



## NEW BUILD

# Floating NPP leaves for Murmansk

The world's unique floating nuclear power unit Akademik Lomonosov has left the Baltic Shipyard in Saint-Petersburg. It will be towed to Murmansk, where nuclear fuel will be loaded into its reactors.

Fuel loading and first criticality are scheduled for autumn 2018. All procedures will be carried out in Atomflot's facilities.

Akademik Lomonosov will be operated in Pevek, Chukotka region in the northern part of Russia's Far East. It will supply both heat and electricity, as production at Bilibino Nuclear Power Plant and Chaun coal-fired power plant will be phased out. The floating NPP will save about 50,000 tonnes of CO2 emissions per year compared to the current levels. Upon its

connection to the grid, Akademik Lomonosov will become the northernmost nuclear installation in the world.

The floating NPP is expected be towed to the sea port of Pevek in summer 2019. At the moment the pier, hydraulic engineering structures, and other buildings, crucial for the floating nuclear power plant operation, are being built in Pevek.

*For reference:*

*The floating NPP was designed and built for supplying heat and electricity to remote areas. The reactors have the potential to work particularly well in regions with extended coastlines, power supply shortages, and limited access to electrical grids. The plant can be delivered to any point along a coast and connected to existing electrical grids.*

*Akademik Lomonosov is equipped with two KLT-40C reactors - each with a capacity of*

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*35 MW - similar to those used on nuclear icebreakers. Designed by Russian nuclear scientists and naval architects, the vessel is 144 meters long and 30 meters wide, and has a displacement of 21,000 tonnes. Akademik Lomonosov – the first ship of this kind – was named after the 18th century Russian scientist Mikhail Lomonosov.*

*The lifecycle of the FNPP is 40 years with the possibility of being extended to up to 50 years. After decommissioning, it will be towed to a special deconstruction and recycling facility.*

*Rosatom currently designs the second generation FNPPs, or Optimized Floating Power Units (OFPUs), which will be equipped with two RITM-200M reactors. Each them has the capacity of 50 MW. OFPUs will be smaller in size than Akademik Lomonosov.*

## Natural Cooling

**Leningrad NPP-2 Unit 1 was successfully tested at 40% installed capacity and found capable of withstanding blackouts and switching to natural coolant circulation. In the next phase of pilot operation, the unit will be running at 50% power.**

The facility passed a total of 18 tests at 40% of its capacity. “One of the most crucial tests was the blackout. The primary loop switched over to natural circulation to cool down by discharging steam into the air through fast-acting pressure reducing valves,” RosEnergoAtom’s spokesperson said.

The tests also included trial runs of the reactor instrumentation and control system and the emergency power supply system, and an assessment of thermal and hydraulic properties of the primary circuit piping.

“The trials were a success because we were well prepared. This mode was modeled twice with the full-scale control room simulator, and people were thoroughly trained,” said Alexander Belyaev, Chief Engineer at Leningrad NPP-2.

Leningrad NPP-2 Unit 1 was brought to 50% power on April 11 to be followed by the ascension to 75%, 90% and 100%. A set of tests will be carried out at each step.

Technical specifications of the unit will be once again checked during the 15-day tests at full load.

Leningrad NPP-2 Unit 1 with a VVER-1200 reactor was connected to the national power grid on March 9, 2018. RosEnergoAtom expects to commission the facility by late 2018. This unit will serve as a reference project for Turkey’s Akkuyu and Hungary’s Paks II.

## Last in the Series

**Rostov NPP Unit 4 has reached its full capacity and will be tested for about a month, Russian nuclear operator RosEnergoAtom reports.**

The reactor unit is operating in pilot mode, with machinery acceptance tests carried out under the supervision of Russian regulator Rostekhnadzor.

Rostov NPP Unit 4 was brought online on February 1, 2018. The power ascension process, during which the reactor’s power was gradually raised to the designated level, took 72 days and ended in mid-April.

The Rostov NPP is Russia’s only nuclear power plant with three units put in operation within seven years. All the units run on VVER-1000 reactors, with Unit 4 being the last one in Russia to have this



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reactor type. Over the last seven years, the power unit lead time – from the first concrete pouring to grid connection – decreased by 2.5 times. At present, Russia builds nuclear plants with VVER technology.

RosEnergoAtom expects Rostov Unit 4 to be put in full commercial operation by late 2018. After that, the Rostov NPP will account for 50% of power generation in the Rostov region.



## On-Site Construction Started

**On April 3, the first concrete pouring ceremony was held at Akkuyu NPP Unit 1. Turkey and its first nuclear power plant are now officially included in the IAEA Power Reactor Information System.**

The concreting of the reactor building foundation signals the beginning of on-site construction operations. Construction of hydraulic structures on the sea shore off the Akkuyu site started in 2015; construction of auxiliary facilities began in 2016. And now, after all permits were obtained, workers have gone ahead with the reactor building construction.

The plans are to time the startup of Akkuyu NPP Unit 1 in 2023 to coincide with the 100th anniversary of the

Republic of Turkey. Russia voiced its intention to award a large part of project-related contracts to Turkish companies.

After bringing all of Akkuyu's four units online, the plant will satisfy 10% of power consumption in Turkey.

Rosatom will build an advanced, reliable Generation III+ nuclear power plant with four VVER-1200 reactors in Turkey. It will meet all international safety standards. In Russia, such units are now constructed as standard. The first of them – Novovoronezh NPP Unit 6 – was put in operation in 2016, with Leningrad NPP-2 Unit 1 operating since February.

*For reference: Akkuyu is the world's first nuclear power plant built under a BOO (Build Own Operate) model. The project owner is Akkuyu Nükleer, a 100% subsidiary of Rosatom. Total costs of the project are estimated at \$20 billion. Four VVER-1200 units to be constructed at Akkuyu will have an aggregate installed capacity of 4.8 GW. The agreement signed between Russia and Turkey provides for Russian companies to have at least a 51% stake in the project owner. The remaining 49% stake will be sold to international investors. With regulated power prices, investments are expected to pay back within the first decade of operation.*

## Containment Dome for Belarus NPP

**ASE Group, a general contractor for the Belarus NPP, announced that it had finished pouring concrete for the internal containment dome of the plant's Unit 2.**

The concreting, required more than 3,000 cubic meters of concrete. The 24-meter high internal containment dome of the reactor building has an inner diameter of 44 meters.



Reactor units built are based the Russian Generation III+ design. Both Belarus NPP units have two – internal and external – containments. This solution minimizes the risk of negative external impact on the reactor, whether natural or man-made.

Next up at Unit 2 is the installation of a pre-stressing structure for the containment. It consists of steel ropes rigidly fixed and tightly stretched to make the concrete containment several times stronger.

Welding started on the primary loop piping after the dome was completed, welding started on the primary loop piping, with a total of 28 joints to be welded. Once the process is finished and the weld seams are checked for quality, hydraulic tests will start on the reactor.

*For reference:*

*The Belarus NPP will have two VVER-1200 reactor units. The first concrete was poured at Units 1 and 2 in November 2013 and April 2014 respectively. Unit 1 is scheduled to come online in 2019, followed by Unit 2 in 2020.*

## ECONOMY

### Revenue Growth

In 2017, Atomenergoprom's total revenue grew by RUB 47.2 billion (+6.7%) to RUB 747.1 billion (approx. USD 12.8 billion at the average exchange rate for 2017). These figures are presented in its audited financial statements prepared in accordance with international financial reporting standards.

The key revenue driver in 2017 was growth in sales of electricity on the domestic market.

Total profit of Rosatom Group companies in the reporting period increased by RUB 23.4 billion (+25.2%) year-on-year to RUB 116.2 billion (USD 1.99 billion). Assets grew by RUB 82.7 billion (+2.9%).

Atomenergoprom also managed to decrease its total debt by RUB 111.1 billion (down 37.6% year-on-year). According to Atomenergoprom, this step was necessary to prepare for upcoming major investment projects.

Key indicators of company's financial position and liquidity suggest we are very stable financially," Atomenergoprom states.

AtomEnergProm consolidates civil assets of the Russian nuclear industry.

## NEW BUSINESSES

### RosEnergoAtom to Help with Regulatory Issues

RosEnergoAtom, an electric power division of Russian nuclear corporation Rosatom, and Metsamor NPP (Armenia) signed a contract to jointly update Armenian national regulations for nuclear energy generation.

According to its terms, RosEnergoAtom's experts will help their Armenian colleagues to develop commissioning, operation, life extension and decommissioning standards and guidelines for nuclear power plants.

This effort will contribute to improving life-long safety of Russian-designed nuclear plants built outside of Russia. It will also reduce the lead time and costs of nuclear construction (since the regulatory framework will be in place) and

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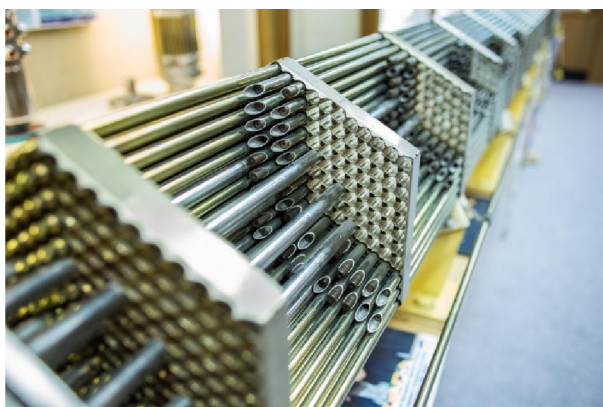
streamline the licensing process by the national regulator, a representative of the company explained.

In the future, RosEnergoAtom plans to provide regulatory framework updating services through a digital platform. The company is now engaged in developing a management system for technical documentation. Access to it for international customers will be fee-based.

In early April, RosEnergoAtom won a contract announced by the Belarus NPP to update the Belarusian regulatory framework for the nuclear power industry. The contract is expected to be signed by the end of April. The company also expects to sign similar contracts with Rosatom's partners from Iran, Turkey and Egypt in 2018–2020.

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### INNOVATION



## Improving Safety

**Rosatom's TVEL Fuel Company will bring accident tolerant fuel to the market in late 2019, said TVEL President Natalya Nikipelova in an interview to RIA Novosti.**

"TVEL is heavily engaged in developing new types of nuclear fuel. One of them is the so called accident tolerant fuel. Apart from accident prevention, it is more cost efficient as it extends the fuel cycle. I can say with certainty that our research

results in this field are ahead of competitors. I believe we will be able to put this fuel on the market in late 2019," Natalya Nikipelova said.

At present, TVEL invests about 5% of its revenue in different areas of research. Accident tolerant fuel will mitigate the risks of core meltdown and hydrogen explosions caused by the zirconium-steam reaction. TVEL may become the first company in the world to commercialize this type of fuel.

## Iran Buys New Fuel

**Rosatom's nuclear fuel division TVEL signed an addendum to its current contract for the supply of nuclear fuel to Bushehr NPP. According to the document, TVEL will supply advanced TVS-2M fuel bundles instead of the currently used UTVS assemblies.**

The first shipment of TVS-2M fuel assemblies to Iran is scheduled for 2020. Before that, Russian engineers will make all necessary calculations and submit technical documentation for the Iranian regulatory authority to license the new fuel. On the part of Iran, the addendum was signed by representatives of the Atomic Energy Organization of Iran and the Nuclear Power Production and Development Company of Iran.

"In comparison with UTVS fuel, the new-generation TVS-2M bundles have higher uranium density, fuel burn-up, and in-pile stiffness. The new version of nuclear fuel will make the power plant more cost-effective and reduce the amount of spent nuclear fuel," TVEL's statement says.

According to Alexander Ugryumov, TVEL Vice President for R&D, transition to TVS-2M is an optimal solution for VVER-1000 reactors using UTVS fuel in terms of technological consistency. The modified



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fuel is already used in operating nuclear power units in Russia.

*For reference:*

*Bushehr Unit 1 is a unique project. Its construction began in 1975 by West German reactor vendor KWU, but was later suspended. In the 1990s, Iran signed an agreement with Russia to resume the construction. According to the deal, Rosatom had to install a VVER-1000 reactor into the reactor building erected by KWU.*

*Unit 1 was brought online in 2011 to become the first nuclear power plant in the Middle East. Its commissioning made it possible in 2014 to sign a bilateral protocol to the Russian-Iranian agreement dated August 25, 1992. The protocol provided for the possibility of building up to eight more nuclear power units in Iran.*

*On November 11, 2014, the parties signed a contract to construct Units 2 and 3 at Bushehr. The Bushehr-NPP-2 project was launched in late 2016.*

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### MECHANICAL ENGINEERING

## Bottom for VVER-TOI Reactor Vessel

**AtomEnergMash made its first reactor vessel bottom for VVER-TOI.**

The lowest part of the reactor vessel to be installed at Kursk-2 Unit 1 will be manufactured at Atommash, AEM's subsidiary based in Volgodonsk (Russia). The manufacturing process was divided into two stages. First, a tube-shaped forged steel blank was flattened to obtain a steel plate. "This is the only way to make a seamless steel plate of the required dimensions," a representative of AEM explained.



The resulting 300 mm thick plate weighed 64 metric tons. At the second stage, the plate was heated at 1,070°C for six hours. Then, the red-hot plate was put into a press with a special die set. The required shape was obtained by stamping the plate with a force of 12,000 metric tons.

*For reference:*

*VVER-TOI is part of the VVER reactor family (TOI stands for 'standardized, optimized and automated'). VVER-TOI has a somewhat wider vessel than the VVER-1200. This critical component has fewer weld seams and, consequently, a longer service life. The VVER-TOI version also has more steam generators per meter.*

*It is fitted with a new main centrifugal pump cooled and lubricated with water. This solution helps minimize risks associated with the use of inflammable lubricants. The first unit with a VVER-TOI reactor will be built at Kursk-II to replace one of the units at the operating Kursk-I nuclear power plant.*

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### MEDICINE

## Mo-99 Supplies

**Rosatom's subsidiary JSC Isotope and Laboratorios Bacon, S.A.I.C. from Argentina signed a contract for the supply of molybdenum-99 (Mo-99) for medical purposes.**

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The two-year contract provides for weekly shipments. Molybdenum-99 for Argentina will be fabricated at the Research Institute of Atomic Reactors (RIAR).

The partnership between Isotope and Laboratorios Bacon started in 2013, but initial deliveries of Mo-99 to Argentina were irregular – only when the Argentinean research reactor producing this molybdenum isotope was shut down for maintenance.

“In 2017, the Russian party made a number of ‘back-up’ shipments to secure supplies of this critical isotope for Argentinean medical institutions. Technetium-99m, a product of molybdenum-99, is used in 70% of all diagnostic procedures in oncology and 50% in cardiology globally,” a representative of JSC Isotope said.

*For reference:*

*A company of Rosatom’s R&D division, RIAR is the number one isotope producer in Russia in terms of its product range.*

*JSC Isotope is an authorized supplier of isotopes fabricated by Rosatom Group companies. At present, nuclear isotopes are supplied to 100 foreign customers from 30 different countries. In Russia, Isotope sells isotopes to 600 companies, including medical institutions, industrial manufacturers and research laboratories. Izotop operates a special fleet to transport isotopes and provides a comprehensive range of professional services related to isotope sales, irradiation devices and medical equipment.*



## EU reforms its emissions trading system

[EC press-release](#)

The European Council formally approved the reform of the EU emissions trading system (ETS) for the period after 2020. The revised ETS directive is a significant step towards the EU reaching its target of cutting greenhouse gas emissions by at least 40% by 2030, as agreed under the EU's 2030 climate and energy framework, and fulfilling its commitments under the Paris Agreement.

“As Presidency we will work towards retaining the EU's leading role in the negotiations on the conclusion of the implementation rules of the Paris Agreement. Reducing greenhouse gas emissions will not only contribute to the fight against climate change but it will also positively impact the improvement of the air quality. Protecting the

environment and the health of European citizens is one of the priorities of the Bulgarian Presidency”, Neno Dimov, Bulgarian Minister of Environment and Water.

The emissions trading system is reformed by introducing the following elements:

- The cap on the total volume of emissions will be reduced annually by 2.2% (linear reduction factor).
- The number of allowances to be placed in the market stability reserve will be doubled temporarily until the end of 2023 (feeding rate).
- A new mechanism to limit the validity of allowances in the market stability reserve above a certain level will become operational in 2023.

The revised ETS directive also contains a number of new provisions to protect industry against the risk of carbon



## TRENDS

leakage and the risk of application of a cross-sectoral correction factor.

The share of allowances to be auctioned will be 57%, with a conditional lowering of the auction share by 3% if the cross-sectoral correction factor is applied. If triggered, it will be applied consistently across the sectors.

Revised free allocation rules will enable better alignment with the actual production levels of companies, and the benchmark values used to determine free allocation will be updated.

The sectors at highest risk of relocating their production outside the EU will receive full free allocation. The free allocation rate for sectors less exposed to carbon leakage will amount to 30%. A gradual phase-out of that free allocation for the less exposed sectors will start after 2026, with the exception of the district heating sector.

The new entrants' reserve will initially contain unused allowances from the current 2013-2020 period and 200 million allowances from the market stability reserve. Up to 200 million allowances will be returned to the market stability reserve if not used during the period 2021-2030.

Member states can continue to provide compensation for indirect carbon costs in line with state aid rules. Reporting and transparency provisions are also enhanced.

*For reference:*

*The EU emissions trading system sets a cap on how much CO<sub>2</sub> heavy industry and power stations can emit. The total volume of allowed emissions is distributed to companies as permits which can be traded.*

*ETS is a cornerstone of the EU's policy to combat climate change and its key tool for reducing greenhouse gas emissions cost-*

*effectively. Set up in 2005, it is the world's first major carbon market and remains the biggest one. It operates in all 28 EU countries plus Iceland, Liechtenstein and Norway. ETS limits emissions from more than 11.000 heavy energy-using installations (power stations and industrial plants) and airlines operating between these countries. It covers around 45% of the EU's greenhouse gas emissions. Putting a price on carbon and trading it delivers concrete results for the environment: In 2020, emissions from sectors covered by the system will be 21% lower than in 2005.*

*The formal approval at the Council is the final step in the legislative process. The new directive will enter into force on the 20th day following its publication in the official journal.*

- [Directive amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments and Decision \(EU\) 2015/1814](#)
- [Reform of the EU emissions trading system – Council endorses deal with European Parliament](#)
- [Revision of the emissions trading system: Council agrees its position](#)

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## Renewables in Germany: Consequences of Growth

**In 2017, Germany set a new record as renewable energy accounted for 36.1% of all electric power consumed in the country. Reports indicate that, however, this has not brought the German Government anyway closer to its goal of cutting CO<sub>2</sub> emission by 40% against the 1990 level.**

According to [Agora Energiewende](#), a think tank supporting the country's transition to a low-carbon economy, the figure of 36.1% indicates the fastest ever growth in renewable generation (+3.8% year-on-year). Wind turbines account for the most of recently commissioned 'clean' capacity.

The share of coal-fired and nuclear power plants fell to its lowest level in 27 years, as estimated by Agora Energiewende. According to the IAEA, German nuclear stations generated 11.63% of electric power consumed in the country.

Despite the record set by renewable generation, Agora Energiewende admits that CO2 emissions in Germany remained flat for the past three years. This does not allow the country to meet its 2020 emission reduction goals.

"If the current trend continues, Germany will only achieve a 30% reduction in its emissions by 2020 as compared to the 1990 level, instead of 40% as planned," says Dr Patrick Graichen, Director of Agora Energiewende.

According to the think tank, the German energy industry 'cut some of its emissions as the share of coal-fired stations decreased'. At the same time, CO2 emissions increased in the transportation, construction and processing industries on the back of growing oil and gas consumption. Nothing is said in the English part of Agora's report as to why the consumption has grown.

Electricity prices in Germany are also on the rise. According to Agora's estimates, the price of electricity for households in 2018 will for the first time ever exceed 30 eurocents per kilowatt-hour. The end price is growing despite large subsidies for the renewable energy industry.

A larger share of renewable power stations intensifies price fluctuations on the German wholesale power market. The negative market price of electricity (when an energy company pays consumers for the power consumed) in 2017 was registered during 146 hours only. This has been the longest period since Germany began its transition to renewables.

Agora Energiewende also admits that there were 'many hours' (no exact numbers given) when the price was higher than 10 eurocents per kilowatt-hour. It should also be noted that wholesale prices are always several times lower than those paid by end consumers, particularly households. To make price differences less radical, advocates of the renewable power expansion suggest establishing power and heat storage systems. Nothing is said, however, as to how construction and operations costs of such facilities will be compensated.

The general public in Germany is overall positive about the energy transition policy, Agora Energiewende reports. At the same time, the think tank's experts admit that 'many see the renewable pricing as unfair already now'.

According to Agora's forecast for 2018, the total installed capacity of wind and solar power stations in Germany will reach 4 GW and 2 GW respectively. Also in 2018, Germany will permanently shut down Gundremmingen Unit C (the plant's total installed capacity is 1.344 GW) and decommission coal-fired power units with a total installed capacity of 1.1 GW. New gas and coal-fired stations will replace 1.8 GW more of the same type generation capacity.

## ATOMEXPO Expands Reach

At least 80 countries have confirmed their participation in the 10th Anniversary International Forum ATOMEXPO 2018, which will begin on May 14 in Sochi (Russia), Rosatom Director General Alexey Likhachev said.

“There is every reason to believe that Sochi is becoming Nuclear Davos,” the head of the Russian nuclear corporation added.

Atomexpo is organized by Rosatom and has been held annually since 2009. Its program in 2018 will include 20 different events under the general theme of ‘Global Partnership for Joint Success’. Top nuclear industry executives, government officials, representatives of international organizations and leading experts will attend the forum to discuss the most pressing issues of multilateral cooperation in the application of nuclear technologies. The latest industry solutions and nuclear energy projects will be presented at the exhibition that’s part of the Forum.

The anniversary Forum will also host a special inaugural event – ATOMEXPO AWARDS – to recognize outstanding contributors to the global development and expansion of the nuclear industry for the good of mankind. The awards ceremony will be held on May 14, the opening day of the Forum.

## Nominees Selected

Companies from 22 countries filed ATOMEXPO AWARDS submissions, which will be held on May 14, the

opening day of the 10th International Forum ATOMEXPO 2018 in Sochi, have been filed by.

Awards will be given in five categories. The Best Launch award will be presented to the most promising nuclear development programs. The best projects for non-nuclear application of nuclear technology, such as nuclear medicine, safety and security, non-destructive testing and processing, will receive awards in the Nuclear Technology for Better Quality of Life category.

The Innovations for the Future category will include the most innovative construction, operation, decommissioning and engineering projects in the nuclear industry.

Awards in the Public Communication category will be given to the best communication projects aimed at improving public acceptance of nuclear energy.

Finally, the Human Capital Development Awards will be presented to talent management projects in the nuclear industry.

An independent international jury consisting of nuclear experts from different countries will determine the winners. Three awards will be given in each category. The final meeting of the jury will take place on May 13.

*For reference:*

*Award applications have been filed by companies from Austria, Belarus, Belgium, Bolivia, Brazil, United Kingdom, Hungary, Ghana, Germany, Egypt, Zambia, India, Iran, Spain, Kenya, Mongolia, Netherlands, Russia, Turkey, Finland, France and South Africa.*



## ROUND TABLES

### Fuel Cycle in Focus

The round-table discussion 'Fuel Life Cycle. Challenges and Promising Solutions' will be held from 10:00 AM till 1:00 PM on May 15 as part of ATOMEXPO 2018 in the Orange Hall of the Main Media Center, according to TENEX.

Russian nuclear corporation Rosatom is the global leader in the nuclear fuel fabrication and spent fuel management technology.

The next stage of the global nuclear industry development will be a transition to the so-called 'closed' nuclear fuel cycle. Russia is working to develop technological solutions to close the fuel cycle with fast neutron reactors.

Rosatom also continues testing REMIX, a new type of fuel that can be reprocessed multiple times and will improve utilization of uranium in light-water reactors. Another important project launched by the Russian nuclear corporation is the development of accident tolerant fuel.

All these topics will be discussed at the round-table 'Fuel Life Cycle. Challenges and Promising Solutions'. Reports will be made by Vladimir Asmolov, a member of the IAEA International Nuclear Safety Advisory Group (INSAG), Mikhail Baryshnikov, Head of the Innovative Products Department at TENEX, Dmitry Kolupaev, Chief Engineer at Mayak, Peter Breitenstein, Vice President of Orano, and Luc Van Den Durpel, Managing Director of Nuclear-21.

### Digital Future of Nuclear Plants

'Digital Future of NPP Control Systems: What Will It Be Like?' is a theme of the round-table discussion organized by RASU (a Rosatom Group integrator for automated control systems). The discussion will be held from 10:00 AM till 1:00 PM on May 15 in the Green Hall of the Main Media Center.

Participants will discuss the use of digital technologies across the life cycle of a nuclear power plant. The round-table discussion will be focused on the mitigation of industry risks associated with the growing complexity of control processes, increasing cyber security threats, and stricter rules and regulations in the nuclear industry.

"It is becoming obvious that global alliances will increase their role in making nuclear plants competitive. Cooperation, partnership and active involvement in shaping trends and neutralizing global threats are crucial for producing efficient, reliable and safe control systems for nuclear power plants," Andrei Butko, CEO of RASU, commented on the upcoming event.

The round-table discussion 'Digital Future of NPP Control Systems: What Will It Be Like?' will take place from 10:00 AM till 1:00 PM on May 15 in the Green Hall of the Main Media Center.

### Play to Learn

A special quest will precede the round-table discussion 'Building Competencies for Emerging and Expanding Nuclear Countries'. This round-table meeting will be organized

from 2:30 PM till 4:30 PM on May 14 in the Orange Hall of the Main Media Center.

To take part in the Build Your Nuclear Infrastructure quest game, guests of the Forum will have to install a mobile application under the same name. To complete the quest, they will have to collect elements of the nuclear infrastructure (legal framework, stakeholder engagement, security, protection, etc.) at different ATOMEXPO exhibition stands. The final stage of the quest will take place at the of RosEnergAtom stand.

Rusatom Service, provider of maintenance and upgrade services for nuclear power plants, will organize the round-table discussion. It will be focused on the development of nuclear infrastructure by emerging and expanding nuclear countries. Participants and guests of the meeting will learn more about the best industry practices in nuclear infrastructure development, potential problems facing emerging nuclear countries, and ways to mitigate risks.

Reports at the discussion will be made by Alexei Ferapontov, Deputy Director of Russian regulatory agency Rostekhnadzor, Dr. Mohamed Chookah, ENEC Executive Director for Nuclear Fuel Procurement, Lilia Dulinets, Deputy Director of the Nuclear Energy Department of the Belarusian Ministry of Energy, and Kirill Komarov, Rosatom's Deputy CEO for Corporate Development and International Business. In addition, a joint report will be presented by Tatiana Terentieva, Director of Rosatom's HR Department, and Evgeny Salkov, CEO of Rusatom Service.

## 3D Printing at ATOMEXPO

Additive manufacturing technology and solutions will be discussed at the round table 'Additive Technology as a Key Component of the New Industrial Revolution'. This event will take place from 2:00 PM till 5:00 PM on May 15 in the Green Hall of the Main Media Center.

The round-table discussion is organized by Rosatom's TVEL Fuel Company. Its participants will talk about the development and application of additive (3D printing) technology in the energy industry and other areas. Much attention will be paid to environmental safety of materials used in 3D printing.

Alexei Dub, CEO of Rusatom Additive Technologies, and Blanka Szost from Oerlikon AM (Germany) will serve as moderators.

Representatives of national and international manufacturing companies and developers of additive systems and solutions will attend the meeting.

## Nuclear with Harmony

At the round-table "Harmony in public acceptance: can the global nuclear industry achieve it by 2050?" best practices in the realm of public acceptance projects will be presented. It will take place on May 14 between 1:00 to 3:00 p.m. in the hall "Blue" of the the Main Media Center.



# ATOMEXPO-2018

“Harmony in public acceptance: can the global nuclear industry achieve it by 2050?” will bring together top global nuclear industry experts who will answer questions about the most effective ways of working with public opinion.

Roundtable speakers include Dr. Kirill Komarov, First Deputy CEO for Corporate Development and International Business at Rosatom, Jeremy Gordon, Advisor of the WNA on the Programme “Harmony”, Dr. Attila Aszódi, state secretary for the maintenance of the performance of the Paks NPP, and Minna Forsström, Project Director at Fennovoima.

The framework of the event entails open discussion among the participants. The list includes Christian Vega, President of the Argentine Youth Nuclear Generation, Dr. Anthonie Cilliers, Regional Coordinator of the African Nuclear Education, Science and Technology (AFRA-NEST), Carlo Arcilla, Director of Philippine Nuclear Research Institute (PNRI), Basett Buyukah, Director of Publicity and Advocacy of the Kenya Nuclear Electricity Board, and Dr. Robert B. M. Sogbadji, Deputy Director of Nuclear and Alternative Energy, the Coordinator of the Ghana Nuclear Power Program. Dr. Ben Heard, founder and Executive Director of the “Bright New World” association will moderate the discussion.

*For the reference:*

*Within the framework of its Harmony programme, the World Nuclear Association (WNA) emphasizes ambitious nuclear industry development goals. By 2050, the share of nuclear power in the global energy basket needs to amount to 25%. This would only be possible if no fewer than 1000 GW of new power capacities are commissioned by the aforementioned year.*





## Foundation Completed

ASE Group, Rosatom's engineering division and a general contractor for Rooppur NPP, reported that concreting of the foundation slab for the plant's Unit 1 had been completed.

"The work is proceeding on schedule. Our next major step is to erect containment walls," said ASE Senior Vice President Alexander Khazin.

Shawkat Akbar, Director of the Rooppur Project on the part of Bangladesh, noted that the foundation concreting would soon begin at Unit 2. Pursuant to the tripartite memorandum on cooperation between Russia, Bangladesh and India, 50 young Bangladeshi engineers, who will later work at Rooppur, will be sent to India for training, he said. Other 125 students will be trained in Russia.

The Rooppur nuclear power plant will have two VVER-1200 reactor units. The construction contract was signed in December 2015.

## Talents for Rooppur

Nuclear Power Plant Company Ltd (NPPCL), an owner of the Rooppur project, has launched a campaign to recruit qualified employees. According to local media reports, the first 100 employees have already been hired by NPPCL.

All of them – 70 engineers, 24 researchers and six managers – are graduates from Bangladeshi universities. They will undergo additional training in Russia and India before starting their jobs at Rooppur.



# BANGLADESH

A special Bangladeshi-Russian commission is in charge of the recruitment process. It is also responsible for additional training and knowledge assessment of employees.

“We will work on improving skills of our researchers and engineers to meet international construction, operation and safety standards,” said Dr. Shawkat Akbar, NPPCL Managing Director and Rooppur Project Director.

According to Anwar Hossain, Secretary of the Ministry of Science and Technology, a new training center will be established on the plant’s site. Rooppur will need 2,700 qualified employees to operate and maintain its two power units, with 2,535 of them to work right on the site.

New employees will be trained in Russia and India. According to agreements between the countries, Bangladesh will send abroad 251 university graduates in 2019, 309 in 2020, 507 in 2021 and 86 in 2022 respectively. All of them will do an internship at Russian nuclear power plants.