Rosatom To Build Nuclear Center in Zambia

Russia and Zambia are breaking new ground by signing a framework cooperation agreement on the construction of the Center for Nuclear Sciences and Technology in Zambia. The document was signed by Rosatom CEO Alexei Likhachov on the Russian part and Simon Miti, Deputy Head of Zambia's Office of the President, on the Zambian part. The agreement provides for the center to be built around a multipurpose 10 MW VVER reactor.

The center will include laboratories and test rooms for different research programs. According to Rosatom, the center allows for doing research in radiobiology and fabrication of radioisotopes to be widely used in cancer diagnostics and treatment. Another application area of nuclear technology will be irradiation of foodstuffs and agricultural products to treat 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.

Besides, the center will be an important means of training local talent to work in Zambia's nuclear industry and deliver national research programs.

"We entered the signing phase within a very short term," noted Rosatom CEO Alexei Likhachov. "This is just the beginning of our sustained efforts in creating a new industry in Zambia. We are in for a great deal of joint research. The reactor will be a driver of all those projects, and my hope is that it will take Zambia to a new level in technology. Besides, this is a very good commercial project." He noted that nuclear industry had a very long life cycle. "Today, we are setting goals for centuries ahead. My sincere hope is that the coming centuries will see progress of our commercial projects and bring handsome profits to the stakeholders. Russia is ready to give you support and share its best

technologies and practices at every step," Rosatom CEO added.
"This is a very important step for us all. First, it kicks off a process of helping us in national industrialization based on nuclear technology. We are grateful to the Russian government and Rosatom for offering this opportunity. Second, it will help us deal with one of the key challenges. We are confronted with a shortage of water and depend on this resource in power generation. Last year our economy faced a 50% slump for this reason. With the climate change continuing, we are not certain to avoid such problems in the future. We need to improve the country's energy mix to secure sustainable power supply for the next 15 years," said Simon Miti. Apart from staff training, he noted, Rosatom will help Zambia establish a legal framework for peaceful uses of nuclear energy and improve public acceptance of the nuclear.
"We have started this work thanks to concerted efforts of our delegations," he said.
Rosatom has built over 120 research reactors across the globe, with over 20 of them outside Russia, particularly in China, Egypt, Germany, Czech Republic, etc. In March 2016, Russia and Bolivia agreed to construct a nuclear science and technology center that would comprise a research reactor. The framework agreement provides for the center to be built in El Alto. It will feature a multi-purpose gamma irradiation unit, a pool-type pressurized water research reactor, a cyclotron, an engineering department and several research laboratories. The new research and development center will be Bolivia's first step into the world of nuclear technology and its first attempt at applying it in science, medicine, industry and agriculture.

In August 2016, Rosatom and the Bolivian Atomic Energy Agency (ABEN) signed the first commercial contracts related to the construction project. They cover a site survey and comprehensive assessment of Bolivia's nuclear infrastructure. Bolivia will invest 300 million dollars in the project.

INTERVIEW

Modernization Is Promising Market

Andrei Rozhdestvin, "We are interested in partnerships with European countries and companies across multiple areas of interest, including nuclear construction."

Rosatom is the world's only company to operate in every sector of the nuclear energy industry, from uranium mining and nuclear construction to maintenance, decommissioning, and radioactive waste management. The company's portfolio of overseas projects is growing every year.

Rosatom is now a global leader in terms of nuclear construction projects in progress. The Russian state-run nuclear corporation differs from foreign peers in its ability to offer customers integrated solution, Andrei Rozhdestvin, Vice-

President of Rosatom Western Europe, said in an interview to The Politico newspaper. Rosatom's offer centers around a VVER-1200 power reactor, with its design already proven in a reference project, a recently started unit at Novovoronezh-2. Similar reactor units are going to be built in Finland, Hungary, Turkey, Bangladesh and Egypt. The integrated solution also covers fuel deliveries, maintenance, modernization, management of spent nuclear fuel and radioactive waste, workforce training, and assistance in licensing and standardization.

"Vertical integration of our value chain gives us a unique opportunity to come up with turnkey solutions, which are particularly in demand among emerging nuclear energy countries. Unlike the competition, our latest generation of power reactors (3 and 3+) have already been built and put in operation. Before offering our products to customers, we test them to have reference projects," says Andrei Rozhdestvin.

According to him, nuclear power plant maintenance and modernization services are Europe's most promising market segment for Rosatom. This is best exemplified by the Russian-French life extension project at Bulgaria's Kozloduy. Another example is a running contract for the modernization of four operating reactors at Hungary's Paks and delivery of machinery and equipment for this project. Nuclear decommissioning is one more important segment of the European nuclear market. At present, Nukem Technologies Engineering Services GmbH, a German-based subsidiary of AtomStroyExport [Rosatom's foreign engineering division] is decommissioning a power reactor in Philippsburg (Germany). "In the long run, we are also considering a possibility of building new generation capacity in Europe. There is also a good outlook for fuel supplies to Western-designed nuclear stations. Our contract with Vattenfall is a major achievement and a foundation for the expansion into this new segment of the European nuclear market," Andrei Rozhdestvin concludes.

IN BRIEF

IAEA: Belarus Nuclear Station Is Serious Project

The Belarus Nuclear Power Plant, now under construction in Ostrovets, a Belarusian town next to the Lithuanian border, complies with the safety standards established by the International Atomic Energy Agency (IAEA). That was said by Juan Carlos Lentijo, Deputy Director General and Head of the IAEA Department of Nuclear Safety and Security, in an interview to BNS. "I visited the construction site last year and, in my opinion, it is a serious project," he added. According to him, Belarus should improve contacts with Lithuania to prove that it is committed to nuclear safety. In mid-January, IAEA representatives completed a SEED (Site and External Events Design) mission in Ostrovets and concluded that Belarus had minimized all possible external hazards on the site (Read the full story in the upcoming issue).

Japanese Nuclear Experts Visited Leipunsky Institute

Representatives of the Tokyo Institute of Technology and Japan's Science and Technology Agency visited Leipunsky Institute of Physics and Power Engineering in Obninsk (Kaluga Region, Russia) to see Russia's major achievements in the fast breeder technology and share their experience in nuclear decommissioning.

The meeting was stipulated in the Memorandum on Peaceful Uses of Nuclear Power signed in December 2016 by Rosatom, Japan's Ministry of Economy, Trade and Industry and Ministry of Education, Culture, Sports, Science and Technology. Toru Obara and Yuko Tsuda from the Japanese delegation found the visit to be useful and interesting and noted the importance of mutual understanding in pursuit of joint goals. The visitors also expressed a hope that the meeting would be the first step to future cooperation. In their turn, researchers and experts of Leipunsky Institute assured that they were open for contacts and cooperation in research.

Integrated Solution To Every Customer

Rosatom CEO Alexei Likhachov speaks to the Világgazdaságnak newspaper about Rosatom's performance in 2016, advantages of VVER-1200 reactors to be built in Hungary, and progress in the Russian-Hungarian nuclear cooperation.

– What are the global trends in the nuclear power industry? What is the role of Rosatom on the global scene?

– Environmental improvement and reduction of carbon dioxide emissions are key items on the present-day global agenda. An answer to these challenges was given in the Paris Agreement adopted at the UN Climate Change Conference in Paris. It is of particular importance that nuclear was for the first time officially declared, alongside renewables, to be a component of the future 'green energy' mix.

The International Energy Agency, one of the world's most respected expert bodies, says that we need to increase nuclear

power generation 2.5 times to 6,101 TWh by 2040 to secure our non-carbon energy future. Russia is a signatory to the Paris Agreement and is already investing a great deal of effort in tackling climate change.
We operate 35 power reactors on 10 sites across the country. Every year, they prevent 250 million tons of carbon dioxide from being emitted into the atmosphere, which is equivalent to the total emissions from all the vehicles in Russia for 2 years.
And if we count all the Russian-designed VVER-based nuclear power plants to be in the world by 2030, they will prevent 2.4 billion tons in carbon dioxide emissions, or 80% of the annual emissions from all the vehicles on our planet. Figuratively, the nuclear energy industry may be called 'the lungs of the planet', helping the Earth breathe clean air.

– How many reactors are being built by Rosatom?

– Rosatom is currently a world leader in terms of reactors under construction on the international market, with 34 power reactors projects being implemented in 12 countries in Europe, the Middle East, North Africa, and Asia Pacific.

– Are you satisfied with the company's last year performance?

– As of late 2015, our portfolio of foreign projects for the next decade was worth 110 billion dollars. In 2016, it exceeded 113 billion dollars. Rosatom remains a global leader in uranium enrichment and is a Top 3 company worldwide in terms of uranium extraction and international supplies, covering 17% of the global demand for nuclear fuel.
We have commissioned Kudankulam Unit 2 in India and kicked off the second phase of Iran's Bushehr project. The construction contract for the Rooppur nuclear station has taken effect, and we plan to pour the first concrete on the site later this year. Another major development was the signing of the first commercial contract to deliver TVS-K nuclear fuel to Sweden's Ringhals nuclear power plant. Before that, we had supplied our fuel to Russian-designed facilities only. Today, as the situation has changed and we have started shipping fuel for Western-designed reactors, new markets and opportunities are open for us.

–What are Rosatom's major technology achievements in the last year?

– In 2016, we commissioned a BN-800 fast reactor at the Urals-based Beloyarsk nuclear power station that won the 2016 POWER Plant of the Year Award. Fast breeder reactors help us improve spent nuclear fuel management technologies and minimize radioactive waste by introducing the closed nuclear fuel cycle. We have made good progress in developing fast reactors and are ready to share our competencies with foreign partners. Another milestone of the last year was the startup of the world's first Generation 3+ reactor at Novovoronezh.

– Rosatom intends to build two nuclear reactors of this type in Hungary. What are their technical advantages?

– VVER-1200 is our flagship Generation 3+ reactor. It features an unparalleled combination of active and passive safety systems preventing radiation leakage and notably reducing the chance of human error and even the most serious beyond-design-basis accidents. The design is fully compliant with the post-Fukushima safety requirements, the most stringent IAEA guidelines, and the European Utility Requirements (EUR). Russia's new reactor is the world's safest, and I am not exaggerating.

VVER-1200 at Novovoronezh is completed and being prepared to be brought online soon. The same reactor units are now under construction at Leningrad-2, in Belarus, Bangladesh and other countries. In Finland, for instance, the new reactor is going through the licensing process.
It is remarkable that we are not just building a nuclear station in Finland, but also investing in it. We own a 34% share in Fennovoima, a project company responsible for the construction and operation of the Hanhikivi nuclear power plant. Rather than looking for just a technology vendor, customers want to find a partner offering an integrated solution that includes financing, lifelong maintenance, workforce training and many other things. Rosatom was reorganized to become a vertically integrated nuclear vendor capable of providing an integrated solution to every customer.

– How safe are the new reactors if compared to reactors in operation?

– Their specific feature is a strong focus on the so-called passive safety systems that remain operational even if the plant is cut off from power supply. Besides, they require no operator intervention. These systems include passive heat removal components, hydrogen recombiners and a core catcher. As new safety standards require, the reactor island is shielded with a double containment providing for improved protection against earthquakes, tsunami, hurricanes and plane crashes. All these improvements take VVER-1200 to a new height in nuclear safety. VVER units at Paks have been operating for more than 30 years and account for a third of electric power generated in the country. Hungary's nuclear regulator has issued a permit to extend the service life of the first three reactors by 20 years. The fourth unit is scheduled for life extension in 2017.

– Hungary hopes that the construction of new reactors at Paks will begin in early 2018. Do you think it is a reasonable date?

– This is true that on-site operations are expected to start in 2018. The project has already received a license from local environment protection authorities. An application has been sent to Hungary's regulator to issue a construction license. We hope that the regulator will obtain approval of the European Commission within the shortest time possible, and we will be able to get down to the construction.

– When are you going to invite bids for large-size machinery of the turbine island?

– It is a bit early to talk about exact timelines. All procurement procedures will be open and transparent, in strict compliance with the EU standards. We will welcome bids from all balance-of-plant suppliers interested in the project, including those based in the EU, and we expect broad participation of Hungarian businesses. Local content – that is, input of local manufacturers – could reach 40% of the project cost.

– Rosatom has a Hungary-based engineering subsidiary, Ganz EEM. Do you have plans to acquire other local producers?

– Ganz EEM manufactures pumps for Rosatom's nuclear projects in and outside Russia, as well as projects in non-nuclear business areas. Having a 100% stake in the company, we are able to carry out large-scale retrofit and technology upgrade programs. And we have no plans to acquire other businesses in Hungary.

– Does Rosatom have any other partners in the Hungarian nuclear industry alongside Paks?

– The nuclear cooperation between Russia and Hungary dates back more than 60 years and covers many areas.
We have been working with Hungary's power company MVM, supplying fuel to Paks since it was commissioned, and providing maintenance services for the operating nuclear plant. Rosatom has strong ties with the country's educational and research institutions, and other industry organizations.
All in all, the Paks extension project comes logically from the long-standing nuclear cooperation between Russia and Hungary. We place very much importance on the partnership with this country, and I am sure that our cooperation will expand into new fields and projects.