



Rosatom Walks the World

For Rosatom, this May is packed with international forums and conferences. The company took part in three events hosted by Shanghai, Berlin and Cape Town. You will find more details about the events in our report.

The first of the events was the Annual Asia Nuclear Business Platform held on 17–18 May in Shanghai. A key event in the Asian region, every year it brings together major nuclear vendors, including Rosatom, to share their experiences. The centerpiece of the conference was a panel discussion entitled Key Global Drivers of Nuclear Energy Development. Among the speakers was Sergei Dyomin, Vice President for Eastern Asia, Rosatom International Network (RIN). "Rosatom pays much attention to operational safety of its nuclear facilities. We operate VVER-1200, the world's only Generation 3+ reactor, at the Novovoronezh Nuclear

Power Plant in Russia. This is the safest operating reactor in the world," he noted.

The Russian-Chinese partnership comprises many civil nuclear projects, including the Tianwan Nuclear Power Plant where Rosatom built the first two 1,000 MW reactors. They were commissioned in 2006 and 2007 respectively and have been operating without failure till now. Tianwan NPP is another example of economic cooperation between China and Russia. A new step was made in 2010 when Rosatom signed a framework agreement for the construction of Tianwan Units 3 and 4 based on VVER-1000 reactors with a capacity of 1,060 MW each. The construction is progressing in accordance with the schedule to commission the new units in 2018. The Russian-Chinese cooperation has long been gathering pace. A good example is Rosatom's regional center opened in Beijing (China) during the Nuclear Industry China, an international exhibition held in April 2016. "Rosatom's office in Beijing will consolidate our efforts in the region and

bring more Russian nuclear companies to Eastern Asia,” RIN President Alexander Merten said at that event.

An important issue mentioned by Sergei Dyomin was public acceptance of nuclear technology. He reminded of many myth-based prejudices, still existent and hampering the nuclear industry development in the world. He stressed the importance of raising public acceptance by running educational programs and increasing public awareness.

Nuclear education, he believes, is one of the most effective ways of gaining public trust in nuclear energy. This refers, first and foremost, to public awareness programs rather than to institutions of higher education. In Russia, where nuclear facilities account for more than 17% of the total electricity generation, these programs are in the focus of attention. Rosatom operates nuclear information centers in 22 Russian cities to present peaceful uses of nuclear energy in layman's terms. The network was established only five years ago, but already has an impressive track record of more than 45,000 public awareness projects.

Know-how in Berlin

Concurrent with the Shanghai event, Berlin hosted the Annual Meeting on Nuclear Technology (AMNT). The event was staged by the German Atomic Forum (DAF) and the German Nuclear Society (KTG) to concentrate on nuclear know-how and innovations, safety improvements, and performance enhancement. Russia was represented by ASE's subsidiary NUKEM Technologies GmbH demonstrating its unique solutions. The company specializes in back-end services, including radioactive waste and spent nuclear fuel management and nuclear decommissioning. NUKEM's



representatives spoke about their broad expertise in the treatment of liquid radioactive waste at nuclear facilities. Specifically, the company's principal engineer Marina Sokcic-Kostic told the audience about unconventional measurement methods for high background radiation levels. “The components must be carefully selected to ensure resistance to radiation exposure. Unconventional methods make it possible to do measurements even close to damaged Fukushima reactors, at the storage facilities next to the molten core and other similar places,” she said.

Stable energy supplies for Africa

Another major event where Rosatom presented its capabilities was the 17th African Utility Week in Cape Town. Africa needs sustainable energy sources that do no harm to the environment. Nuclear power fully meets all the requirements. Today, African countries regard nuclear not only as a chance to cover their energy needs, but also as a boost to the regional economy. “Investments in nuclear power plants are always long-term and make it possible to ensure sustainable power generation for many years. Koeberg, Africa's only nuclear power plant, is the most cost efficient energy source for South Africa,” noted Viktor Polikarpov, Vice President for Central and South Africa, Rusatom International Network. According to him, nuclear technology is a driver of social and economic development. “Nuclear creates of new jobs and new educational programs for

young professionals. Nuclear medicine saves millions of lives every year; nearly 40% of foodstuffs across the globe have a longer shelf life thanks to irradiation,” Mr. Polikarpov noted.

As Phumzile Tshelane, CEO of the South African Nuclear Energy Corporation (NECSA), said earlier, South Africa had plans to increase its share of nuclear power generation from the current 5% to

30–40% of the national energy mix, and restrictive court judgments would not prevent them from building nuclear power plants with a total capacity of 9.6 GW. “We need nuclear to generate 30–40% of electric power in the country to maintain sustainable economic growth and reduce carbon dioxide emissions from coal-fired power plants,” said Mr. Tshelane in an interview to EE Publishers.

TECHNOLOGY

Small Hydro Solutions for Africa

AEM’s Hungarian-based subsidiary Ganz EEM may supply small hydro power plants to Sub-Saharan Africa.

Hungary’s Ganz EEM controlled by Rosatom may start delivering its 2 MW hydro power plants to Southern and Central Africa. The company signed an agency agreement with South Africa’s Blue World Power and Energy Services in February 2017 to market small hydro power solutions in the region. As part of an effort to expand into non-nuclear industries, AEM is looking for opportunities on power markets of former Soviet republics, which are historically close to Russia. Not long ago, Ganz EEM signed its first contract for the supply of small containerized hydro power plants to Georgia.

The buyer is Georgia's International Energy Co., Ltd. engaged in the hydro power generation development. According to the contract, the company will purchase a pilot plant to be shipped in the first half of 2017, followed by more plants varying in capacity from 0.6 MW to 2 MW.



Small hydro: what is it

Simple and cost-efficient, small hydro power plants (HPP) manufactured by Ganz can be used in areas that are not covered by the power grid for financial or technical reasons. They can serve either as independent power sources or an alternative to cost-inefficient and non-eco-friendly generators since they need no dam construction and have no impact on the environment of rivers and other water bodies. Thanks to their design, small HPPs by Ganz can be installed even at discharge channels of water treatment facilities.

Each HPP consists of a turbine and a set of auxiliary equipment mounted inside a container. The containerized design drastically reduces lead-in times and costs of construction.

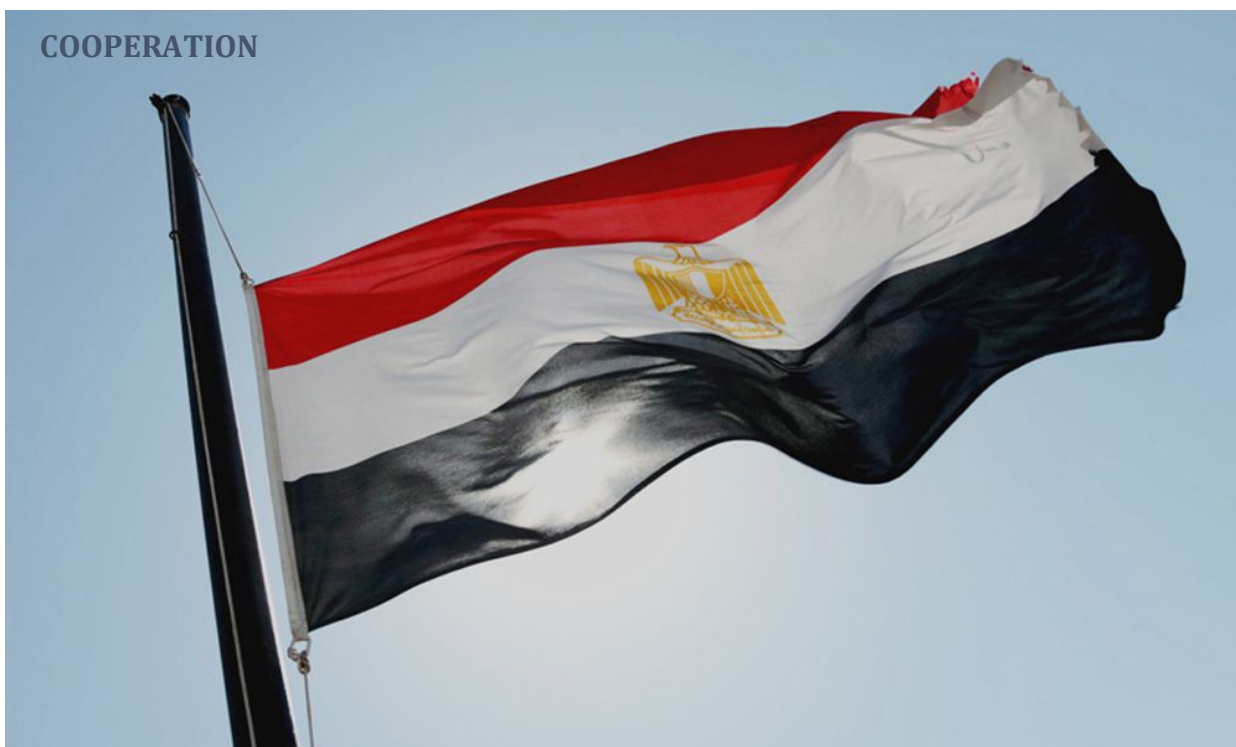
Small HPPs boast low generation costs, a short time of delivery, fast and easy installation. After the container is delivered to the site and water is channeled onto the turbine, power generation can start within a month.

Although compact, hydro power plants have all the monitoring and control devices for their proper operation.

Another advantage is that containerized HPPs can be controlled remotely via (mobile) phone or Internet. Therefore, the owner can monitor and control the plant with a PC, tablet or cell phone, and receive information about the power output.

Rusatom International Network is currently negotiating shipments of containerized small hydro plants produced by Ganz EEM to Armenia, Indonesia, Kazakhstan, Uzbekistan, as well as Latin American, African and other countries.

COOPERATION



El Dabaa Project Making Headway

Egypt has examined an assessment report on environmental impact of the nuclear plant construction project involving Rosatom.

This was announced by Hassan Mahmoud, Head of Egypt's Nuclear Power Plants Authority (NPPA). The country has taken all necessary steps since 2007 when Egypt decided to resume its national nuclear program, Hassan Mahmoud said at a meeting of Egypt's Parliamentary Committee for Energy and Environmental

Protection during the discussion of NPPA's plans for 2017–2018.

The NPPA Head explained that Egypt had engaged a consulting agency to carry out large-scale research and select a strategic partner for the El Dabaa project. Hassan Mahmoud assured the committee members that NPPA had built all necessary infrastructure, utility lines and roads, and accounted for every aspect of the nuclear plant's environmental impact.

The project is of strategic importance for the country as its economic development is clearly hampered by the shortage of

cheap energy. Oil, which is a primary fuel in the country, is imported while the country's demand for electricity is growing by 7% per annum.

On 19 November 2015, Russia and Egypt signed agreements in Cairo to construct Egypt's first nuclear plant near El Dabaa on the Mediterranean coast and set out the terms and condition of a \$25bn sovereign loan to be provided by the Russian Government.

The nuclear power plant will have four 1,200 MW reactor units. The agreements

signed by the governments of Russia and Egypt provide for nuclear fuel supplies for the yet-to-be-built plant, operating support, maintenance and repair, spent nuclear fuel management, staff training and improvement of Egypt's regulatory framework for the nuclear power industry and infrastructure. In addition, a memorandum was signed by Egypt's Nuclear and Radiological Regulation Association (ENRAA) and Russia's regulator Rostechndadzor. Egypt hopes to conclude commercial contracts with Russia and start the NPP construction soon.

STRATEGY

U1 Revenue Growing

In the first quarter of 2017, Uranium One Inc. (a part of Rosatom's international mining division) increased its revenue fivefold.

Following three months of 2017, the revenue of Uranium One Inc. grew fivefold year-on-year to reach 67.9 million US dollars. Its adjusted net profit (net of exchange rate differences, revaluation of financial instruments and inventory, and profit from business combination) reached 21.1 million US dollars for the same period (7.5-fold y-o-y growth). In the first quarter of 2017, Uranium One Inc. reduced its uranium output year on year and produced 2.9 million pounds (1,110 tons) of natural uranium.

Uranium One is Rosatom's international mining division that holds all of its overseas uranium production assets managed by Uranium One Group, a holding company of the division. Its main asset is Uranium One Inc. that mines uranium in Kazakhstan and the USA.

Uranium One is the fourth biggest uranium producer in world with the



lowest production costs among the world's Top 5 uranium companies. Last year, Uranium One produced 4,919 tons of natural uranium. Its performance improvement program implemented in 2016 helped the company to cut operating costs by more than 10 million US dollars.

In March 2017, Uranium One Inc. reported headline earnings of 314.6 million US dollars for 2016. Attributable revenue for 2016 was 405.7 million US dollars based on sales of 13.5 million pounds of uranium at an average selling price of 27 US dollars per pound, with an average cash cost of 9 US dollars per pound sold. Attributable production in 2016 was 12.7 million pounds.

IN BRIEF

Switzerland Will Not Build Nuclear Plants Anymore

According to results of the referendum held on 21 May, the Swiss voters supported the initiative to ban construction of new nuclear stations in favor of renewable energy sources.

According to results of the referendum held on 21 May, the Swiss voters supported the initiative to ban construction of new nuclear stations in favor of renewable energy sources. The Energy Strategy 2050, which provides for nuclear phase-out in the country, was backed by 58.5% of Swiss residents. The initiative did not require a cantonal majority to be approved. According to the new strategy, the Swiss government will support the development of renewables to be used instead of nuclear power. Additionally, the country plans to implement a program aimed at cutting back energy consumption by introducing new energy supply standards and tax benefits for the innovators in the power industry. This was the second time the Swiss voted on the national energy strategy. In November 2016, they supported the plan to maintain the operating nuclear plants till the end of their service life.

Rostov NPP: New Milestone

On the 25th of May the turbine was set for barring in the turbine hall of Unit 4 at Rostov NPP. This is one of most important stages of pre-commissioning.

On the 25th of May the turbine was set for barring in the turbine hall of Unit 4 at Rostov NPP. This is one of most important stages of pre-commissioning. "The turbine has been set for barring and this demonstrates high technical availability of the turbine set and its auxiliary systems for hot and cold runs of the reactor," Vice President for Projects in Russia of Group of Companies ASE Alexei Deriy said. "This stage completion is one more step to ensure timely first power of the unit," he said. The main purpose of the process operation was to check on correctness of assembling and alignment of all components of the turbine's through section as well as alignment of its axes with the turbine generator's shaft. First power of the unit is set for the end of 2017.