When two new gas turbines were launched this March at the power plant of Kirishi, some 100 kilometers away from Saint Petersburg, the event was of sufficient importance to merit a visit from then prime minister and current president Vladimir Putin: The development is a lighthouse project for a country that appreciates the need for a great modernization step.

Text: Moritz Gathmann  Photos: Alexandra Ivanova, Maria Dvygileva
Grigory Otpetov, who has been working at Kirishi power plant since its construction, is in front of the new unit PGU-800.
G rigory Otpetov is not someone who is easily impressed. The 73-year-old engineer is one of the fathers of the Kirishi power plant. He arrived at Kirishi in 1965 with his wife and two children. “When I came here, this place was all stumps and bomb craters,” says Otpetov with a self-confident smile while walking over the territory of the station. But even the warm sun of this summer day doesn’t make him take off his helmet: in 1972, it saved his life when a pipe fell on his head. Since then, he’s been a stickler for safety standards – and Otpetov takes all other aspects of his work equally seriously. “You should do your work properly, otherwise it’s not work,” he says. The tough, wiry Russian is one of the technical inspectors of the plant. He is rarely to be found in his office, since he is always on-site monitoring processes and solving problems. Otpetov built this station with his own hands. He knows pretty much every screw in its six units, every gas-heated boiler where the water is turned into steam, the turbines and the chimneys that rise up into the sky to a height of 320 meters. “Actually, everything has been working quite well for the past 40 years. The technology is quite simple, and we’ve always managed to repair faults,” says Otpetov. But he too has come to understand that time was ripe for a modernization: “Just compare: the efficiency of the old units was 38 percent – the new one operates at 55 percent. This means that for the production of the same amount of energy, we use one-third less gas.”

Increasing the efficiency of its energy sector is on top of Russia’s industrial and economic agenda. In 2010, Russia was the fourth-largest power generator worldwide, but the government expects Russian consumers’ demand for energy to increase by 50 percent by 2030. It is certain that newly built power plants alone will not suffice to cover this increase. Russia is determined to increase the efficiency of its energy sector assets by 20 percent within the same time frame. Given the fact that the country of 145 million produces two-thirds of its energy in thermal power plants, 70 percent of which are fired with gas, it faces a huge challenge. Siemens is ready to become a reliable partner in this effort. Last December, together with its Russian partner, Power Machines, it launched a new joint venture named Siemens Gas Turbine Technologies that will produce high-efficiency gas turbines near Saint Petersburg from 2014 onwards.

Ambitious Target

The project is to become a model for the repowering of Russia’s power plants in the future. In this case, the plant’s existing steam turbine was upgraded, a new control system was installed, as were two generators, and two 279-megawatt gas turbines. The result is a combined cycle power plant (CCPP) that nearly tripled the installed capacity of the unit from 380 to 800 megawatts. The higher efficiency of the unit makes sense not only economically, but also ecologically. CCPPs use the exhaust gases from the gas turbines to drive the already existing steam turbine, which enhances the fuel utilization factor. Siemens expects gas turbine power plants to play a major role in the coming years: In 2010, power plants operated with gas turbines in the Commonwealth of Independent States (CIS) contributed 30 gigawatts to the combined installed capacity of 370 gigawatts. By 2020, Siemens estimates, this share will rise to 100 gigawatts.

“Our main resource is not gas, it’s the people,” says Yuri Andreyev, Director of the Kirishi power plant, referring to long-serving workers like Grigory Otpetov. Andreyev, a heat and power engineer himself, has managed the Kirishi plant since 2008. “Our workers are proud of their work, but modernization efforts like the launch of the combined cycle plant give us a boost in motivation.” That is true especially for himself. Engineers like myself, who started their career in the 1980s, belonged to something of a ‘lost generation’. The big power plants of the country had already been built – our
The energy strategy of the Russian government envisages to raise the efficiency of its power production facilities and to reduce the use of gas in electricity production until 2030. Today most of its energy is produced by burning gas in thermal power stations. By 2030, according to Russian government estimates, the energy demand of the around 142 million population is likely to increase by 50 percent. The current thermal power plants were built in Soviet times and are in need of modernization. In order to meet the rising energy demands, new power plants will be built. In parallel, however, the efficiency of existing plants needs to be raised.

**Meeting the Challenge**

In March 2012, Siemens introduced its first repowering project in Russia. Unit 6 of the Kirishi thermal power station, which had been powered by an aging steam turbine, was upgraded by adding one new control system, two generators and two 279-megawatt gas turbines.

**Repowered**

In Kirishi, the result is a combined cycle power plant (CCPP) that increases the efficiency of the unit from 38 to 55 percent. Its capacity nearly tripled from 300 to 800 megawatts.

The OGK-2 Joint Stock Company, owner of the Kirishi power station, plans to invest 165 billion roubles (more than €4 billion) into the modernization of its thermal power stations until 2016.

---

**In a Nutshell**

Meeting the Challenge

In March 2012, Siemens introduced its first repowering project in Russia. Unit 6 of the Kirishi thermal power station, which had been powered by an aging steam turbine, was upgraded by adding one new control system, two generators and two 279-megawatt gas turbines.

**Repowered**

In Kirishi, the result is a combined cycle power plant (CCPP) that increases the efficiency of the unit from 38 to 55 percent. Its capacity nearly tripled from 300 to 800 megawatts.

The OGK-2 Joint Stock Company, owner of the Kirishi power station, plans to invest 165 billion roubles (more than €4 billion) into the modernization of its thermal power stations until 2016.

---

**Award-winning Russian documentary filmmaker Vitaly Mansky visited Kirishi power station together with Living Energy author Moritz Gathmann. View his film online:**

[siemens.com/living-energy](siemens.com/living-energy)