



LEAD STORY

## ATOMEXPO 2017 Sets Records

**Moscow-hosted ATOMEXPO 2017, the largest international nuclear forum, came to an end. The forum set a new record with over 50 intergovernmental and commercial agreements signed within three days. The number of visitors was also record high with more than 6,000 registered delegates representing 65 countries and 650 companies. You will find more details of the event in the current and next issues of Rosatom Newsletter.**

The first day of the forum was devoted to a plenary session of global nuclear leaders who discussed the role of nuclear energy in non-carbon economy. “Mankind is facing two challenges. The first one is availability of electricity. Over two billion people worldwide have restricted access to electric power. The other challenge is

nature conservation,” Alexei Likhachev, CEO of Rosatom, noted when speaking at the plenary session. According to him, a third of electricity comes from hydrocarbon sources, which produce more than 13 million tons of CO<sub>2</sub> emissions every year. It is clear that the global power industry should reduce emissions. “Renewable sources will make a larger contribution to solving this task than they do today, but they will not be sufficient to both cover peak loads and provide base load power.” It is nuclear energy that should generate base load electricity, he said. “Nuclear power plants are long-term, reliable sources of power. Fuel accounts for less than 10% of nuclear generation costs; the share of natural uranium is even less. This solves three important tasks of establishing a long-term tariff policy, securing return on investment in the existing nuclear plants, and facilitating the prospective development of energy-intensive industries. Along with being environmentally friendly, the nuclear power industry is a kind of insurance policy for national economies.” He noted

that nuclear plants outperformed solar farms in terms of capacity utilization.

Rosatom's CEO also mentioned the Paris Climate Change Agreement. "Certain political developments put the agreement on the agenda again. Two things should be remembered when speaking about its future. The agreement will be effective, and each country will have an opportunity to change the scope of its involvement and forms of participation. The second thing is that the agreement is a truly 'green' way of the power industry development till 2050." He also said that the global target to be achieved by 2050 was to receive 80% of power from non-carbon sources. "It means that installed capacity of nuclear power plants should be increased from 390 GW to 930 GW." To secure this growth of nuclear generation, satisfy the rising demand for electric power and simultaneously reduce CO2 emissions, large players of the nuclear generation market should join their efforts and work as one to contribute to the common goal, Alexei Likhachev concluded.

Agneta Rising, Director General of the World Nuclear Association, also spoke about the need to develop nuclear energy. "If we look at environment, cost of electricity or security of supply, nuclear energy is the only energy source that ticks all these three boxes at the same time. It is amazing to see that some really intelligent and highly developed countries are going in another direction," Agneta Rising said. According to her, the global nuclear industry set a target of how much electricity should come from nuclear sources by 2050. "In 2050, the nuclear share should be 25%, and it means building 1000 GW of new capacity by that time. We know only one country that has politically closed its nuclear program. It is Germany. Its ambitious goal is to reduce CO2 emissions while protecting their

industry and customers from high electricity prices and keeping Germany competitive. Wind and solar capacity commissioned in the country has exceeded the total nuclear capacity of France. France is the country where nuclear accounts for 75% of electricity generation. They have decarbonized their electricity system. By contrast, Germany has not reduced its CO2 emissions although it has put in operation the same non-carbon capacity. Electricity prices for the industry are the second highest in Europe. This owes a lot to government subsidies for renewables. In the Harmony, we set a target for the global nuclear industry to provide 25% of electricity in the world. It is called 'harmony' because we need to harmonize all low-carbon options. All major institutions keep saying that we need nuclear energy."

It is impossible to stop climate change without nuclear energy, says William Magwood, Director General of the OECD Nuclear Energy Agency. "If we made a firm decision to fight climate change, we cannot go without developing nuclear energy. To meet the COP21 requirements, we have to increase the global nuclear capacity 2.5 times from what we have today," he said.

Participants of the plenary session were united in the opinion that nuclear should be a reliable source of base load electricity and a basis of low-carbon energy of the future. They agreed that there would be no competition between nuclear energy and renewable sources, such as wind, solar and hydro, in the foreseeable future. "There is no need to look for the opposition between nuclear and renewables as they can work to the same goal," stressed Daniel Verwaerde, General Administrator of the Alternative Energies and Atomic Energy Commission (France).

## STRATEGY



## Turkish Companies to Acquire Stake in Akkuyu

**One of the central events at ATOMEXPO 2017 was the signing of a framework agreement on the acquisition of a stake in Akkuyu Nükleer by Turkish companies. Akkuyu Nükleer is a company that will build and operate the first nuclear power plant in Turkey.**

The consortium of three Turkish companies includes Jengiz Holding (Cengiz Holding A.Ş.), Kolin İnşaat Turizm Sanayi ve Ticaret A.Ş. and JSC "Kalyon İnşaat" (Kalyon İnşaat Sanayi ve Ticaret A.Ş.). It will acquire a 49% share in Akkuyu Nükleer A.Ş. established in Turkey to carry out the Akkuyu project. One of the consortium companies, Cengiz İnşaat Sanayi ve Ticaret A.Ş., is already engaged in the Akkuyu project as a contractor for building the turnkey construction of offshore hydraulic structures. According to the agreement signed by Russia and Turkey in 2010, Russian companies should hold at least a 51% share in the project operator.

The amount of the deal will not be disclosed until the shareholder agreement is signed by the parties. The signing is

expected to take place before the end of 2017. The signed agreement provides the possibility of attracting the necessary volumes of borrowed financing. The stake acquisition will be the first ever external investment in a nuclear BOO (build – own – operate) project worldwide. This is the world's largest private investment in nuclear energy for the past 17 years. The Turkish companies joining Akkuyu project have extensive experience in construction and operation of energy facilities in the Republic of Turkey, including BOO projects.



*"These Turkish companies are well-known and active on both construction and power markets. This is a truly remarkable event, since it*

*will be the largest private investment into a Russian project abroad and, perhaps, into any nuclear project worldwide for the last several years. The deal will benefit not only the project itself, but also the public acceptance of nuclear power, which is one of the key topics at ATOMEXPO. It is very important for us to have a partner that has such a good understanding of both construction and power markets in Turkey. These companies have extensive expertise and a great deal of finished projects, which were non-nuclear – because Turkey's first nuclear power plant is yet to be built – but focused on construction and operation of power generation capacities in the country. We are sure that the cooperation with such reliable partners will add to the efficiency of our project," said Kirill Komarov, Rosatom's First Deputy CEO for Corporate Development and International Business.*

## FOR REFERENCE

**Jengiz Holding JSC (Cengiz Holding A.Ş.)** founded in 1969 is one of the largest construction, mining and industrial holdings in Turkey, and has implemented projects in the field of traditional energy, including the BOO projects. The total value of the completed projects of the holding is 8.12 billion US dollars, current projects – 14.5 billion US dollars. The operation of the energy division of the holding began in 1998. The total installed capacity is 2,131 MW including hydro, thermal and solar. The total capacity of the projects under implementation is 2,811 MW. For more than 10 years the holding is listed in ENR "250 Top International Contractors" rating.

**Kolin İnşaat Turizm Sanayi ve Ticaret A.Ş.** is one of the largest construction and industrial holdings in Turkey with experience in implementing projects in the field of construction of industrial, generating and infrastructure facilities. It was founded in 1977. The total cost of completed projects is \$5.8 billion, current projects - \$13.5 billion. In 2016, the holding was at 230th place in the ENR "250 Top International Contractors" rating. Kolin's total power generation asset base is 1150 MW (640 MW operating hydro and 510 MW lignite under construction).

**Kalyon İnşaat JSC (Kalyon İnşaat Sanayi ve Ticaret A.Ş.)** is one of the largest construction and industrial holdings in Turkey, founded in 1974. Currently it works in many countries: Russia, Libya, UAE, Saudi Arabia, Iraq,

Qatar. As part of the Holding, companies that own hydroelectric power plants of river type with an installed capacity of more than 100 MW, and enterprises for activities in the sale and distribution of natural gas.



## ABOUT THE AKKUYU NPP PROJECT

The Intergovernmental Agreement on cooperation between Russia and Turkey in the construction and operation of the first Turkish nuclear power plant on the Akkuyu site in Mersin province in southern Turkey was signed in 2010. The Akkuyu nuclear power plant project consists of four power units with Russian Generation III+ WWER reactors incorporating safety features for all scenarios. The capacity of each NPP power unit will be 1200 MW. The total cost of the project is about 20 billion US dollars. The Akkuyu nuclear power plant is the world's first nuclear power plant project, implemented on the BOO model ("build-own-operate"). On June 15, 2017, the Turkish Energy Market Regulatory Authority issued to JSC AKKUYU NUCLEAR a license to generate electricity valid until 2066. The main construction license is expected to be received in 2018.

## COOPERATION

### Nuclear Center for Zambia

**The project to build a center for nuclear science and technology is gathering pace. Rosatom and Zambia signed four project documents at ATOMEXPO 2017.**

The first document was signed between AtomStroyExport and the Ministry of Higher Education of the Republic of Zambia. It is a contract for a preliminary engineering survey of the site designated for the nuclear science and technology center. According to the contract, AtomStroyExport will begin the site survey in the near future to acquire data necessary to design and construct the facility.

The second document is a contract for services to assess and develop national nuclear infrastructure in the Republic of Zambia. The contract was signed between Rusatom Service and the Ministry of Higher Education of the Republic of Zambia. This contract provides for assessing potential nuclear infrastructure components and drawing up a plan for their development in accordance with IAEA recommendations.

The third agreement was a project development agreement signed by Rusatom Overseas and the Ministry of Higher Education of the Republic of Zambia. Its purpose is to provide a basis for negotiations about the construction of a nuclear science and technology center in the Republic of Zambia. "Rosatom is ready to assist Zambia in developing nuclear science and technology in the



country. The agreements signed today represent a very important step in implementation of the project. We expect a general construction contract for the nuclear center to be agreed upon and signed before the end of 2017," said Evgeny Pakermanov, President of Rusatom Overseas.

Finally, Rusatom Overseas and the Zambian Ministry of Energy signed a project development agreement for a preliminary feasibility study of the nuclear plant construction in Zambia. According to the agreement, Rosatom engineers will assess feasibility of the nuclear plant construction project.

The Zambian nuclear center will feature laboratories, test rooms and production facilities. According to Rosatom, the center will enable research in radiobiology and fabrication of radioisotopes to be used in cancer diagnostics and treatment. Another application area for nuclear technology will be irradiation of foodstuffs and agricultural products to protect them against pests, extend shelf life and set the scene for an increase in Zambia's agricultural exports and development of the country's livestock breeding. The center will also contribute to training local talent to work in Zambia's nuclear industry and deliver national research programs.



## Sudan, Ethiopia and Uganda: Rosatom's New Partners

**Atomexpo has always been a venue for promoting cooperation in the nuclear power industry. This year's forum was no exception as Rosatom signed major cooperation agreements with Sudan, Ethiopia and Uganda.**

Rosatom and Sudan's Ministry of Water Resources, Irrigation and Electricity signed a memorandum of understanding on peaceful uses of nuclear energy. It is the first agreement between the countries to promote cooperation in the nuclear industry. It provides for bilateral cooperation across many areas, including development of nuclear infrastructure in Sudan, raising public awareness of nuclear technology and application, radioisotopes and irradiation for industrial, medical and agricultural purposes.

The agreement covers radiation safety and security, fundamental and applied research, training of human resources, nuclear research centers with multi-purpose research reactors, etc. The Russian-Sudanese joint working group will define the scope of initiatives to be implemented.

The parties also agreed to jointly assess feasibility of such projects as a nuclear science and technology center with a research reactor and construction of a Russian-designed nuclear power plant. A road map for the Russian-Sudanese cooperation on peaceful uses of atomic energy was agreed to be developed in accordance with the memorandum.

### **MoUs with Uganda and Ethiopia**

On the same day, Rosatom signed memorandums of understanding on peaceful uses of nuclear energy with the Ministry of Energy and Mineral Development of Uganda and the Ministry



of Science and Technology of Ethiopia. These documents are also the first agreements with these countries aimed at promoting cooperation in the nuclear industry. The agreement with Uganda provides for bilateral cooperation across many areas, including development of nuclear infrastructure in Sudan, raising public awareness of nuclear technology and application, radioisotopes and irradiation for industrial, medical and agricultural purposes. The agreement



covers radiation safety and security, fundamental and applied research, training of human resources, nuclear research centers with multi-purpose research reactors, etc. The joint working group of Russian and Uganda will define the scope of initiatives to be implemented. The same scope of cooperation is provided for in the memorandum signed by Rosatom and Ethiopia.

## IN BRIEF

### **RASU to Cooperate with Doosan Heavy Industries**

*Rosatom's subsidiary RASU and Doosan Heavy Industries signed a memorandum of understanding at the 9th International Forum ATOMEXPO 2017.*

The parties plan to expand their cooperation in automated radiation monitoring systems (ARMS) and neutron flux detectors for Korean-designed nuclear power plants. Such systems are developed by RASU as an integrator of I&C and electrical engineering businesses of Rosatom. Doosan Heavy Industries in a consortium with Samsung C&T and Hanhwa Construction has won a contract to construct Shin Kori Units 5 and 6. Unit 5 is expected to be put in commercial operation in March 2021, followed by Unit 6 in March 2022.

### **Rusatom Service and Škoda JS to Repair Steam Generator Vessels**

*Rusatom Service JSC and Škoda JS have signed a memorandum of understanding and agreed to cooperate in repairing welded joints of steam generator vessels for Russian-designed VVER-440 reactor units.*

The MoU aims at expanding cooperation between the companies and identifying specific joint projects. The memorandum was signed on 20 June 2017 at the 9th International ATOMEXPO Forum in Moscow. The signatories to the document were Evgeny Salkov, CEO of Rusatom Service, and Josef Perlik, Chairman and CEO of Škoda JS.