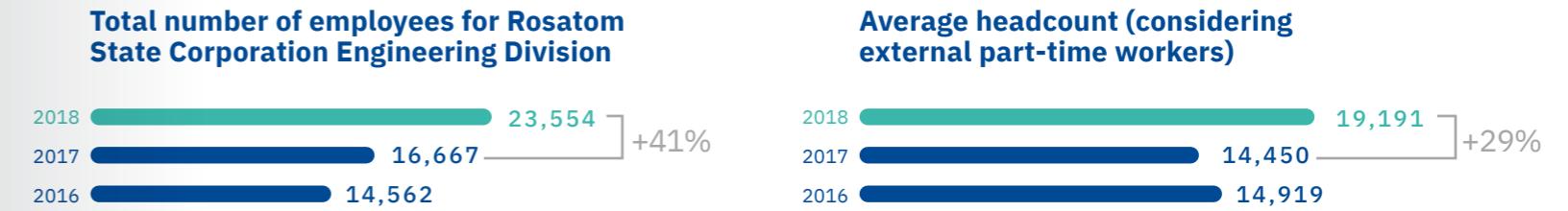
Increase of the number of personnel in construction companies due to commencement of the active stage of NPP construction abroad and in Russia (Kursk NPP), enhancing the skills of design unit specialists engaged in projects abroad; development of system engineering and IT division within the framework of the Company's digital transformation.

Reduction of the costs per one employee is mainly related to a change of personnel structure — increase of the share of blue-collars.

For additional information see Appendix 14 of the Book of Appendices. Organizational structure of JSC ASE EC, the managing company of the Engineering Division, can be found in Appendix 6 of the Book of Appendices.

GRI 102-7, 102-10

Number of employees dynamics, pers.



Additional information can be found in Appendix 13 of the Book of Appendices.

The number of Candidates and Doctors of Science and employees with MBA degree, pers.



Table 9.

Total number of employees — breakdown by gender, age and employees categories, pers.

GRI 102-8

Category of employees	2018		Share of employees under 35 y.o.	Under 35 y.o.			36–50 y.o.			Over 50 y.o.		
	plan	fact		m	f	total	m	f	total	m	f	total
Executives	1,893	2,310	24.4%	472	91	563	704	307	1,011	534	202	736
Specialists	9,641	10,562	47.5%	2,544	2,470	5,014	1,543	1,922	3,465	878	1,205	2,083
Other office staff	96	117	31.6%	3	34	37	1	39	40	3	37	40
Workers	6,585	10,526	44.9%	4,553	172	4,725	3,672	245	3,917	1,685	199	1,884
Other*	59	39	35.9%	9	5	14	8	3	11	9	5	14
TOTAL	18,273	23,554	44.0%	7,581	2,772	10,353	5,928	2,516	8,444	3,109	1,648	4,757

* “Other” category refers to the employees recruited under commercial contracts.

Additional information can be found in Appendix 13 of the Book of Appendices.

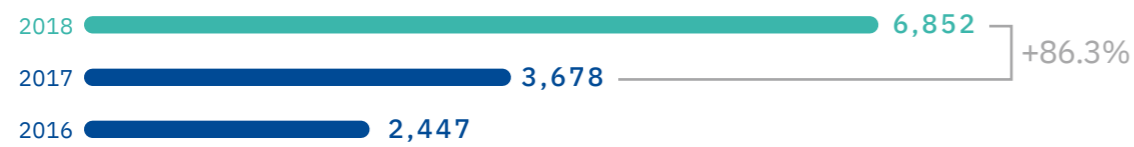
Payroll budget and social payments, mln RUR*



* Data for payroll budget, social payments and payroll budget for employees under commercial contracts are given in accordance with the form of statistical reporting No. 4 "Information on the number and salaries of employees" (Rosstat of RF) (item 8, 9, 10, 11).

Additional information can be found in Appendix 13 of the Book of Appendices.

Number of new jobs within the year



The growth of the number of new jobs is caused by:

- commencement of the active stage of NPP construction abroad and in Russia (Kursk NPP-2);
- enhancing the competence of employees of the design division as part of the foreign projects;
- enhancing IT-competences within the framework of implementation of "Digital Economy" program.

Additional information can be found in Appendix 13 of the Book of Appendices.

Table 10. Personnel turnover – breakdown by age and gender, %

Age groups	Personnel turnover index								
	2016			2017			2018		
	m	f	total	m	f	total	m	f	total
Total	18.0	8.0	14.5	17.4	7.7	14.0	19.7	8.7	16.5
Under 35 y.o.	18.7	10.5	16.0	24.7	13.6	21.1	24.9	11.8	21.4
36–50 y.o.	19.9	6.0	15.0	15.7	6.2	12.4	17.6	8.5	15.0
Over 50 y.o.	14.1	8.3	11.9	12.1	4.8	9.3	13.8	5.0	10.7

The reasons of turnover include resignations due to employees' unhappiness with the job or dismissals when the company is not satisfied with their performance (voluntary resignation, dismissals due to truancy, violations of safety

rules, absence from workplace for reasons not caused by production or state needs).

Additional information can be found in Appendix 13 of the Book of Appendices.

Table 11. Number of complaints on labor relations that were filed, processed and settled via official mechanisms of complaint filing

Index	2015 (fact)	2016 (fact)	2017 (fact)	2018 (fact)	Δ (2018-2017)/2017, %
Total number of complaints filed during the reporting period	292	23	12	21	75.0
Processed during the reporting period	292	23	11	19	72.7
Settled during the reporting period	286	22	11	19	72.7
Total number of complaints filed before the reporting period and settled during the reporting period	0	0	0	1	—

Of twenty one appeals to court by employees in 2018, fourteen were rejected.

Qualified personnel shortfall risk

Risk impact growth factors:

- The lack/absence of specialists in the field of nuclear energy in the target countries for NPP construction;
- Lack of specialists and engineers in the RF.

Strategy of work with personnel quality and personnel shortage:

- Assessment of competences and proficiency in English, re-training, enhancement of employees' skills;
- Recruitment from the labor market of specialists with competence in the field of international logistics and audits of suppliers on international markets;
- Employment of specialists with competence in the field of international designing;
- Employment of graduates of Higher Engineering School;
- Employment of graduates of RF universities, National Research Nuclear University "MEPhI", Master's Degree course of Russian Foreign Trade Academy.

Risk mitigation factors in Directorates:

- Rotation of experienced specialists from ASE (candidates' pool, employees with a high potential) to international projects — about 15%;
- Employment of specialists with competence in the field of international contracting (knowledge of FIDIC standards), international supplies and logistics, quality management, licensing and audits of contractors — closure of demand;
- Employment of graduates from the Moscow State Construction University, "Incubator" project (10%).

GRI 102-16

2.4.2. HR Policy Implementation

The norms and rules of business relations in the Engineering Division are defined in the ethical code of employees' behavior. The Code explains the values and the principles of ethical behavior which determine the relations of employees with their colleagues and with partners. The Code serves as a tool for preventing possible violations and conflict situations.

Values, principles, standards and rules of behavior are part of the corporate culture, they reflect industry values, and for this reason it is extremely important to ensure that all the employees, especially the new ones, get to know these rules.

Firstly, all the new employees familiarize themselves with the relevant documents during employment. Newly employed specialists and operating personnel undergo training dedicated to the valid rules of behavior and industry values. In each enterprise of the organization there is a specialist in charge of the above issues.

GRI 404-3

Managers and specialists of JSC ASE EC undergo annual assessment in accordance with the corporate values within the framework of efficiency management cycle. In 2018, fifty one specialist in executive positions in JSC ASE EC underwent such assessment by 360° method. The assessment was performed by colleagues, subordinates and the immediate supervisor.

More detailed information about the assessment of efficiency and career development can be found in Appendix 13 of the Book of Appendices.

Engagement survey showed that 90.3% of JSC ASE EC are familiar with and understand all the industry values of the company.

The growth of the number of training hours in 2018 was caused by performance of compulsory training of JSC ATOMPROEKT executives (once per 3 years) and of Trest RosSEM Ltd. workers.

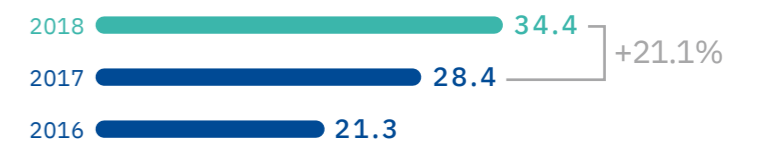
Additional information can be found in Appendix 13 of the Book of Appendices.

GRI 404-2

The Engineering Division is implementing a number of programs for development of skills and enhancement of qualification that help employees sustain their working abilities or retire. Organizations of the Division hold qualification enhancement trainings. Qualification enhancement program includes English classes and English clubs for the employees. Compulsory training of employees complies with the requirements of the RF regulatory authorities. Special industry training programs have been introduced (such as candidates' pool, globalizer leaders), newly employed specialists and specialists promoted to executive positions are taught management skills. A training and qualification enhancement program is approved for every year.

GRI 404-1

Average hours of training per year per employee



Additional information can be found in Appendix 13 of the Book of Appendices.

JSC “Atomenergoproekt” uses a coaching system under which specialists with high qualification (including those who are retired) share their important knowledge with young specialists. A comprehensive program is being implemented for pensioners and veterans. Various events are organized annually for support of pensioners and honored employees who are especially important for the company.

JSC “NIKIMT-Atomstroy” and other companies participate actively in various professional skills competitions.

The employees dismissed due to job cuts are offered help in new employment in other companies of the division and in CV preparation.

In 2018, 388 students underwent training in the Engineering Division, 79 of them underwent on-the-job training and 113 — pre-graduation practice. Upon the results of the training, 46 students were employed by the Division.

In total, the number of the students undergoing training in the companies of the Division increased by 18% compared to 2017, and the number of those who were offered employment upon the results of the training grew by 13%. Additional information can be found in Appendix 13 of the Book of Appendices.

Positive changes are related to improvement of quality and consistency of cooperation with universities and a demand in new personnel due to broad-scale business targets.

An insignificant reduction of the number of students educated under target training programs was compensated by an 80% growth of the number of students employed upon the results of such training.

Career and succession management is a process aimed at providing availability of trained successors for managerial positions of the Engineering Division. The process also allows managing career expectations of employees increasing the level of their involvement.

GRI 404-3

In 2018, the RECORD unified industry system of personnel development was put into commercial operation. The system was developed on the basis of Lumesse ETWeb software — Career and Succession Module. Career progress of each employee is planned on the basis of a fact-based analysis of the current individual profile data of the employee in the system in relation to profile requirements of the target position. Each employee of the company can choose his/her next career step, and the manager can ensure the availability of successors to his/her position and the positions that are subordinate to him/her. In April-May 2018, five thousand employees underwent individual and group training teaching how to work in RECORD industry system.

To mitigate personnel risks and implement career and succession management process, a plan of succession to all the executive positions up to the level of head of department, is developed every year. The succession plan includes 316 positions and 480 successors for executive positions of the Engineering Division. This plan is updated on a quarterly basis and enables to get updated information about the human resources.

Development of candidates’ pool for executive positions is a key element of career and succession management. The main objective of the candidates’ pool is to provide the Engineering Division with managers and experts having expertise in efficient task performance, establishment of a unified corporate culture of management meeting the strategic goals and improving the management efficiency.

A unified industry system of development of the candidates’ pool is being successfully implemented for different levels of positions: “Rosatom Talents” — for low level managers, “Rosatom Capital” — for middle level managers, “Rosatom Assets” and “Rosatom Assets — Basic level” for senior management.

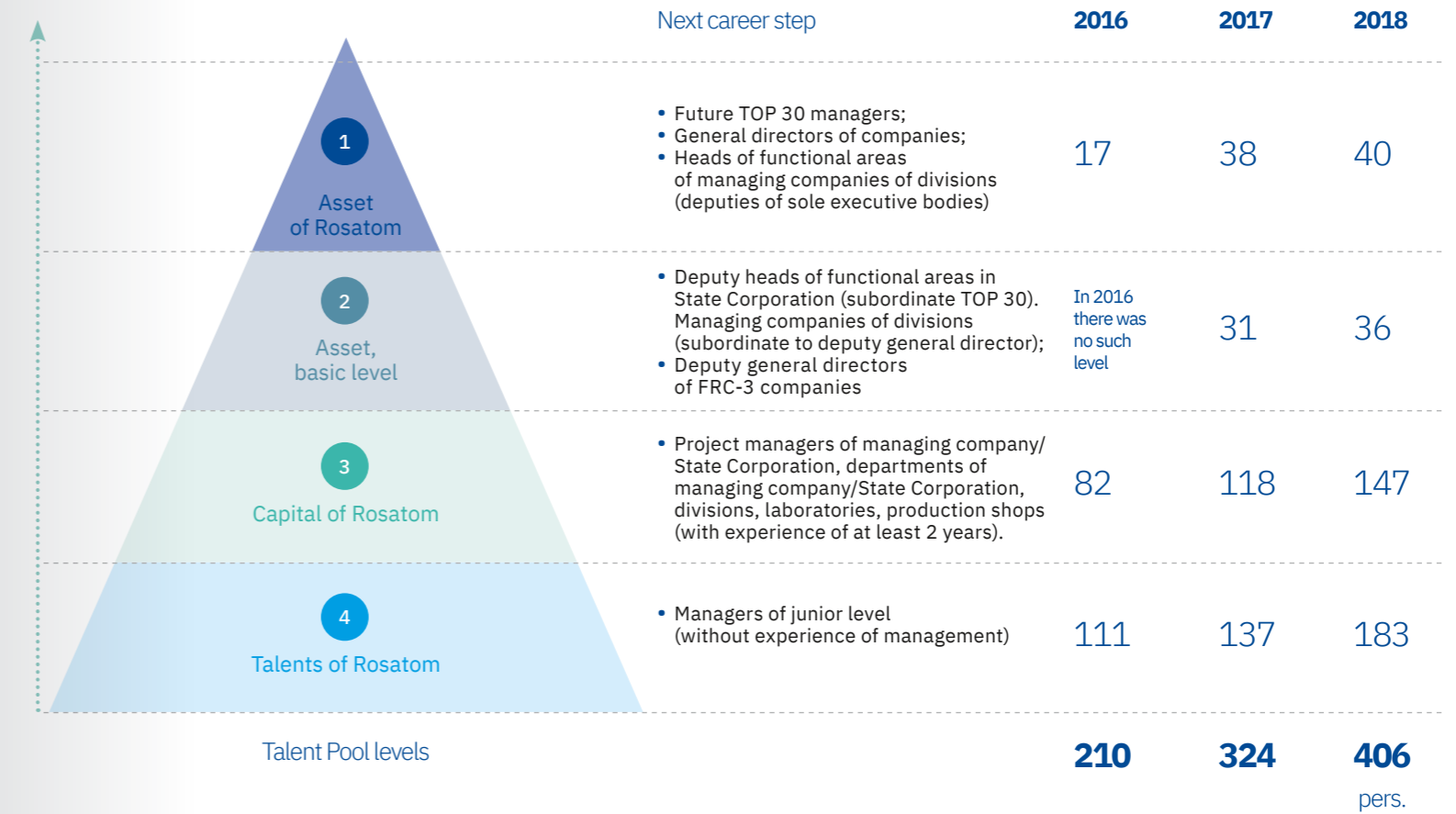
In 2018 the industry candidates’ pool comprised 406 people.

During appointment to senior, middle and junior managerial positions, priority is given to trained employees, selected, as a rule, from the candidates’ pool. The efficiency of the managerial candidates’ pool is confirmed by the career progress of the participants. In 2018, 51.6% of the Engineering Division candidates’ pool were promoted (compared to 43.8% in 2017).

To maintain and share the key knowledge and skills, the Division introduced a system of tutorship and rotation of key specialists within the design companies of the division. Twenty nine “tutor-student” pairs were formed for young specialists-participants of “Energy and Leadership” program and members of the candidates pool. Rotation and monitoring program helps obtain new competence and experience in taking management decisions that will be useful at the next career level.

Upon the results of industry competition for identification of talented young people among students and graduates of the industry universities of RF, eleven young students-finalists of the competitions were employed by JSC ASE EC in 2018 and enlisted in the “Leadership Energy” industry program for development of talented youth. In total, twenty four young specialists of JSC ASE EC were trained under this program in 2018.

A unified industry system of development of the candidates’ pool for different levels of positions



Two specialists underwent training under the “Economic Security, Protection of Assets, Fighting Corruption in Rosatom State Corporation” program. The cost of training for both specialists was 60,000 rubles.

In 2018 fifty eight students-employees of JSC ASE EC — studied at Higher Engineering School of National Research Nuclear University “MEPhI” under Master Degree course “Engineers for the Digital Future”. The studies included practice in JSC ASE EC (thirty six students began their studies in 2018). Twelve multi-disciplinary project groups under the guidance of 11 tutors from JSC ASE EC and scientific advisers from MEPhI are working on projects related to digital transformation of engineering activities (ranging from development and introduction of integration solution between CAD and calculation complexes in electrical systems to development of design platform in accordance with gamification principles). One group comprises exclusively JSC ASE EC employees.

In 2018 seven graduates of NRNU MEPhI were recruited by JSC ASE EC.

In 2018, the internal communications division introduced an innovation — heads of departments and employees of HR division participated for the first time in the cascade information day and in local information days; 912 employees (14 divisions) attended the cascade information days in Nizhny Novgorod with the participation of HR management department.

In September 2018, an internal communication unit was established in the Company. The unit is headed by N.B. Shafalovich, Vice President for HR and Internal Communication.

Table 12.
Awards received by the Engineering Division in the reporting period, results of participation in ratings and competitions

Competition	Achievements
Person of the year Rosatom – 2018	235 applications submitted (70% more than in 2017). 13 prizes in industry nominations (18% more compared to 11 prizes in 2017). 8 first prizes in industry nominations (33% more compared to 6 first prizes in 2017).
“AtomSkills” industry competition	4 prizes. One first prize (for the first time after 2016).
“WorldSkills-HiTech” national competition	4 competences for participation (two times more than in 2017) (2017 – 2). 6 awards (two times more than in 2017) (3 awards in 2017). 3 gold medals (three times more than in 2017) (1 award in 2017). 3 second places in total points scoring.
Competition in the field of information technologies DigitalSkills	One competence for participation (one competence in 2017). One gold medal (one in 2017).
Competition “The Best Expert in Nuclear Capital Construction Industry”	12 competences for participation (33% growth compared to 2017) (2017 – 9). 25 awards (127% growth compared to 2017) (11 awards in 2017). 10 first prizes (ten times more than in 2017) (one first prize in 2017).

GRI 403-1

Occupational Health and Safety

The Engineering Division manages the construction of complex engineering facilities. The construction is performed under hazardous conditions related to changes of elevation, operation of construction machinery, energized systems and equipment.

The Division faces the target of efficient management of such parameters as budget, deadlines, quality and safety at all the stages of projects implementation.

GRI 403-8

All employees of our company take seriously the OHS issues and actively participate in occupational health and safety management.

Occupational safety specialists actively contribute to improvement of OHS management system, prevention of injuries and occupational diseases.

Managers of all levels are continuously improving OHS management system and prevention of injury during designing and construction of power units.

GRI 403-4, 403-5, 403-7

“Safety days” are held in the Engineering Division on a regular basis.

GRI 403-1, 403-8

The Engineering Division demonstrates a systematic approach in ensuring occupational safety which embraces both the employees of the Division and employees of subsidiaries, affiliates and subcontractor companies.

JSC ASE EC and JSC ASE occupational safety management system ensures the management of risks related to health and safety. OHS management system comprises a management structure, planning activities, distribution of responsibility, processes and resources for development, introduction and achievement of the goals in the field of occupational safety established by the Company, analysis of the efficiency of occupational safety policy and measures.

An important part of OHS management system is systematic training, enhancement of qualification and competence of employees in the field of safety:

- Safety briefings;
- Training of workers;
- Training of managers and experts;
- Training and re-training in the field of occupational health and safety.

JSC ASE EC introduced and maintains labor protection and occupational safety management system which is confirmed by Certificate BS OHSAS 18001:2007 of International Certification authority DQS (valid until 30.07.2019).

The main elements of labor protection and occupational safety management system:

- Policy in the field of occupational safety;
- Planning of occupational safety management;
- Numerical methods of assessment of occupational safety conditions;

- Efficiency parameters in occupational safety management;
- Tools of occupational safety management;
- Analysis of industrial injuries;
- Administrative control over the OHS condition;
- Labor safety culture formation.

Benefits from the introduction of the system:

- Elimination and/or mitigation of risks;
- Control over hazardous industrial factors;
- Prevention of incidents, accidents, operational disturbances.

GRI 403-5

In 2018, 4,287 employees of the Engineering Divisions (managers, heads of independent structural divisions, experts in occupational and fire safety) underwent training under compulsory industry and additional training programs.

More detailed information about expenses for training can be found in Appendix 13 in the Book of Appendices.

Occupational safety measures in the Engineering Division companies

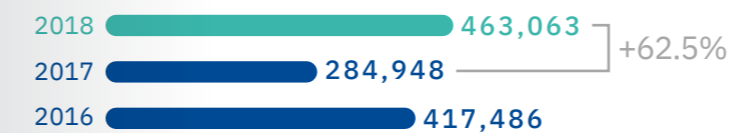
were undertaken in accordance with the plan for occupational safety assurance and prevention of injuries in 2018. Upon the results of activities in 2018, all the measures planned by the Engineering Division companies were completed in full scope.

GRI 403-9

In 2018 six injuries occurred in the Engineering Division companies and subcontractor’s companies.

Additional information can be found in Appendix 13 of the Book of Appendices.

Occupational safety expenses, thous. RUR



GRI 403-9

LTIFR, work related injuries**



GRI 403-1, 403-7

Contractors’ obligations in the field of occupational health and safety

The contractors are responsible for ensuring the safety of their employees and construction facilities in accordance with the concluded contracts.

The Rostov, Kursk and Belarus NPP construction sites, within the framework of the accepted Typical Provision on Occupational Safety Management System at Construction Sites, organize demonstrative walk-downs of working places of subcontractors. The purpose of the demonstrative walk-downs is monitoring by the General Contractor of the general HSE status at workplaces of the construction site of a particular contractor, with the participation of its managers and OHS specialists on labor protection. Upon the results of inspections, the reasons of violations of safety requirements and rules are analyzed.

0.028

Rate of high consequences of work-related injuries*

0

Rate of fatalities*

0

Occupational diseases factor GRI 403-10

Table 13.
Expenses in 2018 – breakdown by companies

Name of the company	Occupational safety expenses, thous. RUR
JSC ASE EC	138,021
JSC ASE	17,047
JSC “Atomenergoproekt”	103,450
JSC ATOMPROM	16,616
VMU LLC	11,616
SMU No. 1 LLC	16,423
Trest RosSEM Ltd	77,063
JSC “NIKIMT-Atomstroy”	33,997
PJSC ESM	48,830
TOTAL	463,063

* It was calculated for 1 million working hours.

** The factor was calculated for the whole management scope of JSC ASE EC.

2.4.3. Social Policy and Results of its Implementation

Social policy management is performed in accordance with the principles of Unified Industrial Social Policy.

A significant scope of work for organization of health care and recreation of employees and members of their families is done by the administration jointly with the trade union committee. The company organizes cultural events for its personnel and their children, “health days” for employees and veterans.

Over 2 000 employees of the Engineering Division are engaged in sports on a permanent basis actively participating in various sports competitions: athletic events, festivals, championships. Sports clubs, swimming pools, gyms, facilities for futsal, volleyball, hockey, badminton and other sports games are available. The Division has good working relations with Atom sport sports society.

The Social policy of the Engineering Division is aimed at enhancing the attractiveness of the Division as an employer and increasing the efficiency of social expenditures.

Special attention is paid to social support and material and non-material incentives aimed an enhancement of the employee’s interest in achieving high results.

Table 14. Expenses for social programs, cultural and sports activities, mln RUR

	2016 fact	2017 fact	2018 fact	2018/2017, %
Social programs	447.06	417.59	451.31	+8
Cultural and sports activities	72.70	91.33	109.45	+20

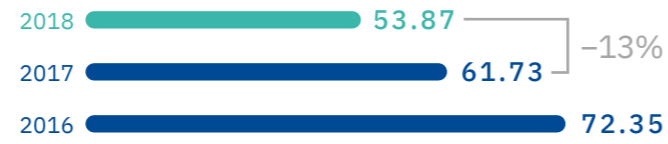
GRI 201-3

Table 15. Non-state pension provision in the Engineering Division

	2016 fact	2017 fact	2018 fact	2018/2017, %
Number of employees with non-state pension provision, pers.	196	155	170	+10
Expenses for non-state public provision, mln RUR	35.3	17.9	17.8	-1

Additional information can be found in Appendix 13 of the Book of Appendices.

Financial aid and other types of personnel support, mln RUR



GRI 403-6

Due to the growth of the number of personnel in the company and the establishment of a new branch office in the People’s Republic of Bangladesh, the social expenses increased. This is primarily related to employees’ insurance in branch offices abroad. In 2018, expenses grew due to recruitment of specialists in the Design Unit, the Prospective Projects Division, Directorate for projects in China, foreign branch offices. In 2019 it is planned to provide private medical insurance in foreign branch offices, to increase the number of employees and to change the cost itemization of some expenditures (travel during vacation, medical care, etc.).

Additional information can be found in Appendix 12 of the Book of Appendices.

Descending dynamic in 2018 is stipulated by qualitative changes in the personnel structure in JSC ATOMPROEKT: increased number of young people (under 35) whose needs in financial support is lower than that of middle-aged, elderly and retired people; reservation of funds for the employees who have come to work to JSC ASE.

Collective employment agreement of JSC ATOMPROEKT for 2019–2021 has been modified; the amount of financial support to employees in certain circumstances has been increased.

Youth policy and volunteering

To implement the youth policy, develop a pro-active attitude to life of the working young people, a Youth Council has been established in the Division. It is functioning on a free disinterested basis.

Young people under 35 participate in the definition of priority areas of the Company’s youth policy and social programs. They offer their projects in social sphere, initiate and organize innovative events (e.g. conferences, meetings, seminars for young people).

Volunteering



Charity event “Magic Christmas Tree”



Charity race “Run, Hero!”



“Corporate Volunteering” Project



“Corporate Volunteering” Project



Project “Good Deeds Marathon for One Village”

- Annual charity event “Magic Christmas Tree”! A Christmas-tree was put up in the Company hall. The tree was decorated with postcards in which school children from boarding school No. 1 had written their wishes. Anybody could pick a postcard and make the child’s dream true.
- Participation of the Division corporate team in charity race “Run, Hero!” which was one of the largest sports events in Nizhny Novgorod. In total, 2000 runners from 9 countries and 24 regions of Russia participated in the race and covered the distances of 5, 10 and 21.1 km. The project targets were:
 - Promotion of healthy life style, involvement of the population in physical culture and sports;
 - Development of popular sports;
 - Image enhancement of Nizhny Novgorod as a tourist attraction.
- “Corporate Volunteering” Project. Volunteer events in Nizhny Novgorod boarding school for blind and visually impaired children. The volunteers improved the territory (planted trees, bushes, made a “contact flower-bed”) and painted the walls in the room adjacent to the conference hall.
- “Corporate Volunteering” Project. Volunteering activities in Nizhny Novgorod specialized (remedial) boarding school No. 1 for orphans with health limitations. The volunteers painted the school corridor walls.
- Social project “Good Deeds Marathon for One Village” Assistance, including financial aid, to needy village families.

Like in the past years, traditionally, attention was paid to reconstruction of churches in the regions of operation (the Assumption Cathedral of Sarov Monastery, the Church of the Protecting Veil of the Mother of God in Dichnya village).

2.5

Natural Capital

2.5.1. Environmental Safety Management at NPP Designing Stage

2.5.2. Environmental Impact Management during Facilities Construction



NPPs with reactor

VVER-1200

safety generation III+



No incidents

according to INES scale of level 2 and higher



Director of Saint-Petersburg Design Institute

Konstantin Ilyinsky

– What can be improved at the design stage to reduce the future amount of radioactive waste from an NPP?

Designing is exactly the stage when solutions are taken that are aimed at mitigating the impact on the environment. Each design solution is based on strict compliance with the regulatory and technical documentation, each decision is properly justified and submitted to design supervision group for approval.

As an example of such solutions one can mention minimization of primary circuit leaks that are processed, i.e. removal of “clean” leaks and their return to the primary circuit without processing. More examples – primary circuit water chemistry, very strict requirements to materials that contact with radioactive media.

– Is an NPP impact on the environment really relatively insignificant?

An NPP impact on the environment, like the impact of any other nuclear facility, is limited by the relevant regulatory and sanitary rules. These documents regulate the values of maximal releases and impact on the environment. These parameters are complied with during designing. At the stage of the design review by the regulatory authorities the compliance is checked, making sure that the values are not exceeded. Assessment of the impact on the environment can and shall be performed by comparing the values of such impact for different types of power plants (thermal and hydro). Relevant numbers can be find in open sources.

– What is the influence of the Engineering Division transformation on design institutes, in particular on JSC ATOMPROEKT?

The Engineering Division transformation in relation to design institutes is aimed at restoration of their status, full-scale interfaces with all the participants of designing process, unprecedented support of the General Designer’s functions. In terms of designing, transformation will result in establishment of a Joint Design Institute which will comprise JSC ATOMPROEKT, JSC “Atomenergoproekt” and Nizhny Novgorod Design Institute. This will allow bringing together the efforts of all the designers in development of design documentation, improving quality and meeting the deadlines of our contractual obligations performance.

“ Natural capital means all renewable or non-renewable natural resources which, this way or another, are used by the Company during manufacture of goods/rendering of services. Natural capital includes air, water, land, subsoil, forests, biological diversity and ecosystem health. Natural capital management means friendliness to the environment and unconditional compliance with all the necessary standards and requirements in ecology and nuclear and radiation safety”

2.5.1. Environmental Safety Management at NPP Designing Stage

GRI 416-1

“The main purpose to be achieved during an NPP designing by the Engineering Division is the NPP safe operation. Other important goals are reduction of releases into the atmosphere, ensuring effective treatment of waste and preservation of biological diversity”

Assessment of the environmental impact of designed VVER-1200 NPPs during normal operation

According to world practice (International Commission on Radiological Protection (ICRP), IAEA, Environmental Protection Agency (EPA USA) the tolerability of economic activities with application of radioactive substances shall be assessed on the basis of a comparative analysis of human health risk from environmental pollution.

Modern strategy of radiation safety is aimed at limiting the damage from stochastic effects to the level considered to be acceptable for the population and guarantee of negligibly low possibility of deterministic effects. A tool for assessment of potential life-time damage after exposure of big groups of people is the effective dose concept. The principles of regulation, justification and optimization (NRB-99/2009) and the recommendations of ICRP (Publication No. 103-2007) form the basis of acceptable radiation risk level.

In accordance with Instruction on Public Health Risk Assessment (P 2.1.10.1920-04), the individual life-time risk due to exposure to polluting substances is over $1 \cdot 10^{-6}$ but under $1 \cdot 10^{-4}$ which corresponds to tolerable upper risk level, i.e. the upper threshold of tolerable risk. For drinking water, World Health Organization stipulates the value of $1 \cdot 10^{-5}$ 1/year as tolerable risk, for atmospheric air — $1 \cdot 10^{-4}$ 1/year. These levels are subject to permanent monitoring. In some cases such risk levels may require additional measures for their reduction.

E.g., the obtained preliminary assessment of life-time risks for the population from environment pollution in the area of Leningrad NPP with VVER-1200, demonstrate the following:

- the forecasted level of radiation risks for the population from emission of radionuclides into the atmosphere by LNPP-2, does not exceed $0,34 \cdot 10^{-6} / (1,1-15,0) \cdot 10^{-8}$ 1/year during normal operation (conservative assessment), and will stay within the permissible level ($\ll 10^{-6}$).

- The forecasted level of radiation risks from radionuclides discharges from LNPP-2 to natural water — $(1,1-15,0) \cdot 10^{-8}$ 1/year — lower that the radiation risks of radionuclides discharge from LNPP and other local radiation sources, which is $42 \cdot 10^{-8}$ 1/year.
- The forecasted level of pollutants concentration, including fine disperse water mist from the cooling towers in the air of the buffer area, the radiation control area and at the borders of European countries is expected to be significantly lower that the maximal permissible concentration. Analysis of danger coefficient calculation (acute inhalation impact) from inhaling the air containing fine-particle dust PM10 and PM2.5 from cooling towers discharge of LNPP-2, shows that the danger coefficient is significantly lower than 1 (0.015 in the residential area и 0.24 at the border of LNPP-2). The possibility of a negative impact on public health through inhaling of such substances during life-time is insignificant (P 2.1.10.1920-04, item 7.4.13).
- According to a conservative assessment, the main hazard risk for the population before LNPP-2 commissioning related to background environment pollution (air, water, food) is consumption of food of local production, drinking water and fish containing heavy metals ($\approx 2^{-6}$) $\cdot 10^{-4}$ 1/year.
- As of 2014, the individual radiation risk for the population due to man-induced background radiation — $(0,24-2,4) \cdot 10^{-6}$ 1/year — is significantly lower than the risk from natural background radiation — $145 \cdot 10^{-6}$ 1/year and the risk from fine-particle dust in the air — $(4-6) \cdot 10^{-6}$ 1/year, being close to the range of permissible risks.



Tianwan NPP (China)

To reduce uncertainties of the obtained results, it is necessary to perform systematic analyses of locally produced food and fine-particle mixture in the air in the residential areas.

The provisional assessment of population risk related to environmental pollution with chemical substances during VVER-1200 NPP operation is conservative (maximal).

According to article 3 (priority goal of preservation of natural ecological systems, natural landscapes and natural habitats, possible impact of economic and other activities on the environment in compliance with the requirements on environmental protection) and article 35 of Federal Law No. 7 “On Environmental Protection”, operation of a VVER1200 NPP with the existing man-induced radionuclides and chemical background will not result in a change of priorities of maintaining natural ecological systems, natural landscapes and natural habitats, will not deteriorate the quality of the environment, will preserve the biological diversity, will ensure rational use and restoration of natural resources.

It has been demonstrated that the concentration of pollutants in the atmospheric surface layer at the border of LNPP-2 buffer zone will not exceed 1 maximum permissible concentration (MPC) in all the ingredients and summation groups. The biggest concentration in specially protected natural areas reaches several parts per thousand for nitrogen dioxide, without considering the background concentration. In adjacent countries, the biggest concentrations of pollutants will amount to 10^{-4} of MPC, without considering the background concentration.

GRI 416-1

Assessment of NPP environmental impact

Forecasts made for designed NPPs demonstrate that radioactive impact on the population and the environment during normal long-term operation, assumed operational disturbances and design basis accidents, do not result in exceeding the established doses of the population exposure. Radiation impact on the population and the environment is maintained below the established regulatory limits.

During normal NPP operation, the main source of radionuclides emissions into the environment is gas and aerosol discharge from the ventilation stack. Engineering and technical solutions of the developed designs ensure the emission levels of radionuclides below the permitted levels (according to SP AS-03 — sanitary rules of NPP designing and operation). The actual annual releases of radionuclides into the atmosphere at operational NPPs are at the same level as those of European NPPs and are negligently low.

Maximal total doze of the population exposure to radionuclides developed during the operation of an NPP, will be less than 0.02% of the minimum significant dose produced by radionuclides of natural origin.

Dose load on the critical components of the land and the aquatic systems during the NPP operation is five and more degrees of order lower than the safe level.



Kudankulam NPP (India)

Considering the background concentration, the largest concentration will reach 0.5 of MPC for nitrogen dioxide, hydrogen sulfide and suspended particles. The contribution of cooling towers to atmospheric pollution at the border of the buffer area is significantly lower.

The accepted design of cooling towers water traps makes it possible to reduce the droplet entrainment up to 0.001% of full water consumption of a cooling tower which complies with the optimal parameters of the current best practices in accordance with the EU standards.

Environmental research of the current status of the surveyed area, its assessment and forecast of LNPP-2 impact were performed in 2007–2014 by specialized research organizations with appropriate licenses of self-regulated organizations and accreditation licenses of Federal Technical Regulation and Metrology Agency.

The collection and analysis of information also involved the use of data of State Hydrometeorological Agency (year books), public reports of the Ministry of Natural Resources and Ministry of Health of RF.

Engineering and environmental surveys were performed for assessment of the current status and forecast of possible changes of the environment under the influence of industrial load and environmental feasibility study, in order to ensure favorable living conditions for the population and mitigating negative impacts on the environment.

Potential impact on the atmosphere by the designed NPPs

The annual amount of emissions of pollutants (NO_x, SO_x) into the atmosphere by the designed and operational NPPs is very insignificant. Such releases are generated mainly during periodic inspections of diesel generators of emergency power supply systems. In this respect the NPP parameters of emissions of pollutants are by several orders lower than those of thermal

power plants. Power generation at hydro-electric power plants and the main alternative power sources does not entail significant emissions of pollutants.

Incineration plants for radioactive waste (RAW) at NPPs are equipped with an efficient system of extensive purification of combustion gas and an emission control system. Non-radioactive NPP emissions into the atmosphere are not significant, they are caused only by start-up and standby boilers and diesel generator stations that are periodically switched in check-up modes, during complete blackout of the NPP or during repair works.

NO_x emissions from NPPs with VVER 1200 are 4,160 times less those from thermal power plants, and SO_x emissions are 63 times lower.

Thus, NO_x (NO₂+NO) emissions arising from NPPs with VVER 1200 is 3.08 tones/year, SO₂ emissions are 1.154 tons/year. The amount of similar emissions of NO generated by thermal plants (in conversion to NO₂) are 12,477.45 tones/year, and SO₂ – 63.14 tons/year.

Potential sources of emissions of substances depleting the ozone layer are gas-insulated switchboards (sulfur hexafluoride) and refrigerating machines (freon). Emission of gas insulator (sulfur hexafluoride) from switchboards are impossible due to the appropriate design solutions. When choosing freons for refrigerators, the requirements of Directive EC 517/2004 are met (for facilities in EU). In any case, freon with the least global warming potential (GWP) is chosen.

Emissions of greenhouse gases (CO₂, CO) into the atmosphere caused by VVER-1000 NPPs are 400 times less than those of thermal power plants that use gas, and emissions caused by VVER-1200 NPPs are 1000 times less.

Table 16. Emissions of greenhouse gases (CO₂, CO) into the atmosphere

Type of power source	Electricity generation per year (kW)	Emissions of greenhouse gases per year
NPPs with VVER-1000 reactor	4,253,000 (4 power units of Kalinin NPP)	CO – 8.28 tons/year; CO ₂ – none.
NPPs with VVER-1200 reactor	2,400,000 (2 units of Leningrad NPP that are being designed)	CO – 3.18 tons/year; CO ₂ – none.
Hydro power plants	6,000,000 Installed power (Krasnoyarsk hydroelectric power plant)	No data
Thermal power plants	3,268,000 (Surgut GRES)	CO – 3,840.61 tons/year
Alternative energy sources	135,000 (Orenburg solar electric plant)	–

The NPPs designed or put into operation by the Engineering Division generate no greenhouse gases (CO₂). However, they generate CO due to periodic inspections of emergency power supply diesel generators.

GRI 303-1

Potential impact on water resources

The designs developed by the Engineering Division comply with the Water Code of RF:

1. no waste water discharge into water bodies without prior treatment and decontamination (prohibition to exceed the standards of permissible impact on water bodies and maximal permissible concentration of harmful substances in water);
2. no withdrawal of water in the amount having a negative impact on a water body;
3. no discharge of waste water with infectious agents and hazardous substances for which no standards of maximal permissible concentration have been established.

GRI 303-2

Concentration of pollutants in waste water of the designed NPPs shall not potentially exceed the relevant maximal permissible concentration of chemical substances, microorganisms and intervention level for radionuclides for the water of the receiving reservoir (used for fishery, potable or domestic purposes).

E.g., for rational use and protection of water resources, in accordance with Article 60 of the Water Code of RF, the design of LNPP-2 envisages recycling system of cooling water supply. Such design solution ensures that the impact on the receiving

water reservoir is reduced as there is no direct discharge of cooling water – it is cooled mainly in the cooling tower and is discharged into the atmosphere in the form of vapor and an insignificant amount of drops (i.e. droplet carryover).

The choice of the cooling water reservoir is made at the stage of the NPP site selection in accordance with the national environmental legislation and international recommendations (IAEA) considering the results of engineering survey, environmental studies and predictive assessments.

During the last decades, direct service water supply has not been designed since it has been prohibited by the Water Code. In view of that, the NPPs designed in Russia use recirculating water supply systems with evaporation cooling towers (1-2 cooling tower per one power unit with a VVER-1200 reactor). The use of recirculating systems for NPP cooling makes it possible to significantly (by dozens of times) reduce the consumption of valuable fresh water for cooling of NPP equipment and reducing the damage to water biological resources in the water reservoir/water stream used as the source of service water.

In international practice, both direct and recirculating cooling systems are designed. E.g., all NPPs in France, USA, Belgium, Japan and other countries use recirculating service water supply systems and evaporation cooling towers. The largest NPPs in France with the power ranging from 900 to 1450 MW use evaporation cooling towers (Dampierre, Civaux, Chinon, Saint-Laurent, Chooz, Cattenom, Belleville, Bugey, Golfech, Cruas).

When selecting and justifying an NPP water supply system, it is necessary to take into account, among other things, the specific natural conditions at the site, the results of assessment of damage to water biological resources, the cost of fish protection facilities and the cost of compensating measures for biological resources, the results of risk assessment for the population arising from environmental pollution with radionuclides and chemical substances during normal operation.

As for the scope of waste water from an NPP, it will not be different from a thermal power plant of similar power and similar service water supply system.

It is difficult to compare the scopes of waste of a hydro-electric power plant (GES) and an NPP/(thermal power plant), as GES practically has no water discharge, almost all the water discharged by a GES is recycled. The operation of the main alternative energy sources (wind, solar) practically do not entail any waste discharge.

To reduce the volume of waste water discharge, all water supply systems of the designed NPPs are made recirculating where possible.

GRI 304-1, 304-2, 304-3, 304-4

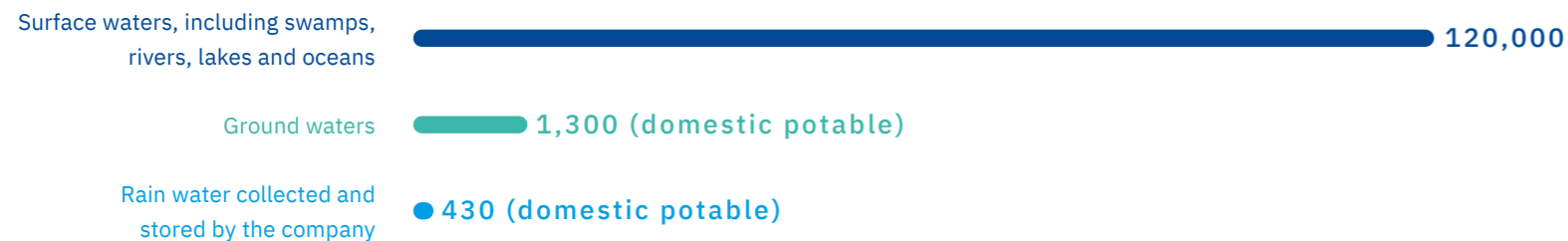
Potential impact on biological diversity

The site for an NPP is selected on the basis of environmental legislation considering the location of specially protected natural areas. NPP designs envisage the location of NPP sites beyond specially protected natural areas.

GRI 303-3

Types of possible sources of water consumption for NPPs designed by Rosatom Engineering Division

VVER 1200 (with recirculating system), total amount of water drawn per year, thous. m³



Maintaining the environmental well-being (which, according to regulations, includes the population) means maintaining all its components in an acceptable condition: ecological systems, communities and genetic diversity.

A state environmental impact assessment of the federal level in the field of atomic energy use shall cover:

- materials for justification of licenses for certain types of activities having a negative impact on the environment in accordance with the RF legislation;
- design documentation for facilities whose construction and reconstruction is planned to be performed on the land of specially protected natural areas of federal importance.

For NPP projects, the sites shall be selected outside the specially protected areas and environmental review of design documentation is to be performed for those sites.



Belarus NPP

GRI 201-2

Potential impact on climatic changes

During the designing of NPPs, assessment of external impacts is performed within PSA (probabilistic safety analysis). The amount of works performed is huge – calculations, modeling (not only those related to the climate). PSA is compulsory for receiving a positive conclusion of Glavgosexpertiza (RF State Expert Evaluation Department) (granting construction license for the Customer) in the Russian Federation and of regulatory authorities where the Company projects are implemented. Without it, the Division will not be able to commence the NPP construction (except the preparatory period). That is why climatic risks are considered before the commencement of an NPP construction, and upon the results of engineering surveys the relevant solutions are taken for every project. During designing, extreme external impacts are taken into account, such as hurricanes, extreme temperature changes, precipitation, floods, etc.

They are considered as constraints on the basis of which design solutions are taken. Financial assessment of the risks and possibilities related to climatic changes is not performed or planned before the enactment of the relevant legislation in the Russian Federation.

2.5.2. Environmental Impact Management during Facilities Construction

Director for Quality of Equipment, Construction and Erection Works

Sergey Streltsov

– What does safety culture mean for the Engineering Division?

The notion of safety culture was for the first time introduced during the analysis of the consequences of Chernobyl accident, in IAEA INSAG-1 report. According to the conclusion, one of the main reasons of Chernobyl accident, like of all THE other accidents before, was a low level of safety culture. Later the safety culture concept was expanded and described in other IAEA standards, WANO recommendations and Russian and foreign legislation.

In my understanding, safety culture is primarily the attitude of each employee to safety. In their activities, employees shall assess any action or inaction in terms of how it will influence safety in general. It shall be a priority both for the company and every employee. For the nuclear industry, safety is one of the main management mechanisms. Safety culture must be developed, introduced and improved. Of course, this is not a goal in itself. It is a tool for the company to reach its goals.

– What are the goals of the Engineering Division in this field?

First of all, bringing home to every employee that any activity that he/she undertakes shall not result in any detriment to safety, even the smallest one. The next goal is as follows. We are building nuclear power plants. We must ensure such quality level of our work that guarantees future safe operation. These are our main goals.

To implement safety culture, we have introduced a policy which is applied to all the companies of the Division. In this policy we declare our commitment to safety culture. The companies of the Division have their own regulatory documents in this field; there are also specific documents for NPP construction projects as our customers have different requirements. All the above mentioned documents comply with the requirements of the policy. All the employees are familiarized with the policy which is downloaded on the company’s web-site.

A Safety Culture Council has been established in the company for the implementation of the policy. It is supreme body in the division in this field and we can even call it a legislative body. The composition of the Council has already changed twice. Within the current transformation of the Division we are planning to modify the composition of the Council once again.

– What other changes in the field of safety culture are implemented in the Division due to transformation?

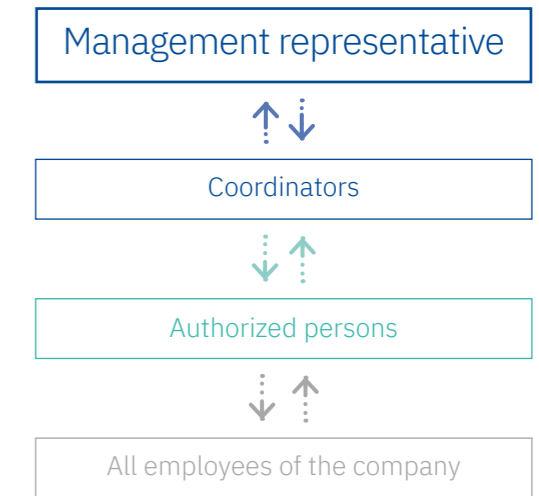
There are plenty of changes, e.g., we have introduced the position of director – general inspector for nuclear, radiation, industrial, occupational safety and environmental protection.

Last year I was director for quality and was in charge of those issues. Now these functions have been delegated to general inspector. I believe that a specialist who is directly responsible for safety will strengthen our position in this field.

Coordinators of safety culture have been appointed in the key companies of the division – JSC ASE EC, JSC ASE, JSC “Atomenergoproekt” and JSC ATOMPROEKT. In the future, coordinators will be appointed in all the companies of the management scope.

The coordinators interact with authorized representatives for safety culture in departments. The main functions of the authorized representatives is getting feedback from all the employees, ensuring information provision upstream and downstream, improvement of communication, increasing the level of involvement of all the employees in safety culture development. Vertical interaction on safety culture is regulated by the internal standard.

Safety Culture Management System of the Engineering Division



– Are there any programs and measures on safety culture that have already been developed and introduced?

We have been involved in safety culture issues for three years. We are at the beginning of this journey. We are working in accordance with the programs. The “Safety Culture Improvement Program” has been approved for 2018-2019. It describes the measures, the responsible parties and the deadlines. All the activities planned for 2018 were implemented.

Besides, we perform regular training of our employees. In 2018 we invited external coaches to train our specialists in the field of inspection, occupational safety, quality management system and safety culture.

– What methods for assessment of safety culture level are used in the Division?

One of the methods is questionnaires. We have developed questionnaires and have performed surveys for a number of projects, e.g. Paks-II NPP construction project. On the one hand I was happy with the results because we reached an acceptable (medium) level. However, this is only one side. On the other hand, we must realize that the survey was performed among the best prepared employees of our companies, i.e. among the specialists who were involved in European projects and who are most advanced in this field. Firstly. Secondly, we have not reached a high level in any parameter. This is our goal. We have a lot more to achieve.

The next method of monitoring and assessment of safety culture level are audits. Within our internal audits of quality management integrated system we perform safety culture analysis. We have developed criteria, requirements and plans for the audits. Last year an internal audit of Paks-II construction project was performed in terms of compliance of the process with safety culture requirements. We check the employees' knowledge of the policy, their level of involvement, the documents that departments are guided by, compliance with the requirements of these documents.

– The level of an employee’s involvement in safety culture development is assessed. What steps are taken by the division to enhance such level of involvement?

We are planning to implement a project within the framework of modifications support team. This is a safety culture project, it will be aimed at receiving information “from below” and involvement of all the employees. The project team includes both employees of the central office and specialists from subsidiary companies. We hope that under this project we will be able to involve the maximal number of our specialists and draw their attention to the necessity of ensuring the safety of our activities.

We work on many construction sites abroad, and taking into account the wishes of our customers, we have developed and translated into English booklets and posters on safety culture. Booklets and posters are distributed at NPP construction sites to draw attention to safety culture of both our employees and our partners, the companies who participate in NPP construction together with us.

In conclusion I would like to sum up what I have said. I have mentioned only the main areas of our development. We have a unified understanding or safety culture principles. We are planning to follow them by means of appointment of authorized representatives in all the departments, training and dissemination of information on safety culture.

Leadership development. Leadership development, as I have mentioned, is primarily training of management personnel. We have a plan for management training in safety culture and we are planning to do more in this field.

Effective communication within the framework of safety culture development. The project that I mentioned earlier is dedicated to development of this focus area. Providing information on safety culture to contractors and subcontractors. We started putting safety culture requirements into contracts with our contractors and subcontractors that we conclude at various construction sites. We make sure that these requirements are reflected in safety assurance programs that all the contractors performing safety related works shall have.

We realize that we are at the beginning of a long journey, there is still plenty of work to be done. We have done a lot, and we are planning to do more in the nearest future.

2.5.2.1. Industrial and environmental monitoring

Industrial and environmental monitoring in the Engineering Division Companies is performed at all facilities under construction and operation referred to category II and III having a negative impact on the environment, in accordance with environmental monitoring programs. In the Division there are no class I facilities having negative impact on the environment.

To ensure efficient environmental monitoring at facilities that have been put into operation, and facilities under construction during by JSC ASE and JSC ASE EC, joint standard STO 48546926.015–2018 “Regulations on industrial environmental control and monitoring”, was enacted in 2018.

Within the framework of industrial environmental control, the monitoring of soil was performed during the construction of Kursk-2 NPP. It was established upon the results of laboratory analyses that the parameters of the selected samples were below the maximal permissible concentration. The results of laboratory analyses are documented and stored in accordance with the requirements of regulations on document management.

At Belarus NPP construction site, environmental monitoring was performed in accordance with the approved schedule of industrial environmental monitoring for the representative office and the subcontractors.

JSC “NIKIMT-Atomstroy” has developed environmental monitoring programs for facilities of categories II and III. The program envisages industrial control over sources of atmospheric pollution, laboratory control over pollutants in domestic and rain waste water, control of pollutants in the atmosphere at the border of the buffer zone, checking the efficiency of operation of dust and gas catchers and industrial monitoring over the sources of waste generation and storage.



Rooppur NPP (Bangladesh)

2.5.2.2. Industrial safety

GRI 102-12

Safety assurance requirements

Construction safety in the Engineering Division is ensured in accordance with Federal Law of RF 21.07.1997 No. 116 “On Industrial Safety of Hazardous Industrial Facilities”, the requirements of regulatory documents of RF and Unified Industry Policy of Rosatom State Corporation in the field of industrial safety.

In order to implement the Unified Industry Policy of Rosatom State Corporation in JSC ASE EC, the Policy of JSC ASE EC in the Field of Industrial Safety was approved and accepted for guidance and execution in accordance with resolution dated 28.03.2016 No. 40/373-П .

Within the framework of the goals set by Quality and Safety Inspection Control Division of JSC ASE EC in 2018, inspections of industrial safety status were performed in 2018 at the nuclear facilities constructed by the Company.

Inspections of compliance with the requirements to observation of industrial safety requirements at hazardous industrial facilities were performed. In the course of the performed inspections it was established that the companies operating hazardous industrial facilities comply with the requirements of industrial safety:

- hazardous industrial facilities are registered in the state register;
- civil liability for damage as a result of an accident at hazardous industrial facilities is insured;

- persons responsible for organization and performance of control over industrial safety, over the maintenance of hoisting equipment in operable conditions and safe performance of works with such equipment, at hazardous industrial facilities have been appointed in local regulatory acts.
- job descriptions for the above mentioned responsible specialists have been developed as well as regulations on production control, industrial manuals and manuals for occupational safety for the operating personnel and the personnel involved in cargo slinging.

In the branch offices of the general contractor, specialists have been appointed who are in charge of monitoring of the status of industrial safety at construction sites. Internal safety audits are performed during inspections of the industrial site. Upon results of the audits the contractors receive prescriptions on elimination of the revealed violations with further control of fulfilling the prescription requirements.

The most frequent violations in the field of industrial safety revealed during inspections are as follows:

- Records in the log books of hoisting equipment are not made on time by specialists responsible for industrial safety;
- Crane and sling operators are not familiarized against signature with the standard operating procedure;
- Gripping devices without identification numbers are located in areas where work with hoisting equipment is performed.

The status of industrial safety assurance in companies of the Engineering Division and at nuclear facility industrial sites is assessed as satisfactory.

GRI 102-11

2.5.2.3. Nuclear and radiation safety

In 2018, the Engineering Division recorded no accidents, incidents or anomalies during the use of radiation sources, no emissions and releases of radioactive substances into the environment. There were no cases of exceeding the control levels, agreed by Federal Medical and Biological Agency (FMBA) of Russia, of the main dose limits, internal releases of nuclides, air pollution, rooms surfaces, work places and equipment during works performance with radiation sources.

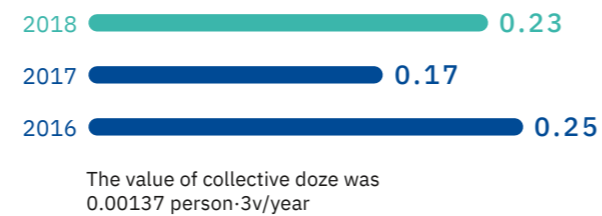
The operation of radioactive sources is organized in accordance with the requirements of regulatory documents in the field of use of nuclear power — maintaining the lowest possible level taking into account the economic and social factors of individual radiation doses and the number of persons being irradiated during the use of any radiation source (ALARA).

The company has licenses for works performance in the sphere of nuclear power issued by the state safety regulatory body to perform activities with sources of ionizing radiation. FMBA of Russia has granted sanitary and epidemiological permissions for the above activities. Specialists responsible for radiation safety assurance, accounting and monitoring and physical protection of radioactive substances, have been appointed. Such persons have undergone training, obtained certification and permissions of Federal Environmental, Industrial and Nuclear Supervision Service of Russia. Persons who are admitted to work with radiation sources have been examined by a medical commission to confirm that they have no medical contra-indications, have undergone training on the rules of work with radiation sources, have passed examination for admission to work with sources of ionizing radiation and have undergone safety briefing.

Individual exposure doses are recorded. Quarterly and annual doses as well as the total dose during the whole working period are recorded as well. The scope and character of dosimetric control is defined by radiation monitoring program approved by CEO of the company and agreed upon with the territorial body of executive power that is authorized to perform federal state sanitary and epidemiological monitoring.

The ionizing radiation sources, flaw detectors, and transportation and storage casks are stored in stationary storage facilities in accordance with the radiation safety requirements.

Annual Effective Doze of Group A Personnel



In order to ensure readiness to prevention of accidents at nuclear facilities, measures for prevention of accidents and incidents and documents determining the criteria for decision taking after radiation incidents, have been developed. A plan for protection of the personnel against radiation accident and its consequences has been elaborated and approved by FMBA of RF. Programs and methods of emergency drills were developed. Emergency drills are conducted on a regular basis.

Individual protection equipment is available, as well as communication facilities and tools for elimination of the consequences of radiation incidents.

During 2018, inspections of compliance with the requirements of federal norms and rules in the sphere of the use of nuclear power during the operation of radiation sources were held. Such inspections were performed by organs of internal control of safety and quality, state regulatory authorities of atomic energy use and state regulatory authorities of safety of atomic energy use. The comments and non-conformities revealed by commissions on safety during work with ionizing radiation sources did not have any significant impact; they were promptly eliminated during the work of the commissions.

The radiation safety assurance in organizations operating radioactive substances is assessed as satisfactory.

2.5.2.4. Environmental impact during an NPP construction

Environmental impact of the facilities constructed abroad is mainly in the scope of responsibility of the customers. This report discloses information on environmental impact of facilities built in the Russian Federation and of those facilities abroad where environmental impact is made by companies of the Engineering Division.

GRI 304-1, 304-2, 304-4

Impact on biological diversity during NPP construction

Construction of NPPs in specially protected natural areas (as a rule, places with a high biological diversity) is prohibited by the legislation of the Russian Federation and the Republic of Belarus. That is why the construction areas are mainly located in developed agricultural territories and small forest areas with few animal species and habitats. Such areas are characterized by insignificant amount of vegetation, mainly in the form of low forest and bushes that are secondary plants developed after elimination of primary vegetation.

Considering an insignificant number of birds, both local and migrating, no special measures are envisaged.

During the study of land areas involved in NPP construction, no vegetation and animals from the Red List of Threatened Species of Russia and the Red List of International Union for the Conservation of Nature, were discovered.

As no construction is carried out in specially protected natural areas, the companies of the Engineering Division make no negative impact on the biological diversity in protected areas and areas of high biodiversity value outside protected areas.

GRI 304-3

The areas of NPP construction are characterized by near absence of animal life and animal habitats, due to which no special measures for rehabilitation of habitats are taken.

Impact on soil during NPP construction

In 2018, no land recultivation at the construction facilities of the Engineering Division was performed.

Impact on atmosphere during NPP construction

During the reporting year, releases of pollutants into atmospheric air were in compliance with the requirements of the environmental legislation of RF.

The total amount of pollutant substances discharged by the Engineering Division facilities in 2018 was lower than in 2017 and amounted to 22.52 tons. Of the total pollutant emissions, sulfur dioxides amounted to 3.6%, carbon oxide — 38.3%, nitrogen oxide — 14.4%, other substances — 43.7%.

Pollutant emissions were significantly lower due to improved parameters of JSC “NIKIMT-Atomstroy”.

Table 17. Emission of pollutants into atmosphere (NO_x, SO_x) during NPP construction, tons

Type of pollutant substances	Volume of pollutant substances, tons			
	2016	2017	2018	(2018–2017)/2017, %
Sulfur dioxide	0.20	1.33	0.82	–38.3
Carbon oxide	8.70	12.04	8.62	–28.4
Nitrogen oxide	2.50	4.47	3.24	–27.5
Other substances	25.56	49.07	9.83	–80
TOTAL	36.98	66.88	22.52	–66.3

Detailed information can be found in Appendix 11 of the Book of Appendices.

GRI 303-1

Impact on water resources during NPP construction

Water intake

The companies of the Engineering Division use water resources to supply drinking and household water to amenity rooms. Water is mainly taken from city water supply systems. Exceptions are water intake from underground sources of Lesnoy Uyut recreation center of JSC ASE EC, Baltic Branch of JSC ASE EC and surface sources of Tsimlyansk water reservoir for the needs of Volgodonsk Branch of JSC ASE EC.

GRI 303-3, 303-5

The total water withdrawal was 246.5 thousand m³ without natural water inflow, 10 676.7 m³ with natural water inflow. The total volume of water withdrawal in the regions of operation can be found in Appendix 11 of the Book of Appendices with break-down by the sources.

Water discharge

Domestic and rain water was discharged mainly to city sewage network, except Volgodosk and Baltic Branch Offices of JSC ASE EC. To treat the waste waters of JSC ASE EC Baltic Branch during the period of the NPP construction, sewage treatment facilities of two types are envisaged:

- Mechanic treatment facilities for drain and surface (storm and melted) waste waters;
- Biological treatment facilities for domestic waste water of the construction base.

Annually, under a contract with a specialized laboratory, samples of natural water of IN-18-18 channel are analyzed for hydro-chemical parameters, waste water at the inlet to IN-18-18 channel are analyzed for hydro-chemical and microbiological parameters for the purpose of monitoring of the efficiency of treatment facilities operation, waste water is sampled before and after treatment. The morphometric parameters of the water reservoir are monitored as well.

Besides, Kursk Branch of JSC ASE EC carries out construction dewatering of the open pit of Kursk NPP-2. To increase reliability, water from the dewatering system is discharged via two pipes up to the connection point to the common discharge pipeline. The common discharge pipeline consists of two mutually redundant lines with the diameter of 530 mm; the flow of waste water is distributed evenly between the two discharges — No. 1 and No. 2.

Waste water from dewatering system is discharged into the Seym river. Kursk Branch of JSC ASE EC has developed a program of regular monitoring over the water reservoir and its water protective area. These programs envisage monitoring over the quality of surface water in the background section and the monitoring section and their comparison to discharge of waste (drain) water into the water body, morphometric observations; control of the status of the water body and the impact of waste water on it; observations over the Seym river and its water protective zone, control over microbiological parameters in the waste water and the water body. Periodicity of sampling and analyses of surface water in the background and the monitoring sections of the Seym river is similar to periodicity of monitoring over waste (drainage) water. These programs contain a list of traced pollutants and parameters of permissible discharge approved for Kursk Branch of JSC ASE EC, the periodicity of sampling and the list of certified methods of measurement.

Rainwater collected and stored by the company and waste water of other organizations are not analyzed.

GRI 303-2

Waste water is discharged on the basis of permissions for discharge of waste into water body which stipulate requirements to the quality of discharged water.

GRI 303-4

In the Engineering Division, water is discharged at the NPP construction sites in Kursk, Volgodosk and Baltic Branches of JSC ASE EC. In 2018, the total amount of discharged water grew by 40% compared to 2017 due to an increased amount of water discharged in the process of dewatering at Kursk NPP-2 construction site.

In Volgodosk Branch of JSC ASE EC, waste water is discharged through central treatment facilities of Rostov NPP, and in the Baltic Branch — through sewage treatment facilities of two types: mechanic treatment of drain and surface (rain and melted) water from the construction base and from the Baltic NPP open pit construction site, and biological treatment for cleaning of the construction base domestic water. For the Baltic Branch of JSC ASE EC, a resolution on granting the right to use the water body has been issued and approved in accordance with the procedure established by the environmental legislation; a permit for discharge of polluting substances into the water body has also been received.

GRI 306-5

Water discharge of the Engineering Division does not have a significant impact on water bodies in terms of biological diversity and habitats.

No treatment facilities for waste waters discharge are envisaged in Kursk Branch, in accordance with the permissible waste discharge approved by the design. Decision on granting the right to use the water body and a permit to discharge substances and microorganisms into water bodies have been issued in accordance with the requirements of the environmental legislation.

In accordance with the terms and conditions of permitting documents for waste discharge, Kursk and Baltic Branches of JSC ASE EC have developed programs of measurement of the quality of waste water, regular monitoring of the water body and its protective zone. Such studies are performed by specialized organizations certified in accordance with the established procedure, under a contract.

GRI 306-1, 303-4

The quality of discharged waste water belongs to “other” category.

Table 18.

Total volume of water discharge with breakdown by destination, mln liters

ENGINEERING DIVISION

Surface waters, including swamps, rivers, lakes and oceans	Central treatment facilities of Rostov NPP, the Seym river (CHER/DNIEPER/892/360), Channel In-18-8	67.6	7,554.46	10,541.06	+39.5
Underground waters	—	—	—	—	—
Sea water	—	—	—	—	—
Other destinations and the volume of water supplied to other companies:	Nizhny Novgorod Vodokanal; Ostovets RUE for housing and community amenities; JSC Mosvodokanal; Mosvodostok SUE; Vodokanal SPb SUE; Balakovo Vodokanal MUE; Volgograd Gorvodokanal; Desnogorsk Public Utility MUE; MUE GTS; Vodokanal MUE; Aquaservice MUE; Vodokanal MUE, Obninsk; JSC Seversk Vodokanal	217.02	199.57	293.86	+47.2
TOTAL		284.62	7,754.03	10,834.92	+39.7

Additional information can be found in Appendix 11 of the Book of Appendices.

Power consumption during NPP construction

The amount of energy resources consumption by the Engineering Division grew in 2018 as compared to 2017 and amounted to:

- Electrical power — 63.28 mln KW·h (growth by 28%);
- Thermal power — 170 465.67 GJ (growth by 12.8%).

Increased amount of power consumption was mainly caused by changes of data submission principle at Belarus NPP construction site and an increase of the scope of services provided at cultural and recreational facilities.

Additional information can be found in Appendix 11 of the Book of Appendices.

GRI 103-1, 103-2, 103-3, 301-1

Materials used during NPP construction

During civil and erection works, road filling at NPP construction facilities, the Engineering Division uses broken stone, sand and semi-products — bricks, metal structures and pipelines.

No registration of construction materials per weight and volume is maintained as civil and erection works at construction facilities are performed with involvement of contractors who independently procure raw materials in accordance with the working documentation.

During the performance of administrative, economic and design activities in the reporting period, the organizations of the Engineering Division used paper products purchased from external suppliers. The total scope of consumption of paper products in the organizations of the Engineering Division in 2018 was lower by 15.6% compared to 2017.

There is no record of treated or re-used waste.

Additional information can be found in Appendix 11 of the Book of Appendices.

GRI 306-2

Waste management during NPP construction

The management of industrial and consumer waste at construction and operation facilities of the Engineering Division complies with the environmental legislation of the Russian Federation, the countries of operation and the developed draft standards for waste production and limits for their disposal.

Waste accumulation areas are available at all construction and operation facilities of the Engineering Division of Rosatom State Corporation. Waste is accumulated in specially installed containers, as soon as they are filled, the waste is transferred to specialized organizations for subsequent decontamination and disposal on the basis of a license for collection, transportation, handling, disposal, decontamination and burial of Class I–IV waste.

The Engineering Division companies do not operate facilities for long-term waste storage and disposal.

In 2018, the total volume of waste production grew by 17% compared to 2017 and totaled in 5558.27 tons.

The low-hazard waste (IV class of hazard) and virtually no-hazard waste (V class of hazard) accounted for 56% and 43% respectively, of the total amount of waste production in 2018. In 2018, there was no significant growth of generation of class IV–V waste.

As before, the main way to handle waste of IV–V hazard classes is to transfer them to specialized organizations for placement in landfill sites that have been included in the State Register of Waste Disposal Facilities (GRORO).

The volume of I hazard class wastes generated in 2018 reduced by 13%, as compared with 2017. The reason was replacement of mercury-containing fluorescent tubes by LED ones.

The volume of class II waste generated in 2018 reduced by 55%. At the same time, the reduction in the volume of waste generation was due to smaller scope of works performed on certain construction sites, the maintenance and repair of transportation vehicles by third-party organizations under contracts and, therefore, the exclusion of waste generated from the technological process of organizations.

Table 19.
Waste capacity, tons

Total waste generation categories	2016	2017	2018	(2018–2017)/2017, %
I hazard class waste (extremely hazardous):	2.30	3.00	2.57	–14
II hazard class waste (highly hazardous):	1.23	1.56	0.70	–55
III hazard class waste (moderately hazardous):	8.20	7.82	8.48	+8
IV hazard class waste (low-hazard), including:	2,941.07	2,917.32	3,138.00	+8
V hazard class waste (practically no hazard), including:	2,173.80	1,802.34	2,408.53	+34
Total for I–V hazard category wastes	5,126.60	4,732	5,558.30	+17

More detailed information on hazard classes and treatment methods can be found in Appendix 11 of the Book of Appendices.

Transportation and transfer of waste to third-party organization for their further decontamination/storage was performed on the basis of contracts with specialized companies having licenses for management of class I–VI waste.

GRI 306-4

In 2018 organizations of the Engineering Division did not perform any activities related to transportation, import, export or treatment of waste which is hazardous according to Appendices 1, 2, 3 and 4 to “Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal”.

Fuel types

In 2018 the companies of the Engineering Division used non-renewable types of fuel for motor vehicles, special machinery and heating.

There was a reduction in fuel consumption in 2018: petroleum consumption declined by 12%, natural gas — by 15%, coal — by 4%.

Reduced petroleum consumption was caused by optimization of expenses for in-house loads, reduction of own transportation, use of rented transport. Reduced consumption of gas and coal used for heating is related to absence of extremely low air temperature during the year.

However, the consumption of diesel fuel in 2018 has grown.

Significant increase of diesel fuel consumption by Kursk Branch of JSC ASE EC is caused by the use of own special machinery for production purposes and establishment of a new structural division “Department of work performance with involvement of own resources”. The goals of the above department is annual cleaning of the work execution area and access roads, including facilities of the construction base, temporary townships and 5-meter adjacent area.

Consumption of diesel fuel by Novovoronezh Branch of JSC “Atomenergoproekt” is related to the use of heavy diesel machinery at the construction site instead of low capacity automobile cranes.

Ensuring environmental safety of motor vehicles, including those that are used during NPP construction

The motor vehicles of the companies of Engineering Division undergo annual regular technical maintenance within the established deadlines under contracts with specialized service centers. These measures make it possible to operate vehicles without exceeding the established permissible amounts of pollutant emissions into the atmosphere.

Table 20.
Fuel types used in the Engineering Division

Fuel type	Fuel consumption/fuel purchase expenses						(2018-2017)/2017, %, dynamics
	2016		2017		2018		
	tons	mln RUR	tons	mln RUR	tons	mln RUR	
Motor petrol	1,343.35	55.94	1,206.51	50.55	1,062.36	53.77	–12
Diesel fuel	1,712.68	80.79	1,282.66	49.63	1,986.12	94.20	+55
Fuel oil	35.07	1.08	0	0	0	0	0
Natural gas	1,525.01	9.70	1,276.93	9.77	1,085.61	8.47	–15
Coal	104.30	0.52	124	0.61	119	0.73	–4

More detailed information about fuel types used can be found in Appendix 11 of the Book of Appendices.

Instrumental measurement data of pollutant emissions (CO, CH) at construction facilities are recorded in the relevant logs with further regulation of vehicle fuel systems (if necessary). Vehicles are examined during their entrance and operation at the construction site to make sure that there are no traces of oil and fuel leaks. Parking of vehicles on the openground is prohibited; vehicles can be parked only on special parking lots with hard pavement. Idle operation of motor during parking and their repair in the territory of the construction site is prohibited.

Euro 4 and Euro 5 standard fuel is used for motor vehicles.

Drivers shall undergo briefings and be aware that idle run of motors is prohibited.

Vehicles shall be washed at special car wash stations under relevant contracts.

Financing of environmental protection measures

The total amount of expenses for environmental protection in the Engineering Division during the reporting period was 20.15 million rubles which is 14% more compared to 2017.

The main reasons of growth of environmental protection expenditures at construction facilities in 2018 was strengthening of environmental monitoring measures at Novovoronezh NPP-2, water management and water protection activities: Installation of water measurement instrumentation; examination of facilities for treatment of domestic and surface waste water from the Baltic NPP construction site.

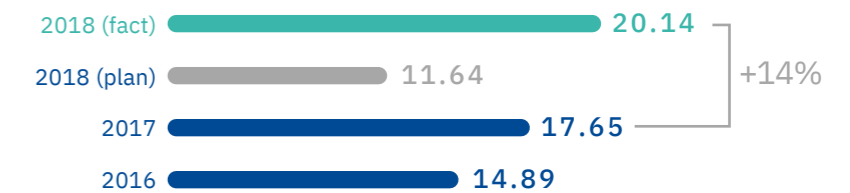
Besides, the expenditures grew due to increased price of transportation, management, decontamination and disposal of waste, change in 2018 of requirements to statistical reporting on current environmental protection expenses, inclusion of additional cost items into 4-OS report.

GRI 307-1

The amount of fines for violations of environmental protection requirements was 20 thousand rubles. Besides the fines, the Engineering Division received two instructions to eliminate the revealed violations in the field of environmental protection. The violations were eliminated in time.

List of certificates and auditors’ conclusions on the compliance of the Engineering Division companies with the standards of quality and environmental safety can be found in Appendix 11 of the Book of Appendices.

Expenditures for environmental protection measures, mln RUR



Additional information can be found in Appendix 11 of the Book of Appendices.

2.6

Social and Relationship Capital

2.6.1. Stakeholders Engagement

2.6.2. Information Policy

2.6.3. Contributing to the Development of Regions of Operation



6,852

Number of New Jobs within the year



15.43

bln RUR

Charged and paid taxes by Engineering Division



Head of Communications Division

Nina Dementsova

– Which communication events held in 2018 by the Engineering Division had an impact on image enhancement of the nuclear industry?

Rosatom State Corporation Engineering Division is the global leader in NPP designing and construction. The development of nuclear power engineering largely depends on public acceptance, that is why one of the main goals of communications division is shaping a positive public opinion of the activities of our company and the nuclear power industry in general. Special attention is paid to events aimed at combating radiological phobia and protests in newcomer countries of the “global nuclear club” in South and South-East Asia, Middle East and North Africa.

Activities for enhancement of public acceptance of the nuclear industry are permanently carried out in every country of operation in accordance with the communication plans jointly developed with representatives of local authorities and International Business Department of Rosatom State Corporation. Besides information support of NPP construction, these activities include implementation of special projects in Russian Federation and abroad, among them sports and cultural events.

In 2018, the communications division jointly with the colleagues from Rosatom state corporation and with assistance of local authorities organized a number of high-level events.

In August 2018, “Green Square” project was implemented in the city of Ostrovets, where the Engineering Division builds the first nuclear power in the Republic of Belarus. It coincided with the 550th anniversary of the city and was dedicated to promotion of carbon-free types of power generation. “Green Square” interactive program with 4 zones (water, sun, wind, atom) was attended by over 9000 local residents and visitors.

Rosatom Festival of Science held in New Delhi was dedicated to the 30th anniversary of cooperation between Russia and India. The activities held during the Festival included scientific and educational events in the field of nuclear science and technology, presentation of a Nuclear ABC in English and Hindi and a children’s drawing competition.

A “Week of Nuclear Power and Science – 2018” was held in Bangladesh in the cities of Ishvardi, Kushtia, Rajshahi and Dhaka. Students and schoolchildren of Bangladesh could listen to over 20 lectures in physics, mathematics, ecology, participate in educational, scientific and entertainment programs and receive plenty of materials telling in easy language about the advantages and safety of nuclear power.

“ Social and relationship capital includes: promoting constructive cooperation with the main stakeholders, public acceptability of nuclear technologies, brand management, contribution to the development of the areas of operations, charity activities, etc.”

Within the framework of Nuclear Industry Suppliers Forum in Cairo, gala concert of opera signers of Moscow and St. Petersburg “High Art – High Technologies” was held. The film “Wild Edens: Russia” was shown at the Tenth All-Arab Forum of Russian and Soviet University Graduates. The event drew the public attention to global heating problem and the necessity to apply low carbon solutions in power industry.

As far as our activities in Russia are concerned, we certainly could not overlook such an important event as the World Football Cup. In Nizhny Novgorod we launched educational and entertainment project “The Champions”. The largest radio stations broadcast mini-programs about nuclear power engineering and football.

The commissioning of Rostov NPP Unit 4 with capacity of 1000 MW was marked by production of a new film telling about the largest power generation source in the South of our country. Besides, in 2018 experts of the communications division organized a number of press-tours of public representatives, mass media and bloggers to nuclear facilities. They also supported the work of foreign Information Centers of the nuclear industry and Public Counseling Offices at nuclear power plants.

“As for social responsibility, the division ensures stable salaries and decent working conditions to over 23.5 thousand own employees and over 10 thousand employees of contractors”

— How does the Company work with stakeholders, what was done in 2018?

Fostering a dialogue with the stakeholders, we always follow the principle of information transparency. Due to our information activities, our stakeholders obtain full and reliable information about production and social activities of our Division, its strategic goals, its short-term and long-term plans. In accordance with the information policy of Rosatom State Corporation, the Company pursues the policy of information transparency; all the materials issued by the communication division are regularly updated on the official external web-site, accounts, social networks and other information resources. In their presentations, interviews, when talking to the public, representatives of the Division follow such approach. We are fostering efficient bilateral communication with all the stakeholders. In particular, when preparing the annual reports, we have regular meetings and dialogues with public representatives. It is our tradition to take our stakeholders to our NPPs, to organize round-table discussions for the population devoted to safety of nuclear power, environment and sustainable development. In 2018, in Belarus alone the Division organized several large events for the stakeholders: Panel discussion “Nuclear power of Belarus: Environment and Safety”, round-table discussion: “Environmental and social aspects of nuclear power development” within the framework of the 23rd Belorussian power and environmental forum, exhibition and congress “Power. Environment. Energy saving”. Our stakeholders received full information upon the results of international ecological expedition of Oka LLC and Belorussian environmental organizations to the Belarus NPP and the results of international forum “Trade unions and “green” work places”.

In 2019, we will continue our work with all the stakeholders and we hope to receive active feedback.



Kudankulam NPP (India)

— What UN goals in the field of sustainable development are reflected in the activities of the Division?

Engineering Division is committed to the goals of sustainable development declared by the UN. The main field of activities — NPP construction — pursues the following main goals: Affordable and Clean Energy (No. 7), Decent Work and Economic Growth (No. 8), Climate Action (No. 13).

Power start-up of unit 1 of Leningrad NPP-2, handover to industrial operation of Unit 4 of Rostov NPP and two power units of Tianwan NPP in 2018 were a significant contribution to supply of energy to the relevant regions and their population with safe power which will stay competitive in terms of price for a very long time. Besides, with impact on climatic change being one of the important factors in decision about the source of power generation, nuclear power plants are an important tool in struggle for the environment. NPPs with VVER-type reactors are designed in such a way that they emit almost no carbon dioxide into the atmosphere. Releases of pollutants into atmospheric air are also comparatively low. E.g., the annual volume of sulfur dioxide emissions from an NPP with VVER-1200 reactor is almost 63 times less than from a thermal power plant.

As for social responsibility, the division ensures stable salaries and decent working conditions to over 23.5 thousand own employees and over 10 thousand employees of contractors. At the same time, it is worth mentioning that almost seven thousand new jobs were created in the Division in 2018.

NPP construction activities have a positive effect on the sustainable development of the areas of operation: development of infrastructure, the economy of the regions, to say nothing about the support of social and charity initiatives, volunteer activities, etc. In conclusion I would like to point out that the long time-period of NPP operation, improvement of design properties, technologies of designing and construction, increase of the contribution of nuclear generation to the growing global power needs — all of it guarantees that nuclear power will be available to the current and the future generations, including the population of developing countries.

2.6.1. Stakeholders Engagement

Interface on the Company level

Interface with stakeholders is performed in all the regions of operation of the Division. From 2018, the company has actively promoted cooperation with customers, partners, local media, public and environmental organizations, authorities and other stakeholders in the format of regular meetings, forums, conferences, exhibitions, round tables and press tours to NPP construction sites.



* The map was updated as of end of 2018. Updating is performed once in two years by questioning the Division top management in the areas of the competences. The questioning of done to assess changes in interface with the stakeholders.

GRI 102-44

Table 21. Information about stakeholders engagement in the reporting period

Key stakeholders	Basic interests	Mechanisms of interaction	Comments to dynamics of degree of mutual impact of the Division and stakeholders compared to 2017
Shareholders: Rosatom State Corporation, Atomenergoprom, JSC ASE, JSC "Atomenergoproekt" and others	Strategy implementation. Economic efficiency. Business sustainability. Business process transparency.	Participation in implementation of the shareholder's strategic objectives. Improvement of the corporate management system. Implementation of Rosatom production system. KPI implementation.	The level of mutual impact is on the same level. Strong mutual influence: a shareholder takes management decisions, performs monitoring, the results of the company activity have an impact on the shareholder.
Regulatory and Supervision Bodies: Federal Environmental, Industrial and Nuclear Supervision Service	Meeting Russian and international legal requirements.	Obtaining licenses. Conducting inspections. Reporting. Development of proposals for improvement of legislation.	The influence of stakeholders on the Division has grown. Regulatory and supervision bodies have a strong influence on the Company due to performance of their function of supervision of the activities (audit, inspections, providing reports, etc.).
State authorities of foreign countries	Nuclear power development. Environmental and radiation safety. Infrastructure development. Taxes. Creation of new jobs. Implementation of social programs.	EIA development. Work in joint committees, commissions, expert teams dealing with nuclear power issues. Public accountability. Contribution to the development of regions of operation.	A new group of stakeholders appeared in the map due to the scale of business (80% of the orders portfolio are projects abroad) and a wide geography of the activities. Position in the rank map is explained by the importance and significance of the Division projects for the regions of operation.
International organizations and associations: IAEA, WANO, WNA, NEA/OECD	Nuclear power development. Environmental and radiation safety.	International conferences/exhibitions/forums. Joint programs. Work in joint committees, commissions, expert teams dealing with nuclear power issues.	The level of mutual impact is on the same level. The scale of business and the geography of activities, the technical properties of the Division's projects ensure a strong mutual interest of the company and the stakeholders towards each other.
Self-governing local bodies	Environmental and radiation safety. Infrastructure development. Taxes. Creation of new jobs. Implementation of social programs.	Memoranda on cooperation. Social and charity programs. EIA development. Public counseling offices. Public accountability.	The influence of the division on the stakeholders has grown due to the scale of business (80% of the orders portfolio are projects abroad) and a wide geography of the activities. The Division is a responsible tax payer into the budgets of different levels, including the regional ones, its activities have an impact on creation of new jobs in the regions of operation (see 2.6.3. "Contribution to the development of regions of operation").
Population of the regions of operation (public representatives)	Creation of new jobs. Contribution to the development of regions of operation.	Public counseling offices. Social and charity programs. EIA development.	The level of mutual influence has grown due to increased number of projects for NPP construction that are in an active phase.
The Division personnel and the bodies representing the employees' interests. Trade union, Youth Council, Veterans Council	Company's development. Professional and career growth. Labor safety requirements. Fair remuneration.	Personnel qualification enhancement. Management staff pool programs. Social support of employees. Social partnership.	Mutual influence has grown due to increase of the Company's scale (the growth of total number of employees by 28%, 6,852 new jobs were created).

Key stakeholders	Basic interests	Mechanisms of interaction	Comments to dynamics of degree of mutual impact of the Division and stakeholders compared to 2017
Top management of the Division	Strategy of the Company development.	Improvement of the management system. Efficiency improvement program.	Mutual influence has increased due to transformation of the Engineering Division, changes of the organizational structure, enhancement of the role of project managers.
Top-management of subsidiaries			A new group of stakeholders appeared in the rank map of stakeholders due to the growth of the number of subsidiary companies that belong to the Division management scope and due to establishment and strengthening of the function of management of subsidiary companies.
Consumers of technologies, products and services on the global market	Implementation of construction plans. Reduction of construction periods and cost. Improvement of the quality of works.	Performance of contractual obligations. Participation in the work of steering committees. Mastering of up-to-date engineering technologies. Bilateral visits.	A new group of stakeholders appeared in the rank map of stakeholders due to strengthening of the Division's positions as a player on the global nuclear market, increase of the number of foreign orders, power start-up of the first generation III+ NPP (Novovoronezh NPP-2 in 2017).
Consumers of technologies, products and services on the Russian market			
Suppliers and contractors	Acquisition of new orders. Company's financial status. Prospects of cooperation.	Open bidding. Entering into long-term contracts with transparent pricing principles. Participation in exhibitions and forums. Bilateral visits. Establishment of strategic partnerships.	Mutual influence grew due to the growth of the number of projects that are in the active stage.
Competitors on the global market of technologies, products and services: Framatome (former Areva) (France); Chinese and Korean nuclear companies; companies that design and construct other generation sources	Participation in tender procedures. Work in joint committees, commissions, expert teams dealing with nuclear power issues. Development of industry research. Development of innovative technologies.	Participation in exhibitions and forums. Bilateral visits. Establishment of strategic partnerships. Social programs and projects.	New players in the rank map of stakeholders due to strengthening the Division position as a player on the global nuclear market, increase of the number of foreign orders.
Financial institutions and investment community	Strategy of the Company development. Investment programs. Increase of shareholder value. Financial and production indicators.	Financing, debt financing.	The level of mutual interaction is at the same level, however, we can see strengthening of business relations of the Company and financial institutions due to the Division activity (growth of the number of projects in the active stage).
Scientific community	Development of industry research. Development of innovative technologies.	Joint programs. R&D orders. Scientific conferences.	The level of mutual influence has grown due to the following reasons: <ul style="list-style-type: none"> • the year of science and innovations in the nuclear industry (2018); • effective cooperation of the Division with the scientific community in all the projects; • digitalization; • interaction of the Division with the leading Russian and foreign partners on issues related to research and development.

Principles of stakeholders engagement:

GRI 102-40, 102-42



OPENNESS AND INVOLVEMENT

The Company pursues the policy of informational openness and involvement of the personnel in the projects (Environmental Impact Assessment — EIA, public reporting, forms/exhibitions, publications, etc).



RECORD AND RESPONSE

The Company considers the requests and demands of the main stakeholders, including the interest of those who cannot express their opinion (e.g., the future generations) and timely responds to the grounded requests and proposals.



MATERIALITY

The Company interacts with the stakeholders on all the issues that are significant for the company and all the interested parties.



MUTUAL BENEFIT

The Company strives to build stakeholders engagement on the basis of partnership and mutual benefit.

Key stakeholders	Basic interests	Mechanisms of interaction	Comments to dynamics of degree of mutual impact of the Division and stakeholders compared to 2017
Educational institutions: National Research Nuclear University MEPhI, NSTU, the Lobachevsky Nizhny Novgorod State University, Ivanovo State Energy University, etc.	Personnel target training. Development of industry research. Development of innovative technologies.	Training, retraining and refresher training of employees. Organization of students' field periods. R&D orders.	The level of mutual influence has grown due to the need of the Division in qualified personnel, also demand for new professions — digital engineer, etc. (Establishment of MEPhI HES, public counseling offices, etc.).
Environmental organizations	Social partnership. Environmental protection.	Environmental expeditions. EIA development.	The level of mutual influence has grown. The importance and significance of the Company's projects for the regions of operation, power start-up of the first NPP of generation III+ (2017) arises environmental organizations' interest in the activities of the Division.
Public organizations (except environmental ones)	Social and charity programs. Social partnership.	Social and charity programs. Volunteering. Public accountability.	The influence of the Division on the stakeholders has grown. The importance and significance of the Company's projects for the regions of operation is of great interest for public organizations.
Rating agencies, market analysts: RA expert	Submittal of significant analytical information for modern financial and economic institutions. Assessment of the partner's financial reliability. Full-scale risk assessment.	Public accountability. The Division web-site. Participation in business meetings and conferences.	New members in the stakeholders' rank map. Mutual interest of the Company and stakeholders due to strengthening the role of the Division as a player on the global nuclear market.
Expert and professional community: the Russian Union of Industrialists and Entrepreneurs	Improvement of the business environment. Enhancement of the status of Russian business in RF and abroad. Maintaining the balance of the interests of society, authorities and business.	Participation in conferences on up-to-date economic problems with the participation of representatives of the Division and chief executive officers of federal authorities. Public expert review of the accounts.	
Mass media	Provision of prompt access to information about the Company's activities.	Press-conferences and press tours. Public accountability. Updating of information on the site, official weblog, resources in the social networks.	The level of mutual impact is on the same level. It is important to point out the importance and significance of the Division projects for regions of operation and information requirements of the public in the regions of operation.

“ In 2018, during international forums and conferences and in the normal course of business, a number of meetings with the leading global engineering and construction companies were held. The Engineering Division of Rosatom State Corporation is planning to foster partnerships during the implementation of foreign projects, involving global partners and local suppliers in cooperation to ensure the sustainable development goals”

Table 22. Main Russian and International Agreements of 2018

Organization with which the Engineering Division formed a partnership (alliance)	Description of projects implemented within the framework of this partnership (alliance) and the role of the Engineering Division	Milestones in joint projects within the framework of this partnership (alliance) in 2018
National Research Nuclear University MEPhI/Alexeev Nizhny Novgorod State Technical University	Agreement on educational, scientific and technical cooperation	Agreement was signed by V.Limarenko, President of JSC ASE EC, management company of the Engineering Division, M.Strikhanov, Rector of the National Research Nuclear University MEPhI and Sergey Dmitriev, Rector of Nizhny Novgorod State Engineering University. The signed Agreement substantially expands the boundaries of cooperation between the Engineering Division of Rosatom State Corporation that implements the largest long-term NPP construction program in the world in Russia and abroad and two major supporting universities of Rosatom State Corporation.
SOVNET Project Management Association	Roadmap in pursuance of Memorandum on Cooperation	Road map on development of Project management activities in 2018–2021 in the Engineering Division was signed at the Forum. The map was signed by President of JSC ASE EC, Managing Company of Rosatom State Corporation Engineering Division, and Alexander Tovb, President of SOVNET Project Management Association. Cooperation foresees the development of professional standards, preparation for the certification of the Engineering Division’s personnel, mutual work and participation in IPMA and Rosatom activities.
Russian University of Transport	Agreement on cooperation	The signed agreement foresees the following areas of cooperation: <ul style="list-style-type: none"> • development of technologies in the field of designing, construction and operation of transport infrastructural facilities, including high-speed transport systems; • solution of tasks related to analysis and structuring of big data bases on operation of transport infrastructural facilities; • information modeling of designed facilities and construction of transport infrastructural facilities; • solution of tasks in the field of virtual and augmented reality; • implementation of joint projects and programs with the participation of specialists in the field of digital transformation of the nuclear industry.
Bureau Veritas S.A.	Memorandum on cooperation	The parties express an interest in establishment of a strategic partnership for development of digital platforms ensuring data integration and management at all the stages of nuclear facility life cycle by all the stakeholders (including designer, operator, regulatory authority, inspection organization and suppliers).
Assystem Group	Conclusion of a contract	Providing consulting/engineering services at the initial stage of the project.

2.6.2. Information Policy

Communication policy of the Engineering Division has not changed compared to 2017.

For more information refer to Annual Report 2017 p. 108.

Table 23. Participation in large international and federal communication projects and events in 2018

Communication project, event	Participation format, result
Information projects:	
Press-tour of Russian journalists to Rooppur NPP construction site in Bangladesh	One of the important activities in 2018 in South Asia was information support of First Concrete ceremony at Rooppur NPP Unit 2. A press-tour of Russian mass media to Bangladesh was organized. Over 450 publications came out upon the results of joint work with “Rosatom — South Asia” in international mass media including Russia and Bangladesh. Within the framework of this event, information materials were prepared for Yuri Borisov, Deputy Chairman of the RF Government on Defense, speakers of Rosatom State Corporation and Russian and Bangladeshi journalists. The site of the event was branded. The Government of the Russian Federation expressed gratitude to representatives of the Engineering Division of Rosatom and Rusatom International Network for organization of the event.
Visit of Russian bloggers to Bangladesh to Rooppur NPP construction site	A visit of Russian bloggers (TOP 50 Instagram) to Bangladesh. The bloggers travelled along the route of equipment supply to Rooppur NPP. They also visited Dundarban, the largest mangrove forest on Earth whose existence is threatened due to climatic changes. The goal of the trip was promotion of nuclear power industry among young people (18–35 years old) in Russia and CIS countries, enhancement of the level of knowledge of the Bangladeshi population about Rooppur NPP that is being constructed under the Russian design. The bloggers’ visit was highlighted by the leading mass media of Bangladesh: three press releases were prepared and circulated and a meeting with TV correspondents was held. The media coverage included 75 publications and four TV broadcasts over 5 minutes each. Upon the results of the trip, the bloggers published 6 posts and a number of stories including 3 posts and 4 stories from Rooppur NPP construction site. During the trip, the bloggers met students from Department of Journalism of Dhaka University and schoolchildren. The bloggers told the students and the children that that they had lived about 200 km from nuclear power plants and other enterprises of Russia (Rooppur NPP is located at about the same distance from Dhaka, the capital of Bangladesh), they encouraged Bangladeshi students to be more active in social networks which are currently playing the role of new mass media. Upon the results of the trip a meeting was held between the bloggers and Khan Kabir, CEO of Council for Tourism of Bangladesh, Deputy Minister of Ministry of Tourism and Civil Aviation who expressed gratitude to Rosatom State Corporation and the Engineering Division for organizing the bloggers’ tour. He pointed out that cooperation between Russia and Bangladesh in the nuclear industry has created a platform for development of humanitarian exchanges between the countries. The meeting was attended by Kazi Wahidul Alam, editor-in-chief of Bangladesh Monitor, the leading Bangladeshi newspaper about travelling.
Days of Russian culture in India	Days of Russian culture were for the first time organized in India. During those days three concerts of children’s folk dance group named after A.N. Filippov took place. The children also performed in Anushaktinagar, the nuclear community of Department of Atomic Energy of the Government of India. The days of Russian culture in India were much publicized in the mass media. Over 30 publications covered the events. The Days of Russian culture were organized jointly by the Department of Atomic Energy of the Government of India, Nuclear Power Corporation of India, the Embassy of Russia in India and “Rosatom — South Asia”.
Press-tour of Belorussian mass media to Novosibirsk Chemical Concentrates Plant	The press-tour was organized for leading Belorussian mass media on 3–6 September 2018. The main objective of the tour was to inform mass media in Belarus about the safety and environmental friendliness of the nuclear fuel manufactured for Belarus NPP. The enterprise demonstrated the global-level quality standards, a high level of production culture and automation. Belorussian journalists were provided information about the safety of transportation of fresh fuel to be loaded into the first unit of Belarus NPP. Besides the information component, the press-tour included discussions with Russian experts who demonstrated the compliance with the radiation safety requirements during fresh fuel transportation. Upon the results of the press-tour, 50 publications and a TV broadcast came out at Belarus-12 federal channel. All the publications were of neutral or positive character.

Communication project, event

Gala-concert of opera singers of Moscow and St. Petersburg during the Forum for nuclear industry suppliers in Cairo, Egypt

Participation format, result

Within the framework of Nuclear Industry Suppliers Forum in Cairo, gala-concert of opera signers of Moscow and St. Petersburg “High Art — High Technologies”, was held. The official event was attended by the Ambassador of the Russian Federation to the ARE S.V. Kirpichenko, Minister of Electricity and Renewable Energy Dr. Mohamed Shaker El-Markabi, Chairman of Board of Directors of Nuclear Power Plants Authority of the Arab Republic of Egypt (NPPA) Dr. Amged El-Wakeel, the managers of Egyptian supplier companies. The gala-concert was attended by over 1000 guests. Upon the results of the PR-event, 194 publications came out in Egyptian and Russian mass media in Arab, English and Russian.

The Champions media-project integrated into the Football World Cup

Educational and entertainment project “The Champions” was launched in Nizhny Novgorod during the World Football Cup. Vesti FM and Mayak radio stations broadcasted educational mini-programs in Nizhny Novgorod dedicated to nuclear industry and football. To visualize the scopes of nuclear projects implemented by the Engineering Division, the journalists compared the technical properties of NPP equipment and main facilities with the characteristics of the famous architectural monuments of Nizhny Novgorod or the well-known achievements in football. Twelve topical mini-programs (40 seconds each) came out. Video-versions of the mini-programs were downloaded on the Company’s page in Facebook . Total outreach of the project was 0.9 million people.

Sports competition organized by trade unions among companies of Nizhny Novgorod

Informational support of sports competitions organized by trade unions. Different sports competitions were held during the year. The team of JSC ASE EC held first place among 23 teams in competitions in 14 sports events. Stories in Nizhny Novgorod State Television and Radio Broadcasting Company and in Nizhny Novgorod Television. Coverage on web-sites, in social networks, corporate newspaper and wall newspaper.

Educational projects:

Science festival “Peaceful Atom — 30 Years of Russian-Indian Cooperation”, New-Delhi, India.

Science festival of Rosatom State Corporation “Peaceful Atom — 30 Years of Russian-Indian Cooperation” dedicated to the 30th anniversary of Russian-Indian cooperation in the field of peaceful use of atomic energy was held in the schools of New Delhi. A number of scientific and educational events in the field of nuclear science and technology was held. On 8th February — the Russian Science Day, “Nuclear ABC” book was presented in the Russian Center of Science and Culture in Delhi, in English and Hindi. Schoolchildren had an opportunity to read the Nuclear ABC, the books were also handed over to schools in Delhi. Within the framework of the Festival, children’s drawings competition of Rosatom State Corporation was organized. The competition was attended by over 100 schoolchildren from Russia and India. In total, about 800 children participated in the event. About 50 publications appeared in mass media. The event was organized by the Engineering Division of Rosatom State Corporation, “Rosatom — South Asia” and Russian Center of Science and Culture in New Delhi.

Festival of science in India

The third Festival of Science of Rosatom State Corporation was organized in Mumbai and New Delhi. About 5000 school children participated in the event. Among honored guests of the event were S.K.Sharma, Chairman and Managing Director of NPCIL, Shri Jayant Khobragade, Deputy Director of Department of Atomic Energy of India, Mikhail Kornienko, astronaut, Dmitry Kandyba, official representative of Rosatom State Corporation in India and Andrey Shevlyakov, general director of “Rosatom — South Asia”. Upon the results of the Festival, over 70 publications appeared in the leading mass media of India in English, Hindi and Marathi (one of the languages spoken in Mumbai). Articles were published in the Times of India, Hindu, Maharashtra Times, Nav Bharat Times, Hindustan Times (belong to TOP-10 media); a story about the festival was shown on Doordarshan, the leading state TV channel. In total, about 100 publications covered the event in Indian mass media. The event was organized jointly by the Department of Atomic Energy of the Government of India, Nuclear Power Corporation of India, Jawaharlal Nehru Centre for Advanced Scientific Research, the Embassy of Russia in India and “Rosatom — South Asia”.

Week of Atomic Energy — 2018 in Bangladesh

A Week of Nuclear Power and Science-2018 was held in Bangladesh in the cities of Ishvardi, Kushtia, Rajshahi and Dhaka. Over 20 lectures on physics, mathematics and ecology were delivered for students and schoolchildren. Various educational, scientific and entertainment programs were organized. Information materials promoting nuclear power and telling about its safe use were handed out during the events. The outreach was over 1000 people. Upon the results of the event, over 50 publications appeared in the republican and regional media. The event was organized by the Engineering Division of Rosatom State Corporation, “Rosatom — South Asia” and Bangladesh Atomic Energy Commission.

“Green Square” Interactive Program (Belarus)

“Green Square” interactive program with 4 zones (water, sun, wind, atom) was attended by over 9 000 local residents and visitors. About 30 publications appeared in mass media. Average outreach of the project was 2.2 million people.

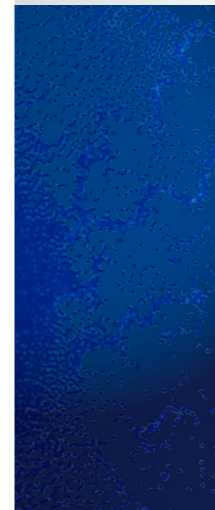
Film production dedicated to Rostov NPP construction

The film production was timed to putting of Rostov NPP unit 4 into industrial operation. The film tells about the construction of the NPP four units that were designed and built by specialists from JSC ASE EC. The film was also shown on regional Volga channel and at the corporate event dedicated to Nuclear Industry Day.

Achievements and Awards:

Rating “Fuel and Energy Industry of Russia in Social Networks”

First place in efficiency rating in category “Machine Building and Engineering”. The rating was prepared by communication agency PR Company.



Educational project “Green Square”

In August 2018 the 550th anniversary of the city of Ostrovets in the vicinity of Belarus NPP site was celebrated. The celebration was accompanied by the “Green Square” educational project. This is the common name of the four environmentally friendly energy sources of the future: nuclear, solar, water and wind power. The main slogan of the PR-campaign is “Nuclear energy is the universally acknowledged source of pure and safe power”. The “Green Square” interactive program was attended by over 9,000 residents and guests of Ostrovets

Plans for 2019

The 2019 and the mid-term plans in the field of communications:

- implementation of unified industry informational, advertisement and brand-policy of Rosatom State Corporation.
- Implementation of communication programs enhancing the image Rosatom State Corporation as the technical leader, also via information centers in regions of operation.
- Educational, information, social and cultural events in the regions of operation of Rosatom State Corporation Engineering Division.

- Organization of continuous informational exchange with mass media about the activities of the Division, organization of press-tours to NPPs, organization of PR-support of important events within the framework of the Division’s activity.
- Creating the image of a company open for cooperation with strategic partners, mass media, public organizations in Russia and abroad.



Belarus NPP

2.6.3. Contributing to the Development of Regions of Operation

GRI 413-2

Development of regions of NPP construction

NPP construction is a business that largely determines the level of employment in the regions of project implementation as it requires significant work force, highly qualified specialists, workers and engineers. These personnel are employed both by the Engineering Division and contractors participating in projects implementation.

The Engineering Division is undertaking consistent efforts to develop the regions where NPPs are constructed. In 2018, a number of events were organized aimed at development of those regions.

Kursk NPP-2

JSC ASE EC annually organizes a competition of charity projects. Non-commercial, state, municipal and budget companies, governmental and non-governmental mass media, self-government bodies, youth public organizations of Kursk region were invited to participate in the competition.

The total cost of social projects involving the local population and local communities in 2018, amounted to 5 910 thousand rubles.

Belarus NPP

Social and engineering infrastructure is being created in Ostrovets, in the region of Belarus NPP construction. The following facilities were built in 2012–2017: a school for 520 children, a kindergarten for 190 children, a supermarket, two cafeterias for 20 and 30 places, a library and book storage for 10 thousand books, a post office, a consumer services center in district No. 2. In 2018, a new sports complex was put into operation, including a swimming pool, a gym and a sauna for 25 people.

Table 24. Taxes and fees charged and paid by organizations of the Engineering Division, bln RUR

TITLE	2016		2017		2018		(2018-2017) / 2017, %	
	Charged	Paid	Charged	Paid	Charged	Paid	Charged	Paid
Taxes and fees in total, including:	6.24	5.45	8.56	6.24	14.63	15.43	70.91	147.27
To Federal budget	-2.57	-5.15	-3.05	-2.67	-2.62	-4.33	-14.10	62.17
To RF subjects budget	0.16	0.16	0.19	0.15	0.21	0.22	10.53	46.67
Local budgets	0.04	0.04	0.03	0.04	0.03	0.03	0	-25.00
Foreign countries budgets	2.11	2.29	2.94	2.16	3.10	3.11	5.44	43.98
Consolidated taxpayers group profit tax	2.18	3.85	4.34	2.34	8.87	11.08	104.38	373.50
Insurance fees to off-budget funds	4.33	4.27	4.11	4.22	5.04	5.32	22.63	26.07

Taxes

The Engineering Division plays a significant role in forming the income part of the budget in areas where the company operates.

GRI 201-4

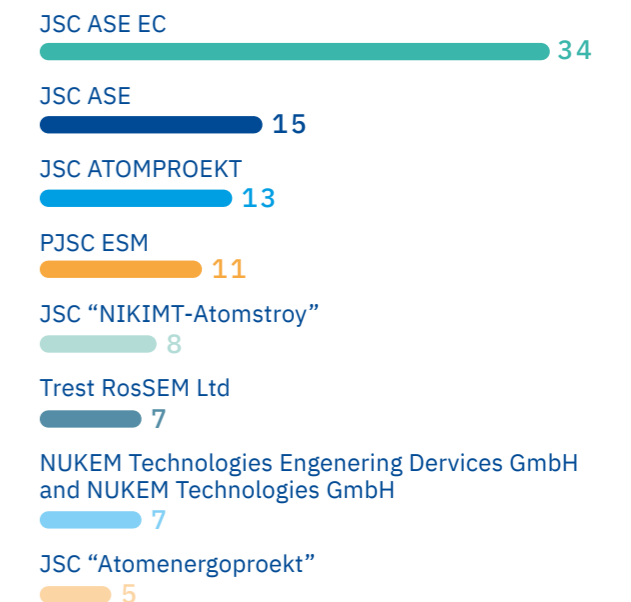
The Government of Nizhny Novgorod region granted JSC ASE a tax exemption for profit tax to be paid to the regional budget in the amount of 29.84 million rubles, for assistance in the organization of sports event. Other companies in the management scope of the Engineering Division did not get any tax exemptions or any other financial assistance from the state in 2018.

The main volume of tax payments is VAT to be refunded from the budget (-) due to export operations for sales of equipment (reimbursement during sales charged with VAT 0%) for JSC ASE.

JSC ASE EC, JSC ASE, JSC “Atomenergoproekt”, JSC ATOMPROEKT, Trest RosSEM Ltd are members of taxpayers consolidated group (TCG) due to which they do not pay profit tax independently. Charged and paid profit tax is reflected in the amount corresponding to settlements with the responsible CTG participant.

15.43
bln RUR
the volume of paid taxes in 2018

Contribution of the companies of the Engineering Division management gross tax payments in 2018, %



“ A significant focus area is organization of Charitable Projects Competition for non-profit organizations, which is held in the following categories:

- culture and sports
- environmental protection
- patriotic initiatives
- young generation”

509.9 mln RUR
the funds allocated by the Company for charity purposes in 2018

Charity activities

 GRI 413-1

The relations of Rosatom Engineering Division with regional authorities and local self-government bodies, as well as public organizations are based on mutual interest and commitment in the area of social and economic development of the regions where it operates.

One of the most important Company’s fields of work is charity.

Charity projects competition

A significant focus area is organization of Charitable Projects Competition for non-profit organizations, which is held in the following categories:

- culture and sports,
- environmental protection,
- patriotic initiatives,
- young generation.

The competition has been held for 5 years. In 2018 the total grant funding amounted to 15 million rubles. (In 2017, it was 26.4 million rubles).

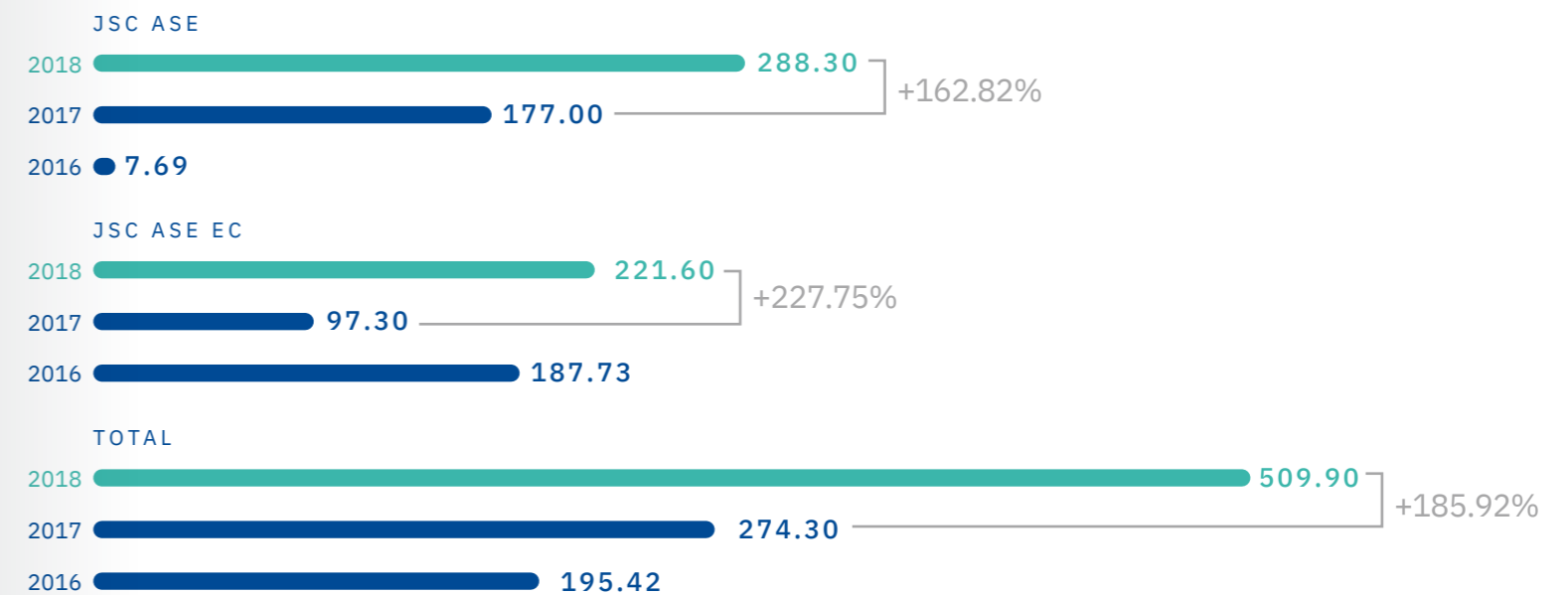
One of the winners in Ecology nomination was the Limpopo Zoo in Nizhny Novgorod. The zoo received a grant in the amount of 400 000 rubles.

The Zoo project has participated in the grant competition of JSC ASE EC in the region of operation for two years. The funds are used for the construction of a penguinarium.

Additional form of charity activities is implementation of a trilateral agreement on cooperation in conducting sports events in Nizhny Novgorod region. The parties of the agreement are JSC ASE, the Government of the Nizhny Novgorod region and the State Autonomous Institution “Sports Training Center”. In 2018 the amount of support was 30 million rubles. These funds are not part of the charity program, so in accordance with the Law of Nizhny Novgorod region dated 01.11.2017 No. 145-3 “On reduction of profit tax rate for certain categories of tax payers in 2018”, the funds will be compensated during the payment of profit tax.

Upon application of the above funds, and in case of their long-term use, the beneficiary shall submit and annual detailed Report about the use of the funds in accordance with the stipulated form, attaching copies of payment documents and other documentation confirming the appropriate use of the funds (copies of certificates, estimates, invoices, bills, etc.). These reports are examined by the legal and accounting departments of JSC ASE EC and JSC ASE, and in case of additional request, by auditing departments of the companies.

Charity funds*, mln RUR



* Charitable agreements are concluded by two legal entities – JSC ASE EC and JSC ASE.

Significant attention was paid to the following:

1. Implementation of socially important cultural and sports initiatives of the local communities in the city of Paks and adjacent regions in the area of Paks-II NPP construction.
2. The construction of an orthodox church has commenced at Belarus NPP site.
3. A planetarium has been built in Sirius Educational Center. The video-content of the planetarium includes modern digital technologies of Rosatom State Corporation.
4. Reconstruction of churches in the regions of operation (the Assumption Cathedral of Sarov Monastery, the Church of the Protecting Veil of the Mother of God in Dichnya village).

Information on the Report

The Public Annual Report for 2018 (hereinafter – the Report) of Rosatom State Corporation Engineering Division discloses financial and non-financial results of the activity in the reporting year. The report is issued in Russian and English. The English version of the Report is a translation of the Russian version approved in accordance with the established procedure

GRI 102-52

The integrated annual report is issued on an annual basis. This is the fourth report for the Division and the eleventh report for JSC ASE EC. Following the results of 2018, an integrated report of the Division, a booklet (short report) of the Division according to the results of the year and reports of subsidiaries have been issued.

Priority Topic of the Report – Engineering Division Transformation

High-priority topics of the Report are determined in the course of a dialogue on the significance determination by Rosatom Engineering Division management together with the key stakeholders' representatives.

The Report was developed in accordance with GRI principles.

International standards and guidelines

- AA1000 AP 2018.
- Global Reporting Initiative sustainability reporting standards (GRI SRS).
- The International Integrated Reporting Framework (International <IR> Framework).

Regulatory and legal framework of the Russian Federation

- Federal Law No. 208-FZ dated. 26.12.1995 (on Joint-Stock Companies).
- Letter by the Bank of Russia No. 06-52/2463 dd. 10.04.2014 “On corporate management code”.
- Law of the Russian Federation No. 5485-1 dd. 21.07.1993 “On State Secret”.
- Federal Law No. 98-FZ dd. 29.07.2004 “On Commercial Secret”.

“ Priority Topic of the Report – Transformation of the Engineering Division ”

- Federal Law No. 149-FZ dated 27.07.2006 “On Information, Information Technologies and Information Security”.
- Federal Law No. 402-FZ of 06.12.2011 “On Accounting”.

Rosatom State Corporation Regulatory documents

- Policy of Rosatom State Atomic Energy Corporation in the area of public accountability.
- Unified Industry Procedural Instructions for Public Reporting of Rosatom State Corporation and its Organizations.
- Ethical Code of the Rosatom State Atomic Energy Corporation.

Regulatory documents of the Engineering Division

- Regulations on Commission of Stakeholders of Rosatom State Corporation Engineering Division.
- Regulations on Public Reporting Committee of Rosatom State Corporation Engineering Division.
- Company standard STO 8841271.012–2016 “Procedure for elaboration of the Rosatom State Atomic Energy Corporation’s public annual report for the reporting period”.

GRI 102-54

GRI Application Level

This report has been prepared in accordance with the GRI Standards: Comprehensive option.

GRI content index and International <IR> Framework content index can be found in Appendix 1 of the Book of Appendices.

Report Scope

GRI 102-50

This Report summarizes the Division activities from 01.01.2018 till 31.12.2018.

GRI 102-51

Integrated Annual Report of the Engineering Division for the previous year (2017) was published in September 2018 on the web-site of the division, see: www.ase-ec.ru/sustainability/public-reporting/reports/

GRI 102-45, 102-49

As compared to the previous reporting period, the consolidation framework did not change. According to item 3 of Minutes of the Meeting of the Public Reporting Committee of the Division dated 01.11.2017, the basic consolidation framework is defined as JSC ASE EC, JSC ASE, JSC “Atomenergoproekt”, JSC ATOMPROEKT, their subsidiaries and other companies in the management scope of JSC ASE EC with planned revenue over 2 billion rubles or the number of employees exceeding 2 thousand (Trest RosSEM Ltd, JSC “NIKIMT-Atomstroy”, PJSC ESM). Financial indices for management accounting are generated on the basis of nine FRCs (Financial Liability Centers): JSC ASE EC, JSC ASE, JSC “Atomenergoproekt”, JSC ATOMPROEKT and five companies in the management scope (NUKEM Technologies GmbH, Nukem Technologies Engineering Services GmbH, Trest RosSEM Ltd, JSC “NIKIMT-Atomstroy”, PJSC ESM).

Some sections of the Report contain indexes for the organizations that have a significant impact on a specific activity of the Company. In such cases the consolidation framework is described separately. The Company can change the boundaries of the Report depending on the disclosed topic. The boundaries of each material topic were established by officials in charge of this subject management. The boundaries of reporting are determined according to the list of organizations within the Division's framework. Compared to the previous report, the following topics were considered to be significant: GRI 204 Procurement practices (2016), GRI 303 Water and effluents (2018), GRI 304 Biodiversity (2016), GRI 307 Environmental compliance (2016), GRI 406 Non-discrimination (2016), GRI 413 Local communities (2016).

The Report comprises target and estimated parameters in view of short-, mid- and long-term forecasts. The timing of plans/forecast disclosure in terms of separate indicators depends on the degree of confidentiality of information. Accounting (financial) reporting of JSC ASE EC, JSC ASE, JSC "Atomenergoproekt", JSC ATOMPROEKT, Trest RosSEM Ltd, JSC "NIKIMT-Atomstroy", PJSC ESM was prepared in accordance with Russian Accounting Standards (RAS). Accounting (financial) reports of JSC ASE EC and PJSC ESM is downloaded in the Interfax web-site:

- JSC ASE EC: www.e-disclosure.ru/portal/company.aspx?id=19054;
- PJSC ESM: www.e-disclosure.ru/portal/company.aspx?id=25762.

Information about the Auditor

The audit of accounting report of JSC ASE EC, JSC "Atomenergoproekt" and JSC "NIKIMT-Atomstroy" was performed by Nexia Pacioli Ltd., and the audit of accounting report of JSC ASE, JSC ATOMPROEKT and Trest RosSEM Ltd was performed by FBK, LLC. Information about Nexia Pacioli Ltd. Location: Bld. 1, 25, B. Polyanka str., Moscow, 119180. Certificate of state registration No. 856.235 of the Moscow Registration Chamber dated 23.06.1995, put into Uniform State Register of legal entities with No. 1027739428716 issued by the Moscow Interdistrict Tax Inspectorate No. 39 of the Ministry of Taxes and Levies on 22.10.2002.

Membership in the self-regulatory organization of auditors: Member of Self-regulatory Organization of Auditors Association "Sodruzhestvo" (included into the list of auditors and auditing organizations Sodruzhestvo on 28.10.2016).

Information about auditor Financial and Accounting Consultants Limited Liability Company. Location: 44/1, bldg. 2AB, Myasnitskaya street 101990, Moscow.

Registered by the Moscow Registration Chamber on 15 November 1993, registration certificate UZ Z No. 484.583 RP, put into the Uniform State Register of legal entities with No. 1027700058286.

Membership in the self-regulatory organization of auditors. The company is a member of Self-regulatory Organization of Auditors Association "Sodruzhestvo".

Responsibility for Report elaboration

GRI 102-32

The Report is signed by President of JSC ASE EC and chief accountant of JSC ASE EC, approved by board of directors of JSC ASE EC, JSC ASE, JSC "Atomenergoproekt" and JSC ATOMPROEKT.

Materiality definition process

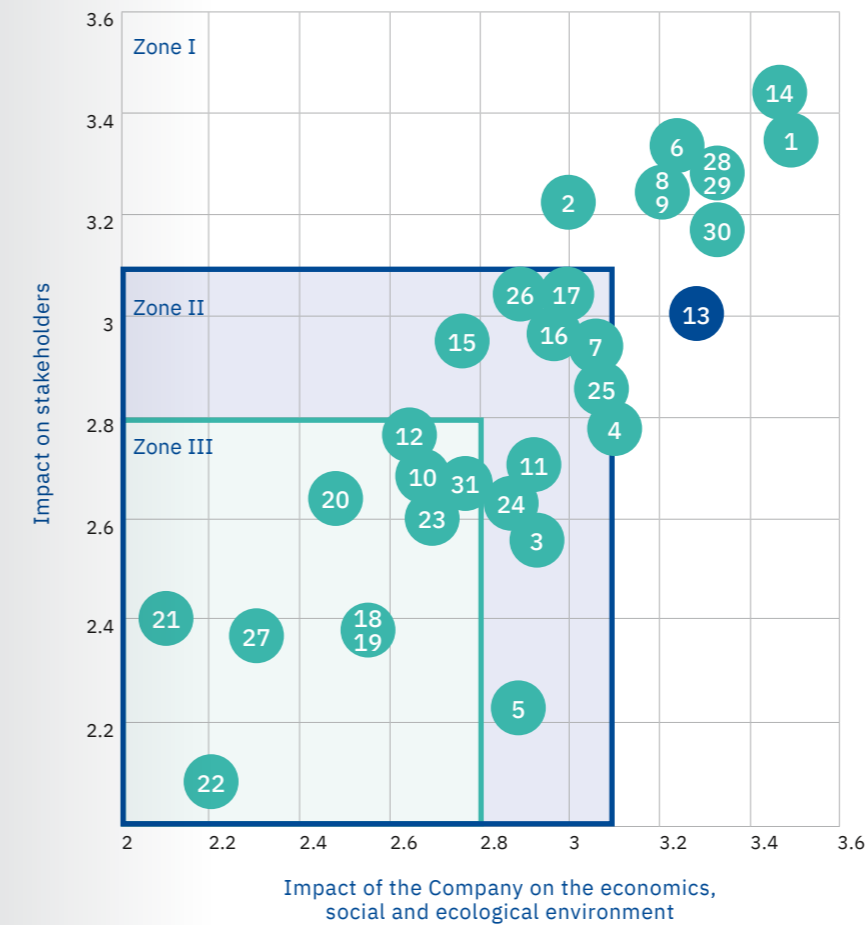
GRI 102-46

The material topics to be reflected in the report were identified during the report preparation. The works were performed as part of the communication with stakeholders based on Rapid Foresight technology. Materiality foresight was arranged in accordance with the GRI and International <IR> Framework procedures for defining the report content, on-line voting was used for the first time. The priority issues of the Report are defined by JSC ASE EC management and stakeholders' representatives in due course of material issues identification. Priority Topic of the Report – Engineering Division Transformation.

Table of disclosure of GRI SRS indicators, table of compliance with Standard <IR> (Appendix 1 of the Book of Appendices) contains information about 98 indicators on material topics.

GRI 102-47

Materiality matrix



Zone I – material topics mandatory for disclosure

- 1 NPP safety
- 2 Environmental and industrial safety at construction facilities
- 6 Ensuring of performance of the Company's obligations for the contracted projects
- 8 Reducing of time periods and cost of NPP construction
- 9 Portfolio of orders of the Company for the long-term perspective
- 13 Prioritized topic: transformation of the Engineering Division
- 14 Company's contribution into fulfillment of the "Digital economy of the Russian Federation" programme
- 28 Corporate culture : approach, norms, programmes, projects etc.
- 29 Company's compliance with up-to-date requirements set for engineering companies abroad
- 30 Safety Culture

Zone II – less material topics information for which is disclosed on the partial or selective basis

- 3 Management of industrial wastes during construction
- 4 Occupational health and safety
- 5 NPP Decommissioning projects
- 7 Development of the project management system
- 11 Improvement of operational effectiveness and labour efficiency
- 15 Division's compliance with the international agenda in the area of sustainability
- 16 Company's complex economy efficiency
- 17 Company's impact on the social economic development of the regions of operations
- 24 Company's fulfillment of regulatory requirements in the area of sustainability
- 25 Decent labour conditions and observance of employees' rights
- 26 Company's personnel's retraining

Zone III – less material topics information for which is disclosed on the partial or selective basis

- 10 Implementation of innovation projects
- 12 Company's intellectual property
- 18 Procurement management and countermeasures to the anti-competitive behavior
- 19 Anti-corruption Policy
- 20 Rational use of natural resources
- 21 Company's impact to biodiversity in the regions of operation
- 22 Emissions of greenhouse gases and other harmful substances
- 23 Suppliers and contractors evaluation in line with sustainability requirements
- 27 Observation of human rights during the Company's projects implementation
- 31 Responsible chain of supplies

Table 25.
Comparison of material topics with GRI SRS standards

MATERIAL TOPICS	COMPLIANCE WITH GRI STANDARDS
NPP safety	103, 416
Environmental and industrial safety at construction facilities	103, 301, 303, 304, 306, 307, 403
Ensuring of performance of the Company's obligations for the contracted projects	103
Reducing of time periods and cost of NPP construction	103
Portfolio of orders of the Company for the long-term perspective	103
Engineering Division's transformation	103
Company's contribution into fulfillment of the "Digital economy of the Russian Federation" programme	103
Corporate culture : approach, norms, programmes, projects etc.	103, 404, 406, 407
Company's compliance with up-to-date requirements set for engineering companies abroad	103, 204, 413
Safety culture	103

Report verification

GRI 102-56

Independent auditor FBK, LLC was invited for checking the non-financial information in the Report. Assurance report can be found in Appendix 3 of the Book of Appendices.

The Report was subject to public/stakeholder verification procedures aimed at checking materiality and completeness of the reporting data and the Company's response to stakeholders' requests. Conclusion is given below.

The Report was subject to public/expert verification by Non-Financial Reporting Board of the Russian Union of Industrialists and Entrepreneurs and Russian Integrated Reporting Framework. Conclusions can be found in Appendices 4 and 5 of the Book of Appendices.

An internal audit of the process of elaboration of integrated public annual report of the Engineering Division for 2018 was performed. Conclusion of the Internal Audit can be found in Appendix 2 of the book of Appendices.

Disclaimer on Disclosure of Forecasted Data

The Report contains statements of forecast nature with regard to production, financial, economic, social and other indicators characterizing further development of the Company. Implementation of plans and intentions depends on the changing political, economic, social and legal situation in Russia and worldwide. In this connection, the actual performance results in subsequent reports may differ from the forecasted ones.

Interaction during the Report Preparation

GRI 102-43, 102-44

During the preparation of this Report, public consultations and two dialogues with representatives of the main stakeholders were held.

A dialogue for determining the important subjects to be reflected in the Report was held in JSC ASE EC Moscow Branch Office on 13.11.2018. The dialogue was held with application of Rapid Foresight technology which made it possible to perform a full cycle of works for the development of matrix of significance as a result of joint work of the Company top-management and representatives of the main stakeholders.

A dialogue for determining the priority subject to be reflected in the Report (Engineering Division Transformation) was held in JSC ASE EC Moscow Branch Office on 26.02.2018.

Public consultations on draft report were held on 23.04.2018 in JSC ATOMPROEKT (St. Petersburg) with participation of JSC ASE EC Moscow Branch via video-conference.

In the course of dialogues during the report preparation, the stakeholders put forward 60 proposals and recommendations, 78% of which were requests for publication of certain information in the Report. Proposals related to the activities of the Company were submitted to appropriate structural divisions. The company has responded to recommendations on the draft report (about the structure, contents and format of the reporting documentation).

In total 84% of proposals were taken into account; 3% were not taken into account (argued answers were provided); 13% of proposals of the stakeholders will be taken into account or reviewed during the preparation of reports for the next reporting periods.

Table 26.
Consideration of the experts' recommendations (upon conclusion by the Russian Union of Industrialists and Entrepreneurs)

No.	RECOMMENDATIONS	INFORMATION TO BE CONSIDERED
1	The Report provides information about the correlation between the Companies activities and the UN Sustainable Development Goals. It is recommended to expand the coverage of this topic in the future, to compare the goals of the Division with the global goals and reflect the correlation between the achieved results and the Sustainable Development Goals-2030, considering the growing interest in this subject worldwide.	Shall be considered in the reports of the next years
2	It is recommended to provide more details and more qualitative indicators when covering the expected impacts of the designed facilities on the economic and social sphere and on the environment.	Partially considered
3	It is recommended to pay more attention to human rights issue in business activities, not limiting to compliance with employment rights. This is especially important for a Company working in more than 20 countries, considering the importance of this subject in the global agenda.	Shall be considered in the reports of the next years
4	As the Report uses the concept of capitals and highlights the results of the Company's activity via their development, it is recommended to use a uniform structure of information disclosure on management of different types of capital.	Considered
5	It is advisable to reflect information on international and national initiatives in the field of corporate responsibility and sustainable development in which the Company participates.	Shall be considered in the reports of the next years
6	It is recommended to follow the principle of balance of information, to pay more attention to challenges of sustainable development management which the Division face.	Shall be considered in the reports of the next years

Table 27.
Obligations for consideration of proposals made by representatives of the stakeholders in the course of dialogues during the preparation of reports of previous years

No.	RECOMMENDATIONS	INFORMATION TO BE CONSIDERED
1	Demonstrate global industry picture of the Company's competitive advantages in digitalization.	Considered
2	Demonstrate how intellectual property is capitalized, its influence on the business value and business-model (should be reflected visually).	Shall be considered in the reports of the next years
3	Describe how equipment suppliers who are beyond the management scope of Rosatom State Corporation, get interface with Multi-D and Information Management System (IMS).	Considered
4	Analyze the structure of the Division personnel with a break-down by competences and specialties, compare its results with the university specialties. Reflect the work of the Division related to personnel training.	Partially considered
5	Disclose information about the scope of intellectual deliverables as a result of joint work with universities.	Shall be considered in the reports of the next years
6	Add information about teaching personnel anti-corruption procedures.	Not considered
7	Describe the number of digital platforms in the Company, if there are several of them — their interrelation.	Considered
8	Add information about cases for using Multi-D, taking Rosatom Production System (RPS) as a basis.	Considered
9	Disclose the results of application of Multi-D in the Division, in digital values (deadlines, cost, processes, expenses), quote cases.	Considered
10	The annual report and the communications plan of the Division shall contain the effective, not technical part of Multi-D introduction.	Considered
11	Formulate the advantages of Multi-D as a flagship project of the nuclear industry in the field of digitalization, demonstrate the platform character of Multi-D and the possibility of its transfer to other areas (space, digital cities, etc.).	Considered
12	Describe how the business-model will change due to the commenced processes of digital transformation.	Considered
13	Specify which requirements are put to designers and environmental specialists in view of modern environmental quality management.	Considered

Table 28.
Consideration of proposals made by representatives of the stakeholders in the course of dialogues during the preparation of 2018 report

Stakeholders' proposals and comments	The Company's Response
Specify the parameters of respondent selection during survey on safety culture, specify whether the poll was voluntary.	Considered. Information has been sent to the relevant address, it will not be disclosed in the Report in detail.
Reflect the functions of risk management in safety culture.	Considered. Information has been sent to the relevant address, it will not be disclosed in the Report in detail.
Reflect the development of horizontal interaction (e.g., provide information about the workers' initiatives).	Considered. Information has been sent to the relevant address, it will not be disclosed in the Report in detail.
Reflect, apart from the time frame and cost of transformation, the criteria for its implementation, e.g. KPI system.	Partially considered
Tell about the combination of safety culture and general safety.	Considered
Clarify how the employees' qualification assessment contributes to ensuring the safety of facilities under construction.	Considered
Explain the correlation and succession between the strategy of digital transformation of the Company (including the implementation of Multi-D and establishment of a platform of NPP digital twins) and the Division transformation on the whole.	Shall be considered in the reports of the next years
Provide information about the time frame of transformation in the division, the scope of the planned changes, describe which trends or challenged the changed are aimed at.	Partially considered
Include the description of methodological and methodical issues of safety culture development (regulatory control, statistics, assessment of results, etc.).	Considered
Describe horizontal interactions in the Engineering Division.	Considered
Specify the concept of the Transformation that is under way: what is prioritized — standardization and typification of management functions and processes or development of the company's flexibility and ability to adapt itself to different situations in regions of operation.	Considered
Describe production system and quality management system of the Company.	Considered
Reflect a more explicit position and the interests of stakeholders in three spheres of the Company's influence (economy, environment and society).	Considered
Tell in more detail the practice of communicating the safety rules and safety culture tools to contractors and suppliers.	Shall be considered in the reports of the next years
Add more information about priority projects, goals and stages of the Transformation.	Shall be considered in the reports of the next years
Explain what the Company expects from Transformation, how the Transformation results are assessed.	Considered
Add information about the connection between safety culture development and the specific results, as well as safety enhancement works in the reporting year. The Report should demonstrate that safety culture works must bring about changes in business-processes and management systems of the Company.	Considered
Reflect more clearly the risks in the field of digitalization (digital transformation).	Partially considered
Take into account the public requirements to reporting — conciseness, clearness and style.	Considered
Add pictures demonstrating the technical achievements during NPP construction, pictures of workers involved in NPP construction.	Considered
Visual information, diagrams and information graphics on 3D modeling should be added to textual and statistical data of the Report, also to explain what is Multi-D approach.	Considered
Explain why the Division transformation is being implemented.	Considered

Stakeholders' proposals and comments

The Company's Response

All the activities of the Division including production activities should be visualized.	Considered
Demonstrate the results of digitalization of the Company activity as the recurring subject of the Report, in particular within the framework of capital management.	Partially considered
If possible, add to the Report different metrics and indicators of level of digitalization of the Company's activities (e.g., the number of services and functions that are automated and are implemented on the basis of data analysis, etc.).	Partially considered
Check the milestones in terms of their significance for the Company.	Considered
Check once again with Rosatom State Corporation (International Business Department) the data on NPP construction abroad.	Considered
Add case on virtual NPP into the section on digital and innovative products.	Considered
Reduce the size of interviews of top managers up to one page, move the textual part to the relevant sections of the Report.	Not considered. Managers' interview cover the strategic approaches to management (compulsory indicator GRI SRS)
The injuries section should contain the dynamics of indicators for three years in physical expression.	Considered
Reflect measures for prevention of injuries.	Considered
Add the list of major fields of R&D in the Company.	Considered
Move information on BR-1200 and Brest-300 projects to Innovations sections as prospective projects.	Considered
Add information about cooperation with research institutes and universities (p. 74) specifying the projects, volumes of financing over time.	Partially considered
Add to the report information about the Company work with intellectual capital, in particular, provide information about the number of R&D reports, publications, thesis defended by the Company's employees, the number of patents.	Partially considered
Add information about the share of assets (the value) of the Company that form the results of intellectual property (p. 81).	Not considered. The results of evaluation of intellectual property are commercial secret.
Add information about the target training of the personnel, in particular, how many were trained and how many were employed by the Company in the reporting year (p. 108).	Considered
Add information about the introduction of intellectual activities results.	Shall be considered in the reports of the next years (in long-term perspective)
Reflect information whether and how the Company participates in WorldSkills program.	Considered
The Report says that the Company owns category 1 facilities in terms of environmental impact — it is necessary to clarify whether it is true.	Considered
Increase the amount of quantitative data about the Company's impact on water resources, in particular, about the amount of wastewater discharge.	Considered
Explain the consequences of restructuring (integration) of design institutes for the Company's activities and distribution of resources among the projects (p. 66).	Considered
Add information about the projects implemented by the Company where Multi-D is applied, specify how the technology is applied (p. 70).	Considered
Explain the reasons, the problems and organizational status that resulted in transformation.	Considered
Supplement the Strategy section not only with SWOT-analysis, make an introduction to the topic "Company's strategizing". Clarify information about the shortage of the Russian budget in the provided PEST-analysis.	Considered
Provide information about the relation between achievement of Rosatom strategic goals and capital management in the Company (p. 19).	Considered

Stakeholders' proposals and comments

Double-check the information about the calculation of materiality matrix of the topics to be disclosed in the Report; explain why topic No. 14 (Contribution to Development of Digital Economy in RF) is above No. 1 (NPP Safety).

The Company's Response

Considered.
The materiality matrix was developed upon the results of the dialogue for determining the significant topics for the annual report that was held in November 2018 using Rapid Foresight technology and on-line voting. The location of significant topics in the materiality matrix was checked: it was based on realistic assessments given by the managers of the Division and the stakeholders during the dialogue; the participants of the dialogue verified the materiality matrix provided in the Report.

Explain the logic of the current hierarchy of the stakeholders in the Stakeholders Map.	Considered
Explain why the expenses for training are two times less than the expenses for charity.	Considered. Explanations provided. The Division expenses for employees' training and for charity are approved by Rosatom State Corporation.
If possible, assess all the types of capital in terms of their contribution to the Company's revenue.	Shall be considered in the reports of the next years.
Add parties to agreements concluded by the Company, explain how these agreements influence the management of the Company's capital.	Shall be considered in the reports of the next years.
Add explanation of the used terms and abbreviations to the Glossary.	Shall be considered in the reports of the next years and in the interactive version for 2018.
Consider the possibility of adding an aggregate impact index on the Company's capitalization for different types of capitals, in comparison with the previous years.	Shall be considered in the reports of the next years, provided an international or a Russian method of assessment of capitals impact on the Company's capitalization is developed.
If possible, increase retrospective of quantitative data up to 5 years.	Partially considered. In accordance with the requirements of international standards, retrospective is provided for two years back in relation to the reporting period. Data for earlier reporting periods can be found in annual reports of the previous years on the Division web-site: www.ase-ec.ru/sustainability/public-reporting/reports
Emphasize the unique character of Multi-D program.	Considered
The Occupational Safety section of the Report shall reflect quantitative data on injuries and describe the safety days that are organized (p. 116).	Considered
The Social Policy section of the Report shall reflect the events organized within the framework of AtomNEXT Forum.	Shall be considered in the reports of the next years.
Reflect the changes of requirements to personnel due to transformation and digitalization of the industry, if a shortage of qualified personnel is predicted for the nearest years, what measures are taken by the company to compensate these risks.	Considered
Give the sustainable development agenda in more detail.	Considered
Add information about the Company's work with local communities in the regions of operation.	Considered

Conclusion on the Public/ Stakeholders' Assurance of the Report

Introduction

The Engineering Division of Rosatom provided us with an opportunity to assess the Annual Report for 2018 (hereinafter referred to as the Report) including the completeness and materiality of the information provided therein and the Company's response to stakeholders' requests. For this purpose our representatives were given an opportunity to participate in public consultations on the draft Report which took place on 23.04.2019 and in two dialogues with stakeholders:

- dialogue for identification of material subjects to be reflected in the Report on 07.11.2018;
- dialogue on priority topics of the Report on 26.02.2019.

Report Assessment Procedure

Our conclusion is based on a comparative analysis of two versions of the Report (draft Report for public consultations and the final version of the Report) and the materials provided to us upon the results of the dialogues and consultations with stakeholders (protocols of the events, tables of comments of the stakeholders taken into account) and on the comments received from the management and the employees of the Engineering Division in the course of events related to the public assurance of the Report.

Checking of the system of information collection and information analysis as well as the reliability of the actual and forecasted data provided in the Report was beyond the tasks of the public assurance.

All participants of the public assurance had every opportunity to openly express their opinions. We have not received any remuneration from the Company for participation in the public assurance procedure.

Assessments, comments and recommendations

We are unanimous in a positive assessment of the Report – its format and the scope of information provided. The integrated character of the Report made it possible to fully disclose the reporting information about the results of the main activities of the Company, its effective performance in the field of sustainable development, strategy and plans for the future.

The Report was prepared under a broad framework: it includes reporting information of all the key companies of the Division (JSC ASE EC, JSC ASE, JSC "Atomenergoproekt" and JSC ATOMPROEKT) and a number of subsidiary companies in its scope of management.

The Engineering Division is involved in activities in many countries worldwide. That's why it is of extreme importance for the Company to prepare reports using international standards, use digital means of communication and be maximally transparent, also for representatives of its foreign stakeholders.

The report was prepared in accordance with the International <IR> Framework, AA1000 series of standards (Institute of Social and Ethical AccountAbility), Global Reporting Initiative sustainability reporting standards (GRI SRS, Comprehensive option).

In 2019, the Company continued the practice of dialogues with the stakeholders at construction sites and in design institutes. All the public consultations were held in St. Petersburg design institute; JSC ASE EC Moscow Branch participated via video-conference. The selection of the institute was not a random choice. The Engineering Division transformation envisages the integration of the design institutes. We recommend continuing the practice of dialogues and public consultations in the Company's organizations; we believe it is very efficient.

We believe that the selection of priority topics for the report was correct. We recommend disclosing in detail the subject of transformation and digitalization of the Division in future reports.

The Report showed commitment to sustainable development goals up to 2030 approved by the United Nations Organization (UN) and demonstrated the contribution of the Engineering Division into the achievement of these goals. We recommend justifying the selection of sustainable development goals, a more detailed explanation of connection between the strategic goals of the Division with the UN goals.

We point out with satisfaction that the Engineering Division, being one of the leaders of corporate reporting, continues to seek the most efficient and useful types of reports for its stakeholders. We hope to see the analysis of this pilot project in the next Report and the Company's decision to continue this practice.

We express the hope that resolving the goals of transformation of the Engineering Division into a digital company in the nearest future the Company will make its contribution to digitalization of reporting processes and relations with the stakeholders.

Materiality and Completeness of Information

We believe that the Engineering Division has considered the requirements of international standards for determination of materiality. To define material issues, Rapid Foresight technology was used for the third time. It allowed the top-management of the company and representatives of the stakeholders to implement, within a short time (at one event), a full cycle of works to develop the materiality matrix.



The selected material issues were comparable with the issues of GRI SRS. Information on material issues provided in the report is sufficiently complete. All important information on high-priority topics of the Report – “Transformation of the Engineering Division of Rosatom State Corporation into a digital company” and “Personnel Training and Development under digital transition conditions” is disclosed.

In our opinion, the Division strictly follows the principles of materiality and conciseness of the reporting information which has a positive effect on the scope of the Report and the significance of the reported information.

Response to stakeholders' requests

During the preparation of the report, the Company demonstrated readiness for an open discussion with the stakeholders on various fields of its activities. Most of recommendations to the Draft Report were taken into account, or the Company undertook the obligation to consider them in its future reporting cycles. The Report also contains information about the fulfillment of the obligations undertaken by the company in the previous reporting cycles which sets a good example for other companies.

The policy of dialogues pursued by the Company is a good example of improving the level of transparency of the company both in public reporting and on the whole for enhancing the public acceptance of nuclear technologies development.

We hope that the Engineering Division will continue pursuing the policy of information transparency in all the important public issues of the fields of the Company's activities and that it will improve the mechanisms of public reporting every year.

A.I. Ageev
 Director General of Institute for Economic Strategies of Russian Academy of Sciences

P.A. Belousov
 Director of Internet-School of CIS and working group for personnel training for CIS-member states in Council for Cooperation in the Field of Use of Atomic Energy for Peaceful Purposes in the CIS Integration Committee



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 Director of Ecological Projects Consulting Institute, Head of international ecological projects, member of Rosatom State Corporation Public Council



E.V. Kochergina
 Chairman of JSC ASE EC Trade Union Committee



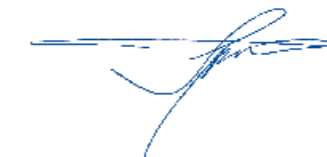
S.Y. Nakvasin
 Director for Research Competence and Technical Capacities Development, Autonomous Non-commercial Organization “Data Economy”



D.I. Pokrovskaya
 Deputy Director for Ecology, Institute of Ecology



A.V. Putilov
 Dean of Department of Business-Informatics and Integrated Systems Management, National Research Nuclear University MEPhI



S.S. Golovachev
 Adviser of Communications Department, member of Sustainable Development Expert Council



A.V. Timonov
 Director of Communications Department JSC “Rosenergoatom”



Glossary

Avant-project — research activities for justification of engineering method and feasibility of R&D aimed at achievement of technical leadership of the industry. The result of an avant-project is justified Terms of Reference (ToR) for R&D performance.

Back-end — the final stage of life cycle of nuclear facilities and materials.

VVER-TOI — typical optimized digital design of a two-unit nuclear power plant complying with the nuclear and radiation safety requirements.

Data-centric architecture — information arrangement and storage method in which the elements of storage and processing are separate databases and links. Alternative to data-centric architecture is document-centric system in which the element of storage and processing is a document.

Coolant supercritical parameters — the reactor coolant outlet temperature (5400C) and pressure exceeding 24 MPa.

Engineering — engineering and consulting services of design, calculation and analytical character, development of projects feasibility studies, recommendations in the field of production and management organization, i.e. the whole scope of commercial services for arrangement and support of the process of manufacture and sales of products, service and operation of industrial, infrastructural and other facilities.

Metadata — data that provide information about other information or data, additional information about the contents or the object. Metadata disclose information about the features and properties characterizing some substance, making it possible to automatically trace and manage them in large data flow.

Ontology (in system engineering) — explicit specification of conceptualization where conceptualization means a description of a set of objects and relations between them. Formally, ontology is related to definitions of terms organized in a taxonomy, their description and rules of arrangement. Ontology is a mathematical description of knowledge and its use for storage, processing, analysis and integration of information.

Obeya — in Japanese means “Big room or big conference hall” where work is coordinated and decisions are taken. Obeya room is a humanistic approach to new products development.

Proprietary software (PS) — software which is private property of the software developers or copyright holders that does not meet the criteria of free software (the availability of an open source code is not sufficient) The copyright holder of proprietary software retains the exclusive privilege for use, fully or in significant aspects. Normally, proprietary software means any non-free software, including semi-free software.

Sustainable development — international agenda of business participation in harmonious development of economic, environmental and social aspects of social life which is classified as such development that meets the needs of the present without compromising the ability to meet the needs of future generations.

UN sustainable development goals — a collection of goals for international cooperation set by the United Nations General Assembly in 2015, containing 17 sustainable development goals and 169 relevant targets.

NPP Power Unit (power unit) — part of a nuclear power plant comprising main and auxiliary equipment, combined in a unified process system designed to generate electricity by using one or two turbines without heat generation or with heat generation by converting the nuclear fuel energy.

AA 1000 — a series of international standards aimed at improving the quality of reporting, transparency and sustainability of business due to maximal engagement of stakeholders and consideration of their opinion during the analysis of the company activity.

EPC Companies — companies implementing “turn-key” projects. The functions of an EPC companies include designing, procurement and construction.

EPCM Companies — companies using methods and means of portfolio management of “turn-key” projects. The functions of an EPCM company include designing, procurement, construction and project management.

GRI (Global Reporting Initiative) — initiative for reporting in the field of sustainable development.

INES (International Nuclear Event Scale) — international scale of nuclear incidents, a tool for defining the level of violations of nuclear and radiation safety.

International Project Management Association (IPMA Delta) Model — enhancing of effectiveness of the company design activities implemented in accordance with the best international practice in the field of project management. Confirmation of the company competence in the field of project management on the international level.

ISO — a series of international standards for company management system aimed at ensuring a predictable and stable level of quality.

ISO 9001 — international standard defining requirements to quality management system of products and services.

ISO 14001 — international standard of environmental management. It describes the main rules that a company may follow for establishment of an effective environmental management system.

LCOE (Levelized Cost of Electricity) — Levelized Cost of Electricity [KW·h] during the whole life cycles for generation of 1 KW·h, expressed in monetary unit. LCOE is determined as the unit cost of electricity, the sum of all the expenses (capital, operational, including the cost of fuel, treatment of spent nuclear fuel and radioactive waste, personnel expenses, NPP decommissioning and other costs) during the whole life of an NPP (considering the time value of money) in relation to the NPP capacity (design or actual capacity).

LTIFR (Lost Time Injury Frequency Rate) — occupational injuries frequency rate.

Multi-D — comprehensive industrial process Multi-D platform ensuring capital construction project management.

Rapid Foresight — technology which allows the people who participate in the foresight, to agree upon the future concept, their activities in relation to such future and their desired future. The method consists in joint work of the participants in a time map; work with images and diagrams instead of texts.

Worldskills — international non-commercial movement aimed at improving the profile and recognition of skilled people, development of professional education by harmonization of the best practices and professional standards all over the world by arrangement and conduct of professional skills contests.

Abbreviations

ARMS	— automated risk management system
NPP	— Nuclear Power Plant
LPNP	— low power nuclear plant
FNR	— fast neutron reactor
VVER	— water-water energetic reactor
IBD	— International Business Department of Rosatom State Corporation
SC	— subsidiary company
ISUP KS	— information management system of capital construction projects
RIMS	— resources information management system
KPI	— Key Performance Indicator
IAEA	— International Atomic Energy Agency
R&D	— Research and Development
NP	— non-commercial partnership
NF	— nuclear facilities
ICCC	— industry center of capital construction
DSW	— design and survey works
CMP	— construction management plan
RPS	— Rosatom Production System
RAW	— Radioactive Waste
RIA	— Results of the Intellectual Activity
CEW	— construction and erection works
FE	— financial estimate
PHRS	— passive heat removal system
PPE	— personal protective equipment
TG	— turbine generator
CER	— construction execution rules
FSUE	— Federal State Unitary Enterprise
FCSM	— Federal Commission of Securities Market
FFS	— Fresh fuel storage
SDG	— sustainable development goals
ETP	— electronic trading platform
BWR	— boiling water reactor
PWR	— pressurized water reactor
KPI	— key performance indicators
LWGR	— light water graphite reactor
PHWR	— pressurized heavy water reactor

List of Appendices

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