Transformation: 
Reloading

2018 
Annual Report
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.

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Company’s Background

International Footprint

2018 Milestones

Financial and Operational Highlights 2018

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10-year Portfolio of Overseas Orders (traditional products)

76.95 bln USD

21.51 bln RUR

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

Design of high-power NPPs

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

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

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 “Atomenergosproekt” (Moscow) and JSC ATOMPROEKT (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.

GRI 102-15a

The Division’s values correspond to those of Rosatom State Corporation:

- Safety
- Efficiency
- One step ahead
- Responsibility for the result
- One team
- Respect

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

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 102-13

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”;
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- Association of construction companies in the nuclear industry (ASKAD);
- Russian department of buildingSMART;
- International Federation of Consulting Engineers (FIDIC);
- Engineering Construction Risk Institute (ECRI).

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

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Company’s Background

International Footprint

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

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

- **Russia**
  - Novovoronezh NPP-2
  - Rostov NPP
  - Kursk NPP-2
  - Leningrad NPP-2

- **Austria**
  - Rooppur NPP

- **Belgium**
  - Belarus NPP

- **Bangladesh**
  - Rooppur NPP

- **Belarus**
  - Belarus NPP

- **Belgium**
  - Rooppur NPP

- **Belgium**
  - Rooppur NPP

- **Belgium**
  - Rooppur NPP

- **Belgium**
  - Rooppur NPP

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  - Rooppur NPP

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  - Rooppur NPP

- **Belgium**
  - Rooppur NPP

- **Belgium**
  - Rooppur NPP

- **Bulgaria**
  - Rooppur NPP

- **Hungary**
  - Paks II NPP

- **Germany**
  - Kudankulam NPP

- **Egypt**
  - Tianwan NPP

- **Japan**
  - Tianwan NPP

- **Kazakhstan**
  - Tianwan NPP

- **China**
  - Tianwan NPP

- **Lithuania**
  - Tianwan NPP

- **The UAE**
  - Tianwan NPP

- **Slovakia**
  - Tianwan NPP

- **Turkey**
  - Tianwan NPP

- **Ukraine**
  - Tianwan NPP

- **Finland**
  - Hanhikivi-1 NPP

- **Japan**
  - Hanhikivi-1 NPP
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.

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).
Company’s Background

Events after the Reporting Date

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.

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.

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.
### Financial and Operational Highlights 2018

#### Company’s Background

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.

#### Financial and Operational Highlights

- **2018**
  - 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.

#### Average Headcount (considering external part-timers), pers.

<table>
<thead>
<tr>
<th>Year</th>
<th>Headcount</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>16.8</td>
<td>+20.8%</td>
</tr>
<tr>
<td>2017</td>
<td>13.9</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>32.4</td>
<td></td>
</tr>
</tbody>
</table>

#### Number of New Jobs

<table>
<thead>
<tr>
<th>Year</th>
<th>Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>7.7</td>
</tr>
<tr>
<td>2017</td>
<td>2.7</td>
</tr>
<tr>
<td>2016</td>
<td>1.5</td>
</tr>
</tbody>
</table>

#### 10-year Portfolio of Overseas Orders (traditional products), mln USD

<table>
<thead>
<tr>
<th>Year</th>
<th>Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>76,950</td>
</tr>
<tr>
<td>2017</td>
<td>90,845</td>
</tr>
<tr>
<td>2016</td>
<td>92,344</td>
</tr>
</tbody>
</table>

#### Number of Power Units in the Company Portfolio*  

<table>
<thead>
<tr>
<th>Year</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>33</td>
</tr>
<tr>
<td>2017</td>
<td>33</td>
</tr>
<tr>
<td>2016</td>
<td>31</td>
</tr>
</tbody>
</table>

* 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.

#### Revenue, bln RUR

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>201.9</td>
</tr>
<tr>
<td>2017</td>
<td>176.2</td>
</tr>
<tr>
<td>2016</td>
<td>152.9</td>
</tr>
</tbody>
</table>

#### Number of Power Units in the Company Portfolio

- **2018**
  - Revenue amounted to 202 billion rubles.
  - The parameter had grown compared to 2017 by 15.2%.
  - The biggest contribution to the revenue was made by Rooppur NPP (Bangladesh), Kudankulam NPP (India) and Belarus NPP projects.

#### Benefits increase owing to the annual indexation of salaries.

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>3.85</td>
</tr>
<tr>
<td>2017</td>
<td>3.73</td>
</tr>
<tr>
<td>2016</td>
<td>3.30</td>
</tr>
</tbody>
</table>

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

#### Average Age of Employees, years

<table>
<thead>
<tr>
<th>Year</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>41</td>
</tr>
<tr>
<td>2017</td>
<td>41</td>
</tr>
<tr>
<td>2018</td>
<td>40</td>
</tr>
</tbody>
</table>

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

- 72% Rosatom State Corporation share of number of overseas reactors under construction
- 53% Rosatom State Corporation share of total number of reactors under construction
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.
Strategic Overview

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 the weight of the index 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: HRHelp@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.

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 synchro-nization 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.

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 interdivisional 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, about 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.

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.

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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.
11% Nuclear power accounted for about 11% of total energy consumption in 2018.

## 1.1.1. NPP Engineering and Construction Market

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

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).
Strategic Overview

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.

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. Amidst 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.

Leading countries in terms of operational nuclear power reactors

<table>
<thead>
<tr>
<th>Country</th>
<th>Reactors</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>50</td>
</tr>
<tr>
<td>France</td>
<td>46</td>
</tr>
<tr>
<td>China</td>
<td>37</td>
</tr>
<tr>
<td>Japan</td>
<td>23</td>
</tr>
<tr>
<td>Russia</td>
<td>18</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Country</th>
<th>Reactors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rosatom</td>
<td>66</td>
</tr>
<tr>
<td>Westinghouse</td>
<td>16</td>
</tr>
<tr>
<td>EDF/AREVA</td>
<td>11</td>
</tr>
<tr>
<td>KEPCO</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
</tr>
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</table>

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. Respectively 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 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 impacts 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 perspectives and aiming to achieve strategic goals. The Company’s business model is based on a long-term strategy.
Financial Capital

<table>
<thead>
<tr>
<th>Financial</th>
<th>Investment</th>
<th>Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit</td>
<td>375.2 mln RUR</td>
<td>27.5 mln RUR</td>
</tr>
<tr>
<td>EPS (RUR)</td>
<td>13.9 mln RUR</td>
<td>17.316 mln RUR</td>
</tr>
<tr>
<td>Dividend per share</td>
<td>5.9 mln RUR</td>
<td>264.13 mln RUR</td>
</tr>
<tr>
<td>Expenditures for the period</td>
<td>0.02 mln RUR</td>
<td>167.99 mln RUR</td>
</tr>
</tbody>
</table>

Manufactured Capital

He is one of the 100 most cited authors and 10,000 references. Quality Management Systems ISO 9001:2015

The total head count of personnel is 409,816.

Quality Management System ISO 9001:2015

Intellectual Capital

Innovators in R&D

0.08 mln

Number of inventors (in R&D)

5

Submissions to patents

26

Submitted scientific and technical reports for training

106

Human Capital

Foreign employees

14,463

Percentage of management employees

57

Percentage of employees covered by collective agreements

40

Number of employees

87,648

Employee turnover

0.86

Social and Relationship Capital

Number of employees covered by collective agreements

13,076

Number of years of employment

24.8

Number of collective agreements

13,076

Number of years of employment

24.8

Natural Capital

Note: data are for the last five years.

Surface area, including water bodies

27.6 mln ha

Area of protected areas

11.6 mln ha

Area of protected areas, including water bodies

127.3 mln ha

Water intake during NPP construction

4.73 mln m³

Amount of generated waste during NPP construction

351.8 mln m³

Table of Contents

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

**VVER-1000** (water type)

- 

**VVER-1200** (water type)

- 

**VVER-TOI** (atomic type)

- 

Construction of high-power NPPs on CPC

**EFPCO** terms and conditions

NPP design within the framework of Proryv Project

**BR-1200**

- 

**Break-300**

- 

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

Business Model

Index value as of 31.12.2017

Table of Contents

Revenue

2,781.4 mln RUR

EBITDA

17.97 %

Net profit

21.51 %

Expenditures for the period

263.30 mln RUR

Expenditures for the period

0.02 mln RUR

Investments

195.64 mln RUR

**Table of Contents**

Scientific community

96%

- 

National digital platform

75%

- 

Digital technologies for management Information systems management

8

- 

Financial Capital

Human Capital

Social and Relationship Capital

Natural Capital

Table of Contents

1. Shareholders

2. Management

3. Share (102-15)

4. Share of transparency (open procurement at the Electronic Trading Platform)

5. Manufacturing Capital

6. Intellectual Capital

7. Human Capital

8. Social and Relationship Capital

9. Natural Capital

10. Table of Contents

* Based on Rosatom’s Sustainable Development Goals.
Process model of the Engineering Division

1. External environment relations management
   - 1.01 International activity
   - 1.02 Technical control during companies management
   Relations management in the role of authorized body for nuclear power control
   - 1.10 Interaction with regional authorities, local communities and public organizations
   Relations management as an economic entity

2. Planning, coordination and development
   - 2.01 Strategic management
   - 2.02 Investment activity management
   - 2.03 Business development
   - 2.04 Medium-term planning
   - 2.05 Budgeting
   - 2.06 Operational activity coordination
   Setting and transmission of long-term goals
   Planning and analysis of goals achievement
   Development coordination

3. Safety and control
   - 3.01 Physical protection
   - 3.02 State secret protection
   - 3.03 Emergency prevention, evacuation of emergency consequences, ensuring emergency readiness and civil defense
   - 3.04 Safety management
   - 3.05 Managing foreign technical intelligence and technical information security
   - 3.06 Safety assurance of NPP use
   - 3.07 State security
   - 3.08 Interagency security and quality control
   - 3.09 Internal control and internal audit
   - 3.10 Assets protection
   - 3.11 Information security

4. Operational processes
   - 4.0.1 Design
   - 4.0.2 Equipment and materials procurement management
   - 4.0.3 Equipment and materials supply management
   - 4.0.4 Construction management
   - 4.0.5 Commissioning
   - 4.0.6 Project management
   - 4.0.7 Contract management during NPP construction in tanks
   - 4.0.8 Contract management during NPP construction abroad
   - 4.0.9 Radioactive waste management
   - 4.0.10 Decommissioning
   - 4.0.11 Designing and sales
   - 4.0.12 R&D
   - 4.0.13 Management of material and technical support
   - 4.0.14 Operational efficiency management
   - 4.0.15 Quality management
   - 4.0.16 Meterological support
   - 4.0.17 Non-core assets
   - 4.0.18 Standardisation

5. Supporting processes
   - 5.01 Treasury
   - 5.02 Corporate finance
   - 5.03 Risk management
   - 5.04 Legal support
   - 5.05 Corporate management
   - 5.06 Property management
   - 5.07 Administrative support management
   - 5.10 Information technology management
   - 5.11 Administrative control
   - 5.12 Procurement activity management
   - 5.13 Management of material and technical support categories
1.2 Risks and Opportunities

1.2.1. Risk Management System
1.2.2. Map of Risks and Opportunities
1.2 Risks and Opportunities

Risks and Opportunities

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.

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.

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.

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- Additional extended parametrical evaluation of NPP construction project risks in 7 NPP construction projects.

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

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

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Risk No.</th>
<th>Name of risk (risk factor)</th>
<th>Trend</th>
<th>Trend justification</th>
<th>Key activities on risk management and response to risks adopted in 2018</th>
<th>Risk management results in 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RISKS—THREATS</strong></td>
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<tr>
<td>Political risks (including the political and economic instability of the target markets and in RF)</td>
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<tr>
<td>Political risks (including the political and economic instability of the target markets and in RF)</td>
<td>19</td>
<td>Risk of violation of the RF international commitments</td>
<td>Introduced for the first time</td>
<td>The introduction of the risk is caused by separation of external and internal factors of political risks</td>
<td>Complete fulfillment of the RF international commitments.</td>
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<td>18</td>
<td>Risk of violation of the sanctions of foreign states</td>
<td>At the level of 2017</td>
<td>Maintaining the high level of risk of sanctions of foreign states by the USA and EU and retaliatory sanctions by Russia</td>
<td>In 2018, Engineering Division’s activities were not influenced by the risk.</td>
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<td>Reputational risks (change of perception, reliability and advantage of Rosatom State Corporation and its organizations and/or their products by stakeholders in comparison with the current or expected perception)</td>
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<td>20</td>
<td>Mass media publications (in RF and abroad) of articles discrediting Russian nuclear technologies in the traditional and prospective markets</td>
<td>At the level of 2017</td>
<td>The risk has remained unchanged. The global nuclear industry has not witnessed major nuclear incidents.</td>
<td>Organization of continuous informational exchange with mass media on the activities of the Division, organization of press-support of RF companies, and organization of PR-support of all important events.</td>
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<td>Commercial risks</td>
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<td>25</td>
<td>Risk of the contractual partners’ (external/internal) failure to fulfill their obligations in full scope within the established period of time (credit risk for suppliers and buyers)</td>
<td>At the level of 2017</td>
<td>The risk remained at the level of 2017</td>
<td>Measures undertaken to strengthen the positive public attitude towards development of the nuclear power industry through further impairment of the information transparency and open communication with all stakeholders.</td>
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<tr>
<td>Economic and financial risks</td>
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<td></td>
<td>26</td>
<td>Risk of unfavourable changes of currency rates (currency risk)</td>
<td>At the level of 2017</td>
<td>In 2018, the trend towards ruble weakening versus major currencies of the currency rates was not observed within 2018.</td>
<td>The Engineering Division was not exposed to negative influences in 2018.</td>
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</tbody>
</table>
Key activities on risk management and response to risks emerged in 2018. Risk management results in 2018

Within the reporting period, the Engineering Division did not influence the risk.

The risk was not realized in the Engineering Division.

The risk management system is implemented in NPP construction projects in RF. Complicated causative 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.

The risk management system for NPP construction in RF are fulfilled in full scope. Commissioning of Rostov NPP Unit 4.

Systematic work for implementation and practical application of:

- information management system for capital construction projects (IPMS-2);
- 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 (IUS-Quality);
- unified industry procedure for non-conformance control.

The risk management system was not influenced by the risk.

The risk was not realized in the Engineering Division.

The risk was not influenced by the risk.

The risk was not influenced by the risk.

The risk management results in RF were fulfilled in full scope.

Commissioning of Rostov NPP Unit 4.

Systematic work for implementation and practical application of:

- information management system for capital construction projects (IPMS-2);
- 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 (IUS-Quality);
- unified industry procedure for non-conformance control.

The risk management results in RF were not influenced by the risk.

The risk management results in RF were not influenced by the risk.

The risk management system was not influenced by the risk.

The risk management system was not influenced by the risk.

The risk was not realized in the Engineering Division.

The risk was not realized in the Engineering Division.

The risk was not realized in the Engineering Division.

The risk was not realized in the Engineering Division.

The risk was not realized in the Engineering Division.

The risk management system was not influenced by the risk.

The risk management system was not influenced by the risk.

The risk management system was not influenced by the risk.

The risk management system was not influenced by the risk.

The risk management system was not influenced by the risk.
1.3. Corporate Governance System of the Engineering Division

1.3.1. Corporate Governance in the Engineering Division’s Key Organizations

Corporate Governance

13 organizations within the Engineering Division management scope

Industry’s leading companies:
- JSC ASE EC
- JSC ASE
- JSC “Atomenergoproekt”
- JSC ATOMPLOEKT
1.3 Corporate Governance

**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 METSAMORENERGATOM 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).

**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.
1.3.2. Corporate Governance in the Engineering Division’s Key Organizations

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

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

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

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.

**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 at 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).

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 the internal documents and local regulatory acts of the Company.

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. 3.4.1 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 were: the 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 nor committed any transactions with the shares on 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: bd. 13, 18, Stromynka str, Moscow.

Non-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 share capital distributed between shareholders as follows: JSC ASE EC owns 99.999998% of shares, JSC “Atomenergoexport” owns 0.000002% 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 the 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.

JSC ASE EC general shareholders meeting

According to i. 12.1 of Article 12 of the JSC ASE EC Articles of Association, the meeting is the Company’s supreme executive body. 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 have not committed any 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. Barbanov Oleg Stanislavovich — Chairman of the Board of Directors, is not simultaneously the Company’s Executive Director.
2. Arseev Boris Nikolaevich.
4. Limarenkov 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. Vaslov Alexander Vyacheslavovich — as Chairman of the Board of Directors, is not simultaneously the Company’s Executive Director.
2. Baydarov Dmitry Yuryevich.
4. Limarenkov Valery Igorevich.
5. Borisov Ivan Alexeevich.

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

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 have not committed any 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.
Corporate Governance

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 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 NPP” (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.
- 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 Igorevich

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.
- 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.
- 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

<table>
<thead>
<tr>
<th>Name</th>
<th>Position and Key Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vyacheslavov, Alexander</td>
<td>Chairman of the Board of Directors</td>
</tr>
<tr>
<td>Limarenko, Valery</td>
<td>Deputy Director General for Strategy and Science</td>
</tr>
<tr>
<td>Borisov, Ivan</td>
<td>Director of Development and Restructuring (Development and International Business Unit)</td>
</tr>
<tr>
<td>Baydarov, Dmitry</td>
<td>Director of Development and Restructuring (Development and International Business Unit)</td>
</tr>
<tr>
<td>Paramonov, Dmitry</td>
<td>Director of Rosatom State Corporation</td>
</tr>
<tr>
<td>Barabanov, Oleg</td>
<td>Director of Rosatom State Corporation</td>
</tr>
<tr>
<td>Arseev, Boris</td>
<td>Director of Rosatom State Corporation</td>
</tr>
</tbody>
</table>

Date and place of birth

<table>
<thead>
<tr>
<th>Name</th>
<th>Date and place of birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vyacheslavov, Alexander</td>
<td>15.02.1985, Moscow</td>
</tr>
<tr>
<td>Limarenko, Valery</td>
<td>19.10.1960, Kharkov</td>
</tr>
<tr>
<td>Baydarov, Dmitry</td>
<td>11.09.1964, Penza-19 of Penza region</td>
</tr>
<tr>
<td>Paramonov, Dmitry</td>
<td>03.08.1968, Moscow</td>
</tr>
<tr>
<td>Barabanov, Oleg</td>
<td>17.12.1971, Moscow</td>
</tr>
<tr>
<td>Arseev, Boris</td>
<td>22.09.1971, Sverdlovsk</td>
</tr>
</tbody>
</table>

Education

<table>
<thead>
<tr>
<th>Name</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vyacheslavov, Alexander</td>
<td>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.</td>
</tr>
<tr>
<td>Borisov, Ivan</td>
<td>Higher, St. Petersburg State University.</td>
</tr>
<tr>
<td>Baydarov, Dmitry</td>
<td>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.</td>
</tr>
<tr>
<td>Paramonov, Dmitry</td>
<td>Higher, Doctor of Philosophy Moscow Aviation Institute; New Mexico University (Albuquerque, USA); New Mexico University (Albuquerque, USA); Pittsburgh University (Pittsburgh, USA).</td>
</tr>
<tr>
<td>Barabanov, Oleg</td>
<td>Higher, PhD in Economics, S. Ordzhonikidze Moscow State Geological Survey Academy; The Institute of Professional Accountants and Auditors; The Military Academy of the Russian Federation.</td>
</tr>
<tr>
<td>Arseev, Boris</td>
<td>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.</td>
</tr>
</tbody>
</table>

Job experience (latest 5 years)

<table>
<thead>
<tr>
<th>Name</th>
<th>Job Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limarenko, Valery</td>
<td>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 NIAEP. From October 2014 — President of JSC NIAEP.</td>
</tr>
<tr>
<td>Borisov, Ivan</td>
<td>From October 2014 – 07.12.2018 — President of JSC NIAEP.</td>
</tr>
<tr>
<td>Baydarov, Dmitry</td>
<td>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. From 2014 — Vice President for Development of JSC NIAEP. Since January 2017 — Director of Development and Restructuring of Rosatom State Corporation.</td>
</tr>
<tr>
<td>Arseev, Boris</td>
<td>February 2010 — February 2013 — Engineering Director; Sales Director, Commercial Director, Acting Director General of JSC Atomenergogash. February 2013 — November 2013 — Executive Vice President of JSC Rosatom Overseas. February 2014 — November 2016 — Director of International Business Development Department, Deputy Director General — Director for Business Development of JSC “Rosenergostat”. Since November 2016 — Deputy Director of Development and International Business Unit — Head of International Business Department of Rosatom State Corporation.</td>
</tr>
</tbody>
</table>
Joint-Stock Company “Atomstroyexport” (JSC ASE)

Corporate Governance

General Shareholders' Meeting
(the sole shareholder)

Board of Directors
(in charge of overall management)

Managing Company JSC ASE EC
(the powers of sole executive body — President)

Top managers and other employees

Resolutions including those in the area of economy, environmental protection, social benefits are binding for the Company's President.

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.


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.

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
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.

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

Table of Contents
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. 7702/1060 dd. 19.12.2018 between JSC ASE and JSC SEZAM.


NUKEM Technologies GmbH (Germany).

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


JSC ASE share in the charter capital of Atomstroyexport-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 2,267,011.14% (100% minus 1 share).


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.
Corporate Governance

Brief backgrounds of members of JSC ASE Board of Directors

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARSEEV Boris Nikolayevich</td>
<td>Chairman of the Board of Directors</td>
</tr>
<tr>
<td>VLASOV Alexander Vyacheslavovich</td>
<td></td>
</tr>
<tr>
<td>SAVUSHKIN Vladimir Nikolaevich</td>
<td></td>
</tr>
<tr>
<td>BAYDAROV Dmitry Yuryevich</td>
<td></td>
</tr>
<tr>
<td>VIKHANSKY Nikolay Igorievich</td>
<td></td>
</tr>
<tr>
<td>BARABANOV Oleg Stanislavovich</td>
<td>(was a Board of Directors member until 27.06.2018, Chairman of the Board)</td>
</tr>
<tr>
<td>PODOROV Nikolay Grigorievich</td>
<td>(was a Board of Directors member until 31.10.2018)</td>
</tr>
</tbody>
</table>

Date and place of birth

<table>
<thead>
<tr>
<th>Name</th>
<th>Date and place of birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARSEEV Boris Nikolayevich</td>
<td>22.09.1971, Sverdlovsk</td>
</tr>
<tr>
<td>VLASOV Alexander Vyacheslavovich</td>
<td>10.02.1985, Moscow</td>
</tr>
<tr>
<td>SAVUSHKIN Vladimir Nikolaevich</td>
<td>23.05.1954, Moscow</td>
</tr>
<tr>
<td>BAYDAROV Dmitry Yuryevich</td>
<td>11.09.1966, Penza-19 of Penza region</td>
</tr>
<tr>
<td>VIKHANSKY Nikolay Igorievich</td>
<td>01.01.1984, Schelkovo, Moscow region</td>
</tr>
<tr>
<td>BARABANOV Oleg Stanislavovich</td>
<td>17.12.1971, Moscow</td>
</tr>
<tr>
<td>PODOROV Nikolay Grigorievich</td>
<td>19.06.1967, Gor’ky</td>
</tr>
</tbody>
</table>

Education

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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>VLASOV Alexander Vyacheslavovich</td>
<td>Higher, Moscow Engineering Physical Institute, Moscow State Institute of International Relations under MIA of Russia.</td>
</tr>
<tr>
<td>SAVUSHKIN Vladimir Nikolaevich</td>
<td>Higher, Moscow Mechanical Institute, The All-Union Order of People's Friendship Academy of Foreign Commerce.</td>
</tr>
<tr>
<td>BAYDAROV Dmitry Yuryevich</td>
<td>Higher, PhD in Law, Pensk/Physical 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.</td>
</tr>
<tr>
<td>VIKHANSKY Nikolay Igorievich</td>
<td>Higher, Lomonosov Moscow State University.</td>
</tr>
<tr>
<td>PODOROV Nikolay Grigorievich</td>
<td>Higher, N.I. Lobachevsky Nizhny Novgorod State University.</td>
</tr>
</tbody>
</table>

Job experience (latest 5 years)

<table>
<thead>
<tr>
<th>Name</th>
<th>February 2010 — February 2013 — Engineering Director, Sales Director, Commercial Director, Acting Director General of Atomenergomash JSC. February 2013 — November 2013 — Executive Vice President of Rosatom Overseas JSC. February 2014 — November 2016 — Director of International Business and Development Department, Deputy Director General — Director for Business Development of JSC “Rosatomzavodostroitel”. Since November 2016 — Deputy Director of Development and International Business Unit — Head of International Business Department of Rosatom State Corporation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLASOV Alexander Vyacheslavovich</td>
<td>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: First Deputy Director — Deputy 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),</td>
</tr>
</tbody>
</table>
| PODOROV Nikolay Grigorievich | N.G. Podorov has been employed in JSC ASE JSC since April 2011 till the present time: }
Joint-Stock Company “Atomenergoproekt” (JSC “Atomenergoproekt”) Corporate Governance

4 meetings
5 issues considered

23 meetings
36 issues considered

General Shareholders’ Meeting
(highest governance body of the Joint-Stock Company)

Board of Directors
(in charge of overall management)

Top managers and other employees

Resolutions including those in the area of economy, environmental protection, social benefits are binding for the Company’s President.

Managing Company JSC ASE EC
(the powers of the sole executive body)

Organizes execution of the management bodies’ resolutions by issuing task orders, administrative and executive orders, by delegating powers by means of the power of attorneys.

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


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.
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).

GRI 102-5

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”.

SINITSIN Vladimir Victorovich
Director for Economy and Finance of JSC “Atomenergoproekt”.

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.


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.
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).
Corporate Governance

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 99.999999935%) and JSC ASE EC (1 share, which is 0.000000065%) 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 0.00000002%.

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

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.

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.

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.

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.
**Corporate Governance**

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Date and place of birth</th>
<th>Education</th>
<th>Job experience (latest 5 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POLYAK Igor Efimovich</strong></td>
<td>Deputy Head of Capital Construction Division of JSC ASE EC</td>
<td>1958, settlement Shalakushi of Nyandomsky district, Arkhangelsk region</td>
<td>Higher, Togliatti Polytechnic Institute.</td>
<td>2007–2015 — Head of Capital Investment and Accounting Division. Since February 2015 — Deputy Head of Capital Construction Division of JSC ASE EC.</td>
</tr>
</tbody>
</table>
Joint-Stock Company Scientific Research and Design Institute for Energy Technologies ATOMPROEKT (JSC ATOMPROEKT) Corporate Governance

Shareholders’ general meeting (highest governance body of the Joint-Stock Company)

Resolutions including those in the area of economy, environmental protection, social benefits are binding for the Company’s President

Board of Directors (in charge of overall management)

Managing Company — JSC ASE EC (carries out the powers and authority of the sole executive body (Director General))

Top managers and other employees

Organizes execution of the management bodies’ resolutions by issuing task orders, administrative and executive orders, by delegating powers through the institute of the power of attorneys.

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

2 meetings in the form of joint attendance
3 issues considered

20 meetings in the form of absentee voting
31 issues considered

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.

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

Corporate Governance

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).

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. 3) acted within the period during 2018:
- Buzharov Nikolay Alexandrovich,
- Kazarin Alexander Mikhailovich,
- Novikova Olga Konstantinovna,
- Ilyinsky Konstantin Mikhailovich,
- Shafalovich Natalia Borisovna.

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.

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

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.

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

<table>
<thead>
<tr>
<th>Member</th>
<th>Date and place of birth</th>
<th>Education</th>
<th>Job experience (latest 5 years)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Member</th>
<th>Date and place of birth</th>
<th>Education</th>
<th>Job experience (latest 5 years)</th>
</tr>
</thead>
</table>
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
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

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.

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).

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.

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

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

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).

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

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).

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.

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

**Revenue, bln RUR**

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>201.9</td>
<td>175.2</td>
<td>152.9</td>
</tr>
</tbody>
</table>

+15.2%  
+3.4%  
−24.8%  

**Commercial costs, bln RUR**

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.0</td>
<td>4.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

−24.8%  
+3.4%  

**Net profit, bln RUR**

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>21.51</td>
<td>5.59</td>
<td>4.89</td>
</tr>
</tbody>
</table>

+285.0%  
++20.6%  

**Gross profit, bln RUR**

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>29.6</td>
<td>21.6</td>
<td>20.9</td>
</tr>
</tbody>
</table>

+36.8%  
+36.8%  

**Manufacturing costs, bln RUR**

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>44.4</td>
<td>27.4</td>
<td>23.6</td>
</tr>
</tbody>
</table>

+62.4%  
+62.4%  

**Management costs, bln RUR**

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.3</td>
<td>8.6</td>
<td>8.1</td>
</tr>
</tbody>
</table>

−2.7%  
+2.5%  

**Foreign projects portfolio, bln USD**

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>76.95</td>
<td>90.85</td>
<td>92.34</td>
</tr>
</tbody>
</table>

−15.4%  
+1.0%  

**GRI 102-7**

**Revenue, bln RUR**

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>201.9</td>
<td>175.2</td>
<td>152.9</td>
</tr>
</tbody>
</table>

+15.2%  
+3.4%  
−24.8%  

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

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16.8</td>
<td>13.9</td>
<td>32.4</td>
</tr>
</tbody>
</table>

+20.6%  
+20.6%  

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

<table>
<thead>
<tr>
<th>Year</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.85</td>
<td>3.73</td>
<td>3.30</td>
</tr>
</tbody>
</table>

+3.4%  
+2.5%  

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

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.

### 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.

### Table 2.

<table>
<thead>
<tr>
<th>Name of the company</th>
<th>2016 % to be received</th>
<th>2016 % to be paid</th>
<th>Balance, %</th>
<th>2017 % to be received</th>
<th>2017 % to be paid</th>
<th>Balance, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSC ASE EC</td>
<td>76</td>
<td>28</td>
<td>48</td>
<td>99</td>
<td>631</td>
<td>0</td>
</tr>
<tr>
<td>JSC ASE</td>
<td>1,634</td>
<td>2,979</td>
<td>-1,344</td>
<td>3,376</td>
<td>1,339</td>
<td>2,038</td>
</tr>
<tr>
<td>JSC &quot;Atomenergoenergo&quot;</td>
<td>211</td>
<td>974</td>
<td>-763</td>
<td>94</td>
<td>1,203</td>
<td>-1,110</td>
</tr>
<tr>
<td>JSC ATOMPROEKT</td>
<td>17</td>
<td>213</td>
<td>-196</td>
<td>16</td>
<td>534</td>
<td>-518</td>
</tr>
<tr>
<td>JSC &quot;NIKIMT-Atomstroy&quot;</td>
<td>47</td>
<td>5</td>
<td>43</td>
<td>13</td>
<td>103</td>
<td>-89</td>
</tr>
<tr>
<td>Trest RosSEM Ltd</td>
<td>2</td>
<td>143</td>
<td>-124</td>
<td>27</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>PJSC ESM</td>
<td>20</td>
<td>143</td>
<td>-124</td>
<td>27</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>NUKEM Technologies GmbH, NUKEM Technologies Engineering Services GmbH</td>
<td>0</td>
<td>545</td>
<td>345</td>
<td>5</td>
<td>689</td>
<td>-681</td>
</tr>
<tr>
<td>TOTAL IN THE DIVISION (minus % on intra-group loans)</td>
<td>943</td>
<td>4,325</td>
<td>-3,382</td>
<td>1,028</td>
<td>1,816</td>
<td>-788</td>
</tr>
</tbody>
</table>

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.

The percentage of interdivisional loans 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).

2.1.3.1. Key Performance Results

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

1. Regulations of process “Limits and Reserves Management in Overseas NPP Projects” were approved;
2. 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):

1. Limits with breakdown by cost items were approved;
2. Resolutions on low-level reserves use according to the results of contract conclusion fact analysis were approved;
3. FE of contracts, limits breakdown by 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.

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 (II) 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 “Rosenergostatom”) 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 (depreciation group 3–10) and minimum procurement price of “Vehicles” groups, with the useful lifetime exceeding 3 years.
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 (IIP), 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 IIP is based on 2018 results amounts to 103.1% (with the target level being 100%).

2.1.5. Control of Financial and Economic Activity

<table>
<thead>
<tr>
<th>CAPEX, bln RUR</th>
<th>2018</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.75</td>
<td>2.71</td>
</tr>
<tr>
<td>+186%</td>
<td>1.45</td>
<td></td>
</tr>
</tbody>
</table>

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 an 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 unfair 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-P20/262-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.

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 representatives 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.
I n t e r n a l c o n t r o l s y s t e m

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/I143-P dd. 28.12.2011 and adopted for guidance by NJAEP JSC and JSC ASE Order No. 40/B5A-JP097/286-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.

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 systems 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 ATOMPROMKT;
- 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 ATOMPROMKT.

Improvement of internal control and audit system in 2018:
- main processes included in HPG “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.

Table 3. Cases of disciplinary measures application

<table>
<thead>
<tr>
<th>Name of the company</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2018/2017 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSC ASE</td>
<td>11</td>
<td>0</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>JSC ASE EC</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>JSC “Atomenergoproekt”</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>JSC ATOMPROMKT</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Trest RosSEM Ltd</td>
<td>13</td>
<td>4</td>
<td>1</td>
<td>75</td>
</tr>
<tr>
<td>JSC “NIKIMT-Atomstroy”</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>P3G ESM</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>JSC “Spb EIZ”</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>100</td>
</tr>
</tbody>
</table>

TOTAL IN THE ENGINEERING DIVISION 89 | 17 | 28 | 65 |

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

<table>
<thead>
<tr>
<th>Name of the company</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2018/2017 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSC ASE</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>71</td>
</tr>
<tr>
<td>JSC ASE EC</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>JSC “Atomenergoproekt”</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td>JSC ATOMPROMKT</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SMO No. 5 LLC</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>VNIIP</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Trest RosSEM Ltd</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>JSC “NIKIMT-Atomstroy”</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>P3G ESM</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>JSC “Spb EIZ”</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

TOTAL IN THE ENGINEERING DIVISION 12 | 26 | 15 | 41 | 373 |

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 institute;
- 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” 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 development and enhancement of quality assurance systems 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, we developed and implemented 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.

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 projects.

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 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.
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*.

- 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.

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.

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.

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.

* 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.
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.

Le an 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.

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.

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 these 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.

“...
Innovative Projects, Patenting of Intellectual Activity Results

2.2.2. 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 NPP 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.

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USRTC held meetings on the following topics:
- Engineering solutions on the NF sites with a high seismic activity (NUVIA Group, TsKTI-Vibroseis 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 (Vedeneyev VNIIIO, Orgenergostrory Institute JSC);
- Standardization of LBB (leak before break) concept requirements for pipelines of NPP reactor coolant circuit (Rosstehdorad, 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 1–4 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 selection 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.

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-1000 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 conceptual new operating qualities of VVER technology and assurance of the highest safety level;
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>
<thead>
<tr>
<th>Table 5. Results of intellectual property objects patenting and registration in 2016-2018 in the RF and abroad</th>
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<tbody>
<tr>
<td>APPLICATIONS IN THE RF</td>
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<tr>
<td>Submitted applications for receipt of RF patents for inventions, useful models</td>
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<tr>
<td>Submitted applications for state registration of computer software and databases</td>
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<tr>
<td>INTERNATIONAL APPLICATIONS</td>
</tr>
<tr>
<td>Submitted national and regional applications (30+ countries)</td>
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<tr>
<td>Submitted international applications in accordance with PCT procedure (Patent Cooperation Treaty)</td>
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<tr>
<td>RECEIVED PROTECTION DOCUMENTS</td>
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<tr>
<td>RF patents for inventions, useful models</td>
</tr>
<tr>
<td>Certificates for computer software and databases</td>
</tr>
<tr>
<td>Foreign states’ patents, including decisions to issue patents</td>
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</table>

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

- Legal protection of the Division’s RIA in the RF and abroad
- Assurance of technologies transfer
- RIA commercialization (implementation)
- Promotion of inventive activities
- Identification of risks related to violation of the Division’s rights in the field of IP by third parties
- Implementation of unified policy on the management of rights to the Division’s RIA
- Technical leadership

* See Glossary.
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

96% Share of NPP equipment procurement from Russian producers

685.53 bln RUR Amount of concluded contractual obligations, with VAT
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 underestimated. 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).

Kudankulam NPP (India)
Customer — Nuclear Power Corporation of India Ltd. (NPCIL).

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.

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.

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.
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.

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 will create additional opportunities for employment.

• 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 project implements Rosatom Production System

60 years NPP design lifetime

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

4 x 1194 MW

The Multi-D digital platform is used

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 Multi-D digital platform is used

1 stage (Units 1)

1 x 1265 MW

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

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.

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.

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.
Paks II NPP (Hungary)

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

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

For the construction of Unit 4, 40+ construction and erection companies with over 1,3 thousand people on their staff list were involved and more than 1,400 workers took part in core operations.

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

**2018 Key Results**
- Power start-up of Unit 4 of Rostov NPP;
- Commissioning of Unit 4 of Rostov NPP.

**Plans for 2019**
- Securing guarantee obligations to eliminate non-conformances revealed during the guarantee period.

**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: WER-1200

Safety generation III+

**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.

**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.

---

**Leningrad NPP-2**

Customer — JSC “Rosenergoatom”.

Reactor type: WER-1200

Safety generation III+

**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.
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

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. 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.

Development of mobile process factories
Experts of JSC ASE EC and JSC “NIKIMT-Atomstroy” started development of mobile process factories for the 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 with non-industry partner enterprises in order to ensure timely supply of equipment to NPP construction sites.

Work with suppliers
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 contractors
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.
###表6
**Consolidated number of projects opened and implemented within the framework of “Effective Province” Project**

<table>
<thead>
<tr>
<th>Area of industry of regional economy</th>
<th>Total number of improvement projects implemented in 2018</th>
<th>Total number of projects completed in 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>State administration (administration of the region and districts)</td>
<td>76</td>
<td>43</td>
</tr>
<tr>
<td>Municipal administration</td>
<td>58</td>
<td>3 (prototype)</td>
</tr>
<tr>
<td>Healthcare</td>
<td>256</td>
<td></td>
</tr>
<tr>
<td>All types of industry</td>
<td>126</td>
<td>5 (3 prototypes)</td>
</tr>
<tr>
<td>Housing maintenance and utilities, transport</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>Multifunctional centers</td>
<td>11</td>
<td>23 (4 prototypes)</td>
</tr>
<tr>
<td>Education (from kindergarten to school)</td>
<td>73</td>
<td>31 (8 prototypes)</td>
</tr>
<tr>
<td>Education (Higher and specialized secondary)</td>
<td>36</td>
<td>27</td>
</tr>
<tr>
<td>Social sphere, Culture, Sport</td>
<td>432</td>
<td>304 (3 prototypes)</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>1 (1 prototype)</td>
</tr>
<tr>
<td>Agriculture</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Construction (including road building)</td>
<td>11</td>
<td>5 (1 prototype)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,073</strong></td>
<td><strong>727 (22 prototypes)</strong></td>
</tr>
</tbody>
</table>

- **Process factories created**: 11
- **Persons trained at process factories**: 416

###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 are 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, 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.

* See Glossary.
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: www.roseltorg.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, which are aimed at establishment of fair competition: all information on procurements in the industry is published on the specialized procurement website: www.roseltorg.ru.

This implies registration of all bidders on these ETP.
To get feedback from the suppliers, forums are held regularly, e.g. Moring Tree, where everyone who wishes to 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.
Procedure of participation of foreign suppliers is 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).

— 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.
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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**


Register of Plan-Schedules and procurement plans on the official state website zakupki.gov.ru contains relevant information on procurements of JSC AIE, JSC AIE EC, JSC “Atomenergoexport”, JSC ATOMPROEKT 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 AIE 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 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 (1С 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 AIE 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 on article or material, list of materials, list of components, list of services. 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.

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 (1С 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 AIE 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 on article or material, list of materials, list of components, list of services. 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.

**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) | 2016-2017/
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>JSC AIE EC</td>
<td>85</td>
<td>89</td>
<td>95</td>
<td>+104</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>15</td>
<td>11</td>
<td>5</td>
<td>+57</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>70</td>
<td>78</td>
<td>80</td>
<td>161</td>
</tr>
<tr>
<td>JSC AIE</td>
<td>99</td>
<td>92</td>
<td>100</td>
<td>+122</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>1</td>
<td>8</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>from foreign producers</td>
<td>98</td>
<td>84</td>
<td>97</td>
<td>+113</td>
</tr>
<tr>
<td>JSC “Atomenergoexport”</td>
<td>86</td>
<td>86</td>
<td>97</td>
<td>+113</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>14</td>
<td>14</td>
<td>3</td>
<td>+18</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>72</td>
<td>72</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>JSC ATOMPROEKT</td>
<td>59</td>
<td>86</td>
<td>85</td>
<td>+10</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>41</td>
<td>14</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>15</td>
<td>15</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>JSC “NIKIMT-Atomstroy”</td>
<td>96</td>
<td>95</td>
<td>72</td>
<td>+76</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>20</td>
<td>20</td>
<td>28</td>
<td>+545</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>76</td>
<td>76</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>PJSC ESM</td>
<td>95</td>
<td>93</td>
<td>84</td>
<td>+91</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>4</td>
<td>7</td>
<td>16</td>
<td>+219</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>19</td>
<td>19</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Trust RosSEM Ltd</td>
<td>94</td>
<td>91</td>
<td>96</td>
<td>+105</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>4</td>
<td>4</td>
<td>9</td>
<td>+66</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>4</td>
<td>4</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Name of the company</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSC AIE EC</td>
<td>85</td>
<td>89</td>
<td>95</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>15</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>70</td>
<td>78</td>
<td>80</td>
</tr>
<tr>
<td>JSC AIE</td>
<td>99</td>
<td>92</td>
<td>100</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>1</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>98</td>
<td>84</td>
<td>97</td>
</tr>
<tr>
<td>JSC “Atomenergoexport”</td>
<td>86</td>
<td>86</td>
<td>97</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>14</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>72</td>
<td>72</td>
<td>—</td>
</tr>
<tr>
<td>JSC ATOMPROEKT</td>
<td>59</td>
<td>86</td>
<td>85</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>41</td>
<td>14</td>
<td>—</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>15</td>
<td>15</td>
<td>—</td>
</tr>
<tr>
<td>JSC “NIKIMT-Atomstroy”</td>
<td>96</td>
<td>95</td>
<td>72</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>20</td>
<td>20</td>
<td>28</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>76</td>
<td>76</td>
<td>—</td>
</tr>
<tr>
<td>PJSC ESM</td>
<td>95</td>
<td>93</td>
<td>84</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>4</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>19</td>
<td>19</td>
<td>—</td>
</tr>
</tbody>
</table>

**Amount of concluded contractual obligations, bln RUR with VAT**

<table>
<thead>
<tr>
<th>Amount in total</th>
<th>685.53</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>485.64</td>
</tr>
<tr>
<td>2017</td>
<td>143.46</td>
</tr>
<tr>
<td>2018</td>
<td>81.46</td>
</tr>
</tbody>
</table>

**Total in the Engineering Division**

<table>
<thead>
<tr>
<th>Share of NPP equipment procurement from Russian and foreign producers</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSC AIE EC</td>
<td>85</td>
<td>89</td>
<td>95</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>15</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>70</td>
<td>78</td>
<td>80</td>
</tr>
<tr>
<td>JSC AIE</td>
<td>99</td>
<td>92</td>
<td>100</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>1</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>98</td>
<td>84</td>
<td>97</td>
</tr>
<tr>
<td>JSC “Atomenergoexport”</td>
<td>86</td>
<td>86</td>
<td>97</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>14</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>72</td>
<td>72</td>
<td>—</td>
</tr>
<tr>
<td>JSC ATOMPROEKT</td>
<td>59</td>
<td>86</td>
<td>85</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>41</td>
<td>14</td>
<td>—</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>15</td>
<td>15</td>
<td>—</td>
</tr>
<tr>
<td>JSC “NIKIMT-Atomstroy”</td>
<td>96</td>
<td>95</td>
<td>72</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>20</td>
<td>20</td>
<td>28</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>76</td>
<td>76</td>
<td>—</td>
</tr>
<tr>
<td>PJSC ESM</td>
<td>95</td>
<td>93</td>
<td>84</td>
</tr>
<tr>
<td>from Russian producers</td>
<td>4</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>from foreign producers</td>
<td>19</td>
<td>19</td>
<td>—</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount of funds saved</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>7.81</td>
<td>7.81</td>
<td>7.81</td>
<td>7.81</td>
</tr>
<tr>
<td>2017</td>
<td>19.08</td>
<td>19.08</td>
<td>19.08</td>
<td>19.08</td>
</tr>
</tbody>
</table>
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 (1) 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.

Training helps new suppliers adapt to the Catalogue better, understand the basic requirements set for the quality of the equipment purchased. Unification and standardization of procurement procedures and concluded supply contracts. Implementation is, first of all, reduction of the number of supply contracts with the erection deadlines. This will ensure budget saving at the expense of consolidation and competitive procurement from foreign producers.

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 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 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 Russian producers.

In order to improve the quality of services and reduce cost price of the Operator’s function, work on restructuring of RRI keeping processes commercialized, 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 the equipment purchased. Unification and standardization of procurement procedures and concluded supply contracts. Implementation is, first of all, reduction of the number of supply contracts with the erection deadlines. This will ensure budget saving at the expense of consolidation and competitive procurement from foreign producers.

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 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 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 Russian producers.

In 2018, works on unification and standardization were performed based 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

**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, Belusu 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. 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 basic technical standards for equipment 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.
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

23,554 persons
Total number of employees for Rosatom State Corporation Engineering Division based on the results of 2018

44%
Share of employees under 35 y.o.
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, and 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, 31 managers and experts of HR management unit of 3SC ASE EC and our subsidiary companies received certificates of completion of the HR-school course. Besides, all the 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 6 years. 100% of 3SC ASE EC and 3SC 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 design engineers. Experts of Design Unit undergo not only the PTKS assessment but also certification confirming compliance with the occupied position. In total, 3,439 employees 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 it 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 3SC 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 CST 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 3SC 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.

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.
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 our portfolio and diversity of projects, our planning horizon in 2018. This is resource planning. Considering the scale of the Company’s digital transformation.

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.

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 level of qualification.

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.

### Table 9. Total number of employees — breakdown by gender, age and employees categories, pers.

<table>
<thead>
<tr>
<th>Category of employees</th>
<th>2018</th>
<th>Share of employees under 35 y.o.</th>
<th>36–50 y.o.</th>
<th>Over 50 y.o.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>f</td>
<td>total</td>
<td>m</td>
</tr>
<tr>
<td>Executives</td>
<td>1,893</td>
<td>2,310</td>
<td>4,203</td>
<td>472</td>
</tr>
<tr>
<td>Specialists</td>
<td>9,641</td>
<td>10,562</td>
<td>20,203</td>
<td>2,544</td>
</tr>
<tr>
<td>Other office staff</td>
<td>96</td>
<td>117</td>
<td>213</td>
<td>3</td>
</tr>
<tr>
<td>Workers</td>
<td>6,585</td>
<td>10,526</td>
<td>17,111</td>
<td>4,553</td>
</tr>
<tr>
<td>Other*</td>
<td>59</td>
<td>39</td>
<td>98</td>
<td>9</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>18,273</td>
<td>23,554</td>
<td>41,827</td>
<td>7,581</td>
</tr>
</tbody>
</table>

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

Additional information can be found in Appendix 13 of the Book of Appendices.
Number of complaints on labor relations that were filed, processed and settled via official mechanisms of complaint filing

<table>
<thead>
<tr>
<th>Index</th>
<th>2016 (fact)</th>
<th>2016 (fact)</th>
<th>2017 (fact)</th>
<th>2018 (fact)</th>
<th>2018 - 2017, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of complaints filed during the reporting period</td>
<td>292</td>
<td>23</td>
<td>12</td>
<td>21</td>
<td>75.0</td>
</tr>
<tr>
<td>Processed during the reporting period</td>
<td>292</td>
<td>23</td>
<td>11</td>
<td>19</td>
<td>72.7</td>
</tr>
<tr>
<td>Settled during the reporting period</td>
<td>286</td>
<td>22</td>
<td>11</td>
<td>19</td>
<td>72.7</td>
</tr>
<tr>
<td>Total number of complaints filed before the reporting period and settled during the reporting period</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>–</td>
</tr>
</tbody>
</table>

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

Human Capital

Payroll budget and social payments, mln RUR*

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>+/-%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>22,360.8</td>
<td>+30.6%</td>
</tr>
<tr>
<td>2017</td>
<td>17,116.0</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>17,448.0</td>
<td></td>
</tr>
</tbody>
</table>

* 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.

Risk impact growth factors:

- shortfall risk

The lack 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 competencies 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 design;
- 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 Directories:
- 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%).

The growth of the number of training hours in 2018 was caused by performance of compulsory training of JSC ATOMPROBAT executives (over 3 years) and of Trest RosSEM Ltd. workers.

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

Table 10.

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Personnel turnover index 2016</th>
<th>Personnel turnover index 2017</th>
<th>Personnel turnover index 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>18.0</td>
<td>8.0</td>
<td>14.5</td>
</tr>
<tr>
<td>Under 35 y.o.</td>
<td>18.7</td>
<td>10.5</td>
<td>16.0</td>
</tr>
<tr>
<td>36–50 y.o.</td>
<td>19.9</td>
<td>6.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Over 50 y.o.</td>
<td>14.1</td>
<td>8.3</td>
<td>11.9</td>
</tr>
</tbody>
</table>

The the number of new jobs is caused by:
- commencement of the active stage of NPP construction abroad and in Russia (Kursk NPP-2);
- enhancing empoyees’ performance as part of the foreign projects;
- enhancing IT-competencies within the framework of implementation of “Digital Economy” program.

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

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A unified industry system of development of the candidates’ pool for different levels of positions

Next career step

2016 2017 2018

1. 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.

2. 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.

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 and HR and Internal Communication.

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.
Achievements

Person of the year Rosatom — 2016
13 prizes in industry nominations (16% 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) (2 awards in 2017).
3 gold medals (three times more than in 2017) (1 award in 2017).
2 second places in total points scoring.
3 second places in total points scoring.
One first prize (for the first time after 2016).

Occupational safety management system and prevention of injury during construction of complex engineering facilities.

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 DOS (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.

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.

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 HEALTH AND SAFETY

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.

All employees of our company take seriously the OHS issues and actively participate in occupational health and safety management.

Safety days are held in the Engineering Division on a regular basis.

Occupational Safety Management System at Construction Sites

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. According to the results of inspections, the reasons of violations of safety requirements and rules are analyzed.
Human Capital

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 their 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 Atomsport 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

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social programs</td>
<td>471.06</td>
<td>475.31</td>
<td>491.31</td>
<td>+8%</td>
</tr>
<tr>
<td>Cultural and sports activities</td>
<td>72.70</td>
<td>91.33</td>
<td>109.45</td>
<td>+20%</td>
</tr>
</tbody>
</table>

Table 15.
Non-state pension provision in the Engineering Division

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employees with non-state pension provision, pers.</td>
<td>1%</td>
<td>15%</td>
<td>17%</td>
<td>+10%</td>
</tr>
<tr>
<td>Expenses for non-state public provision, mln RUR</td>
<td>33.53</td>
<td>17.9</td>
<td>17.8</td>
<td>-1%</td>
</tr>
</tbody>
</table>

Additional information can be found in Appendix 12 of the Book of Appendices.

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.).

Volunteering

1. 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.

2. 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 lifestyle, involvement of the population in physical culture and sports;
   • Development of popular sports;
   • Image enhancement of Nizhny Novgorod as a tourist attraction.

3. “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.

4. “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.

5. Social project “Good Deeds Marathon for One Village” Assistance, including financial aid, to needy village families.

Likel 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 Dzhyn village).
Natural Capital

2.5.1. Environmental Safety Management at NPP Designing Stage
2.5.2. Environmental Impact Management during Facilities Construction
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 compiled 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.
Assessment of the environmental impact of designed VVER-1200 NPPs during normal operation

According to worldwide 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 (Р 2.1.10.1920-04), the individual life-time risk of deterministic effects is significantly lower than 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 and 0.24 at the border of LNPP-2). The possibility of a negative impact on public health through inhalation of such substances during life-time is insignificant (P 2.1.10.3.1920-04, item 7.4.13).

According to a conservative assessment, the main hazard 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 (>2·10^{-1} 1/year).

As of 2014, the individual radiation risk for the population due to man-induced background radiation — (0.24–2.4)·10^{-1} 1/year is significantly lower than the risk from natural background radiation — 145·10^{-1} 1/year and the risk from fine-particle dust in the air — (4·10^{-5}–4·10^{-4}) 1/year, being close to the range of permissible risks.

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% of MPC, without considering the background concentration.

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 5P 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 negligibly low.

Maximal total dose 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.
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 (NOx, SO2) 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.

NOx emissions from NPPs with VVER 1200 are 4,140 times less than those from thermal power plants, and SO2 emissions are 63 times lower. Thus, NOx (NOx+N2O) emissions arising from NPPs with VVER 1250 is 3.08 tons/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 tons/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.

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.

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).

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 36.

<table>
<thead>
<tr>
<th>Type of power source</th>
<th>Emissions of greenhouse gases per year (ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPPs with VVER-1000 reactor</td>
<td>4,253.00 (4 power units of Kalinin NPP)</td>
</tr>
<tr>
<td>NPPs with VVER-1200 reactor</td>
<td>2,400.00 (2 units of Leningrad NPP that are being designed)</td>
</tr>
<tr>
<td>Hydro power plants</td>
<td>6,000.00 (installed power)</td>
</tr>
<tr>
<td>Thermal power plants</td>
<td>3,248.00 (Surgut GRES)</td>
</tr>
<tr>
<td>Alternative energy sources</td>
<td>135,000 (Orenburg solar electric plant)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of power source</th>
<th>Electricity generation per year (kw)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPPs with VVER-1000 reactor</td>
<td>8.28 tons/year</td>
</tr>
<tr>
<td>NPPs with VVER-1200 reactor</td>
<td>3.18 tons/year</td>
</tr>
<tr>
<td>Hydro power plants</td>
<td>No data</td>
</tr>
<tr>
<td>Thermal power plants</td>
<td>3.84 tons/year</td>
</tr>
</tbody>
</table>

Emissions of greenhouse gases (CO2, CO) into the atmosphere

The annual amount of emissions of pollutants (NOx, SO2) 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.
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 environment 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 203-3
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

- Surface waters, including swamps, rivers, lakes and oceans: 120,000
- Ground waters: 1,300 (domestic potable)
- Rain water collected and stored by the company: 430 (domestic potable)

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.

GRI 203-3
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.
— 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 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 "Atomenergoexport" 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.

— 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 a follow-up. 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.

— 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.

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 4854/426.015-2018 “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 water waste, 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.

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.

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.

2.5.2.2. Industrial safety

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 safety 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 slingging.

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.
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 nitrates, 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 permits 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.

The areas of NPP construction are characterized by near absence of Russian life and animal habitats, due to which no special measures for rehabilitation of habitats are taken. The areas of NPP construction are characterized by near absence of Russian life and animal habitats, due to which no special measures for rehabilitation of habitats are taken.

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 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.

#### 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.

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.

The 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 oxides — 24.4%, other substances — 26.7%. Pollutant emissions were significantly lower due to improved parameters of JSC “NIKIMT-Atomstroy”.

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 Ulyt recreation center of JSC ASE EC, Baltic Branch of JSC ASE EC and surface sources of Tsilmysky water reservoir for the needs of Volgodonsk Branch of JSC ASE EC.

### 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 Ulyt recreation center of JSC ASE EC, Baltic Branch of JSC ASE EC and surface sources of Tsilmysky water reservoir for the needs of Volgodonsk Branch of JSC ASE EC.

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 Volgodonsk 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 naphtha 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.

Power consumption during NPP construction

The amount of energy resources consumption by the Engineering Division grew in 2018 as compared to 2018 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.

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 1-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 558.27 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 (GRORG). 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>
<thead>
<tr>
<th>Waste capacity, tons</th>
<th>Total waste generation categories</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>(2018–2017), %</th>
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<tbody>
<tr>
<td>I hazard class waste</td>
<td>Extremally hazardous</td>
<td>2.30</td>
<td>3.00</td>
<td>2.57</td>
<td>-14</td>
</tr>
<tr>
<td>II hazard class waste</td>
<td>Highly hazardous</td>
<td>1.23</td>
<td>1.56</td>
<td>0.70</td>
<td>-55</td>
</tr>
<tr>
<td>III hazard class waste</td>
<td>Moderately hazardous</td>
<td>8.20</td>
<td>7.82</td>
<td>8.48</td>
<td>+8</td>
</tr>
<tr>
<td>IV hazard class waste</td>
<td>Low-hazard, including</td>
<td>2,941.07</td>
<td>2,917.32</td>
<td>3,138.00</td>
<td>+8</td>
</tr>
<tr>
<td>V hazard class waste</td>
<td>(practically no hazard), including</td>
<td>2,173.80</td>
<td>1,802.34</td>
<td>2,408.53</td>
<td>+34</td>
</tr>
<tr>
<td>Total for I–V hazard category wastes</td>
<td></td>
<td>5,126.60</td>
<td>4,732</td>
<td>5,558.30</td>
<td>+17</td>
</tr>
</tbody>
</table>

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.

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 territories 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.

**Financing of environmental protection measures**

The total amount of expenses for environmental protection in the Engineering Division during the reporting period was 20,14 thousand 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 4–05 report.

### Table 20. Fuel types used in the Engineering Division

<table>
<thead>
<tr>
<th>Fuel type</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tons</td>
<td>mln RUR</td>
<td>tons</td>
</tr>
<tr>
<td>Motor petrol</td>
<td>1,143.35</td>
<td>1,206.51</td>
<td>1,062.36</td>
</tr>
<tr>
<td>Diesel fuel</td>
<td>1,712.68</td>
<td>1,282.66</td>
<td>1,986.12</td>
</tr>
<tr>
<td>Fuel oil</td>
<td>35.07</td>
<td>1.08</td>
<td>1.08</td>
</tr>
<tr>
<td>Natural gas</td>
<td>1,631.01</td>
<td>1,276.93</td>
<td>1,085.61</td>
</tr>
<tr>
<td>Coal</td>
<td>104.30</td>
<td>124.61</td>
<td>229.00</td>
</tr>
</tbody>
</table>

More detailed information about fuel types used can be found in Appendix 11 of the Book of Appendices.
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
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 Ishwardi, 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 Al-Irab 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-rooms 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 about 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.

— 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.
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.

From 2018, the company has actively promoted cooperation with customers, Interface with stakeholders is performed in all the regions of operation of the Division. 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


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. 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, VMA, WNA, NEA/OECD

Environmental and radiation safety. Transparency of business process. Compliance with international legal requirements. Business and infrastructure development. Taxes. Creation of new jobs. Implementation of social programs. EIA development. Joint programs. Work in joint committees, commissions, expert teams dealing with nuclear power issues. Public accountability. Contribution to the development of regions of operation. 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 stakeholders towards each other.

Self-governing local bodies


Social and charity programs. Contribution to the development of regions of operation. 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.

Population of the regions of operation (public representatives)


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. Personal 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).

Table 21. Information about stakeholders engagement in the reporting period

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Basic interests</th>
<th>Mechanisms of interaction</th>
<th>Comments to dynamics of degree of mutual impact of the Division and stakeholders compared to 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shareholders</td>
<td>Strategy, implementaion.</td>
<td>Participation in implementation of the shareholder’s strategic objectives</td>
<td>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.</td>
</tr>
<tr>
<td>Rosatom State Corporation, Atomenergoproekt, JSC ASE, JSC “Atomenergoproekt” and others</td>
<td>Economy, efficiency.</td>
<td>Improvement of the corporate management system.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business sustainability.</td>
<td>Implementation of Rosatom production system.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business process transparency.</td>
<td>AIP implementation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regulatory and Supervision Bodies: Federal/Environmental, Industrial and Nuclear Supervision Service</td>
<td>Meeting Russian and international legal requirements.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Obtaining licenses.</td>
<td></td>
</tr>
<tr>
<td>Stakeholders Engagement</td>
<td></td>
<td>Conducting inspections.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reporting.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Development of proposals for improvement of legislation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

Stakeholders’ rank map

1. Shareholders
2. Control and supervision bodies
3. State bodies of foreign countries
4. International organizations and associations
5. Local government bodies in the regions of operation
6. Population of the regions of operation (public representatives)
7. Personnel of the Division and bodies representing its interests
8. Division’s top management
9. Top management of subsidiaries
10. Consumers of technologies, products and services at the global market
11. Consumers of technologies, products and services at the Russian market
12. Suppliers and contractors
13. Competitors at the global market of technologies, products and services
14. Financial institutes and investment community
15. Scientific community
16. Educational institutions
17. Ecological organizations
18. Public organizations (except ecological ones)
19. Rating agencies, market analysis
20. Expert and professional community
21. Mass media

1.5 2 2.25 2.5 2.75 3 3.25 3.5 3.75 4
1.75 2 2.25 2.5 2.75 3 3.25 3.5 3.75 4

Stakeholders’ impact on the Company

Company’s impact on the stakeholders

1 Shareholders
2 Control and supervision bodies
3 State bodies of foreign countries
4 International organizations and associations
5 Local government bodies in the regions of operation
6 Population of the regions of operation (public representatives)
7 Personnel of the Division and bodies representing its interests
8 Division’s top management
9 Top management of subsidiaries
10 Consumers of technologies, products and services at the global market
11 Consumers of technologies, products and services at the Russian market
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13 Competitors at the global market of technologies, products and services
14 Financial institutes and investment community
15 Scientific community
16 Educational institutions
17 Ecological organizations
18 Public organizations (except ecological ones)
19 Rating agencies, market analysis
20 Expert and professional community
21 Mass media
Mechanisms of interaction
Comments to dynamics of degree of mutual impact of the Division and stakeholders compared to 2013.

Top management of the Division
- Strategy of the Company development.
- Improvement of the management system.
- Efficiency improvement program.

Top-management of subsidiaries
- New group of stakeholders appeared in the 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
- Performance of contractual obligations.
- Participation in the work of steering committees.
- Mastering of up-to-date engineering technologies.
- Bilateral visits.

Consumers of technologies, products and services on the Russian market
- Implementation of construction plans.
- Reduction of construction periods.
- Improvement of the quality of services.

Suppliers and contractors
- Acquisition of new orders.
- Company’s financial status.
- Prospects of cooperation.

Competitors on the global market of technologies, products and services
- Participation in tender procedures.
- Work in joint committees, commissions, expert teams dealing with nuclear power issues.
- Development of industry research.
- Development of innovative technologies.

Competitors on the global market of technologies, products and services
- Participation in exhibitions and forums.
- Bilateral visits.
- Establishment of strategic partnerships.

Financial institutions and investment community
- Financing, debt financing.

Scientific community
- Development of industry research.
- Development of innovative technologies.

Environmental organizations
- Social partnership.
- Environmental protection.

Public organizations (except environmental ones)
- Social and charity programs.
- Social partnership.

Rating agencies, market analysts: RA expert
- Subsidiary of significant analytical information for modern financial economic institutions.
- Assessment of the partner’s financial reliability.
- Full-scale risk assessment.

Expert and professional community: the Russian Union of Industrialists and Entrepreneurs
- Improvement of the business environment.
- Enhancement of the status of Russian businesses in RF and abroad.
- Maintaining the balance of the interests of society, authorities and business.

Mass media
- Provision of prompt access to information about the Company’s activities.

2018 | Annual Report

Principles of stakeholders engagement:

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 maintains public accountability. Participation in business meetings and conferences.

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 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 MPNP HES, public counseling offices, etc.).

Key stakeholders
- Basic interests
- Mechanisms of interaction
- Comments to dynamics of degree of mutual impact of the Division and stakeholders compared to 2013.

Educational institutions:
- National Research Nuclear University MEPhI, NSTU, the Lobachevsky Nizhny Novgorod State University, Ivanovo State Energy University, etc.

Environmental organizations
- Social partnership.
- Environmental protection.

Public organizations (except environmental ones)
- Social and charity programs.
- Social partnership.

Rating agencies, market analysts: RA expert
- Subsidiary of significant analytical information for modern financial economic institutions.
- Assessment of the partner’s financial reliability.
- Full-scale risk assessment.

Expert and professional community: the Russian Union of Industrialists and Entrepreneurs
- Improvement of the business environment.
- Enhancement of the status of Russian businesses in RF and abroad.
- Maintaining the balance of the interests of society, authorities and business.

Mass media
- Provision of prompt access to information about the Company’s activities.

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

<table>
<thead>
<tr>
<th>Organization with which the Engineering Division formed a partnership (alliance)</th>
<th>Description of projects implemented within the framework of this partnership (alliance) and the role of the Engineering Division</th>
<th>Milestones in joint projects within the framework of this partnership (alliance) in 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Research Nuclear University MEPhI</td>
<td>Agreement on educational, scientific and technical cooperation</td>
<td></td>
</tr>
<tr>
<td>SOVNET Project Management Association</td>
<td>Roadmap in pursuance of Memorandum on Cooperation</td>
<td></td>
</tr>
<tr>
<td>Russian University of Transport</td>
<td>Agreement on cooperation</td>
<td></td>
</tr>
<tr>
<td>Bureau Veritas S.A.</td>
<td>Memorandum on cooperation</td>
<td></td>
</tr>
</tbody>
</table>

Table 23. Participation in large international and federal communication projects and events in 2018

<table>
<thead>
<tr>
<th>Communication project / event</th>
<th>Participation format, result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit of Russian bloggers to Bangladesh</td>
<td>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 media, including Russia and Bangladesh. The site of the event was branded. The Government of the Russian Federation expressed gratitude to representatives of the Engineering Division of Rosatom and Rosatom International Network for organization of the event.</td>
</tr>
</tbody>
</table>

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.
The third Festival of Science of Rosatom State Corporation was organized in Mumbai and New Delhi.

Achievements and Awards:

- Educational and entertainment project "The Champions" was launched in Nizhny Novgorod during the World Football Cup. The film production was timed to putting of Rostov NPP unit 4 into industrial operation. About 30 publications appeared in mass media. Average outreach of the project was 2.2 million people.
- During the Festival, the Football World Cup was integrated into the Football World Cup. The Champions media-project, associated with Rostov NPP, was launched in Nizhny Novgorod. The film production was timed to putting of Rostov NPP unit 4 into industrial operation. About 30 publications appeared in mass media. Average outreach of the project was 2.2 million people.
- The Champions media-project was integrated into Football World Cup. The film production was timed to putting of Rostov NPP unit 4 into industrial operation. About 30 publications appeared in mass media. Average outreach of the project was 2.2 million people.
- Educational project "Green Square" interactive program with 4 zones (water, sun, wind, atom) was attended by over 9,000 residents and guests of Ostrovets in 2018.
- The Champions media-project was integrated into the Football World Cup. The film production was timed to putting of Rostov NPP unit 4 into industrial operation. About 30 publications appeared in mass media. Average outreach of the project was 2.2 million people.
- The film production was timed to putting of Rostov NPP unit 4 into industrial operation. The film talked about the construction of the NPP four units that were designed and built by specialists from JSC AES EC. The film was also shown on-regional Volga channel and at the corporate event dedicated to Nuclear Industry Day.

Plans for 2019

- Implementation of unified industry informational, advertisement and brand-policy of Rosatom State Corporation.
- Educational and entertainment project "The Champions" was launched in Nizhny Novgorod during the World Football Cup. The film production was timed to putting of Rostov NPP unit 4 into industrial operation. About 30 publications appeared in mass media. Average outreach of the project was 2.2 million people.
- The film production was timed to putting of Rostov NPP unit 4 into industrial operation. The film talked about the construction of the NPP four units that were designed and built by specialists from JSC AES EC. The film was also shown on-regional Volga channel and at the corporate event dedicated to Nuclear Industry Day.
- Educational project "Green Square" interactive program with 4 zones (water, sun, wind, atom) was attended by over 9,000 residents and guests of Ostrovets. The film production was timed to putting of Rostov NPP unit 4 into industrial operation. About 30 publications appeared in mass media. Average outreach of the project was 2.2 million people.
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.

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**Taxes**

The Engineering Division plays a significant role in forming the income part of the budget in areas where the company operates.

**Contribution of the companies of the Engineering Division management gross tax payments in 2018, %**

<table>
<thead>
<tr>
<th>Company</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>JSC ASE EC</td>
<td>34</td>
</tr>
<tr>
<td>JSC ASE</td>
<td>15</td>
</tr>
<tr>
<td>JSC ATOMPROEKT</td>
<td>13</td>
</tr>
<tr>
<td>PSIC ESM</td>
<td>11</td>
</tr>
<tr>
<td>JSC &quot;NIKIMT-Atomstroy&quot;</td>
<td>7</td>
</tr>
<tr>
<td>Trest RosSEM Ltd</td>
<td>7</td>
</tr>
<tr>
<td>NUKEM Technologies Engineering Services GmbH</td>
<td>5</td>
</tr>
</tbody>
</table>

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.
Social and Relationship Capital

--- | --- | --- | --- | --- | ---
Charitable agreements are concluded by two legal entities — JSC ASE EC and JSC ASE.

<table>
<thead>
<tr>
<th>Charity activities</th>
<th>GRI 413-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Charity projects competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A significant focus area is organization of Charitable Projects Competition for non-profit organizations, which is held in the following categories:</td>
</tr>
<tr>
<td>• culture and sports</td>
</tr>
<tr>
<td>• environmental protection</td>
</tr>
<tr>
<td>• patriotic initiatives</td>
</tr>
<tr>
<td>• young generation</td>
</tr>
<tr>
<td>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 pengvinarium.</td>
</tr>
</tbody>
</table>

| 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-З “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. |

<table>
<thead>
<tr>
<th>Charity funds*, mln RUR</th>
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<tbody>
<tr>
<td>JSC ASE</td>
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<tr>
<td>2018</td>
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<td>2017</td>
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<td>2016</td>
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<tr>
<td>JSC ASE EC</td>
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<td>2018</td>
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<tr>
<td>2017</td>
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<tr>
<td>2016</td>
</tr>
<tr>
<td>TOTAL</td>
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<tr>
<td>2018</td>
</tr>
<tr>
<td>2017</td>
</tr>
<tr>
<td>2016</td>
</tr>
<tr>
<td>+162.82%</td>
</tr>
<tr>
<td>+227.75%</td>
</tr>
<tr>
<td>+185.92%</td>
</tr>
</tbody>
</table>

* 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 (theAssumption 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.

The integrated annual report is issued on an annual basis. This is the forth 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.

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).

Regulatory and legal framework of the Russian Federation
- Letter by the Bank of Russia No. 06-52/2463 dd. 10.04.2014 “On corporate management code”.

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
This Report summarizes the Division activities from 01.01.2018 till 31.12.2018.

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/

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, 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).
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 (2018).

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, JSC ASE, JSC “Atomenergomproekt”, JSC ATOMPROEKT, Trest RosSEM Ltd, JSC “NIKIMT-Atomstroy”, P3SC ESM was prepared in accordance with Russian Accounting Standards (RAS). Accounting (financial) reports of JSC ASE EC, JSC ASE, JSC “Atomenergoproekt”, and JSC ATOMPROEKT was performed by FBK, LLC, and the audit of accounting report of JSC ASE EC, JSC ASE, JSC “Atomenergoproekt” and JSC ATOMPROEKT was performed by Nexia Pacioli Ltd., and the audit of the self-regulatory organization of auditors. The company is a member of Self-regulatory Organization of Auditors Association “Sodruzhestvo”.

Responsibility for Report elaboration

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 102-32

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 matrix

GRI 102-47

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 and 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.
Comparison of material topics with GRI SRS standards

<table>
<thead>
<tr>
<th>MATERIAL TOPICS</th>
<th>COMPLIANCE WITH GRI STANDARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPP safety</td>
<td>103, 416</td>
</tr>
<tr>
<td>Environmental and industrial safety at construction facilities</td>
<td>103, 301, 302, 304, 306, 307, 403</td>
</tr>
<tr>
<td>Effective system of environmental management programs</td>
<td>108</td>
</tr>
<tr>
<td>Reducing of time periods and cost of NPP construction</td>
<td>106</td>
</tr>
<tr>
<td>Portfolio of orders for the long-term perspective</td>
<td>109</td>
</tr>
<tr>
<td>Division’s transformation</td>
<td>103</td>
</tr>
<tr>
<td>Company’s contribution of fulfillment of the “Digital economy of the Russian Federation” programme</td>
<td>103</td>
</tr>
<tr>
<td>Corporate culture : approach, norms, programmes, projects etc.</td>
<td>103, 404, 406, 407</td>
</tr>
<tr>
<td>Overall environmental performance</td>
<td>103, 204, 412</td>
</tr>
<tr>
<td>Safety culture</td>
<td>103</td>
</tr>
</tbody>
</table>

Interaction during the Report Preparation

GRI 102-43, 182-44

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 main reasons for future 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 (argumented 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 25. Comparison of material topics with GRI SRS standards

<table>
<thead>
<tr>
<th>No.</th>
<th>RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Demonstrate how capital expenditures are capitalized.</td>
</tr>
<tr>
<td>2</td>
<td>Describe how equipment suppliers who are beyond the management scope of Rosatom State Corporation, including equipment for NPPs, are selected.</td>
</tr>
<tr>
<td>3</td>
<td>Describe how equipment suppliers who are beyond the management scope of Rosatom State Corporation, including equipment for NPPs, are selected.</td>
</tr>
<tr>
<td>4</td>
<td>Describe how equipment suppliers who are beyond the management scope of Rosatom State Corporation, including equipment for NPPs, are selected.</td>
</tr>
<tr>
<td>5</td>
<td>Add information about cases for using Multi-D, taking Rosatom Production System (RPS) as a basis.</td>
</tr>
<tr>
<td>6</td>
<td>Add information about teaching personnel and sustainable development management which the Division face.</td>
</tr>
<tr>
<td>7</td>
<td>Describe how equipment suppliers who are beyond the management scope of Rosatom State Corporation, including equipment for NPPs, are selected.</td>
</tr>
<tr>
<td>8</td>
<td>Add information about cases for using Multi-D, taking Rosatom Production System (RPS) as a basis.</td>
</tr>
<tr>
<td>9</td>
<td>Add information about cases for using Multi-D, taking Rosatom Production System (RPS) as a basis.</td>
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<td>10</td>
<td>Add information about cases for using Multi-D, taking Rosatom Production System (RPS) as a basis.</td>
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<td>11</td>
<td>Add information about cases for using Multi-D, taking Rosatom Production System (RPS) as a basis.</td>
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<tr>
<td>12</td>
<td>Add information about cases for using Multi-D, taking Rosatom Production System (RPS) as a basis.</td>
</tr>
<tr>
<td>13</td>
<td>Add information about cases for using Multi-D, taking Rosatom Production System (RPS) as a basis.</td>
</tr>
</tbody>
</table>

Table 26. Consideration of the experts’ recommendations (upon conclusion by the Russian Union of Industrialists and Entrepreneurs)

<table>
<thead>
<tr>
<th>No.</th>
<th>RECOMMENDATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>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 Rosatom with the global goals and reflect the correlation of the achieved results and the Sustainable Development Goals-2030, considering the growing interest in this subject worldwide.</td>
</tr>
<tr>
<td>2</td>
<td>The Report 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.</td>
</tr>
<tr>
<td>3</td>
<td>It is recommended to pay more attention to human rights issue in business activities, not limiting to compliance with the labor rights.</td>
</tr>
<tr>
<td>4</td>
<td>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 structure of information disclosure on management of different types of capitals.</td>
</tr>
<tr>
<td>5</td>
<td>It is recommended to reflect information on international and national initiatives in the field of corporate responsibility and sustainable development in which the Company participates.</td>
</tr>
<tr>
<td>6</td>
<td>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.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>No.</th>
<th>RECOMMENDATIONS</th>
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<tbody>
<tr>
<td>1</td>
<td>Considered</td>
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<tr>
<td>2</td>
<td>Considered</td>
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<td>3</td>
<td>Considered</td>
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<td>4</td>
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<td>5</td>
<td>Not considered</td>
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<td>6</td>
<td>Not considered</td>
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<td>7</td>
<td>Not considered</td>
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<td>8</td>
<td>Not considered</td>
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<td>9</td>
<td>Not considered</td>
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<td>10</td>
<td>Not considered</td>
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<td>11</td>
<td>Considered</td>
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<td>12</td>
<td>Considered</td>
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<td>13</td>
<td>Considered</td>
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</table>
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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;

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 “Atomenergiyaproekt” 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 those 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
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 (5400°C) 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 (kWh) during the whole life cycles for generation of 1 kWh, 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.
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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
KP1 — 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
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