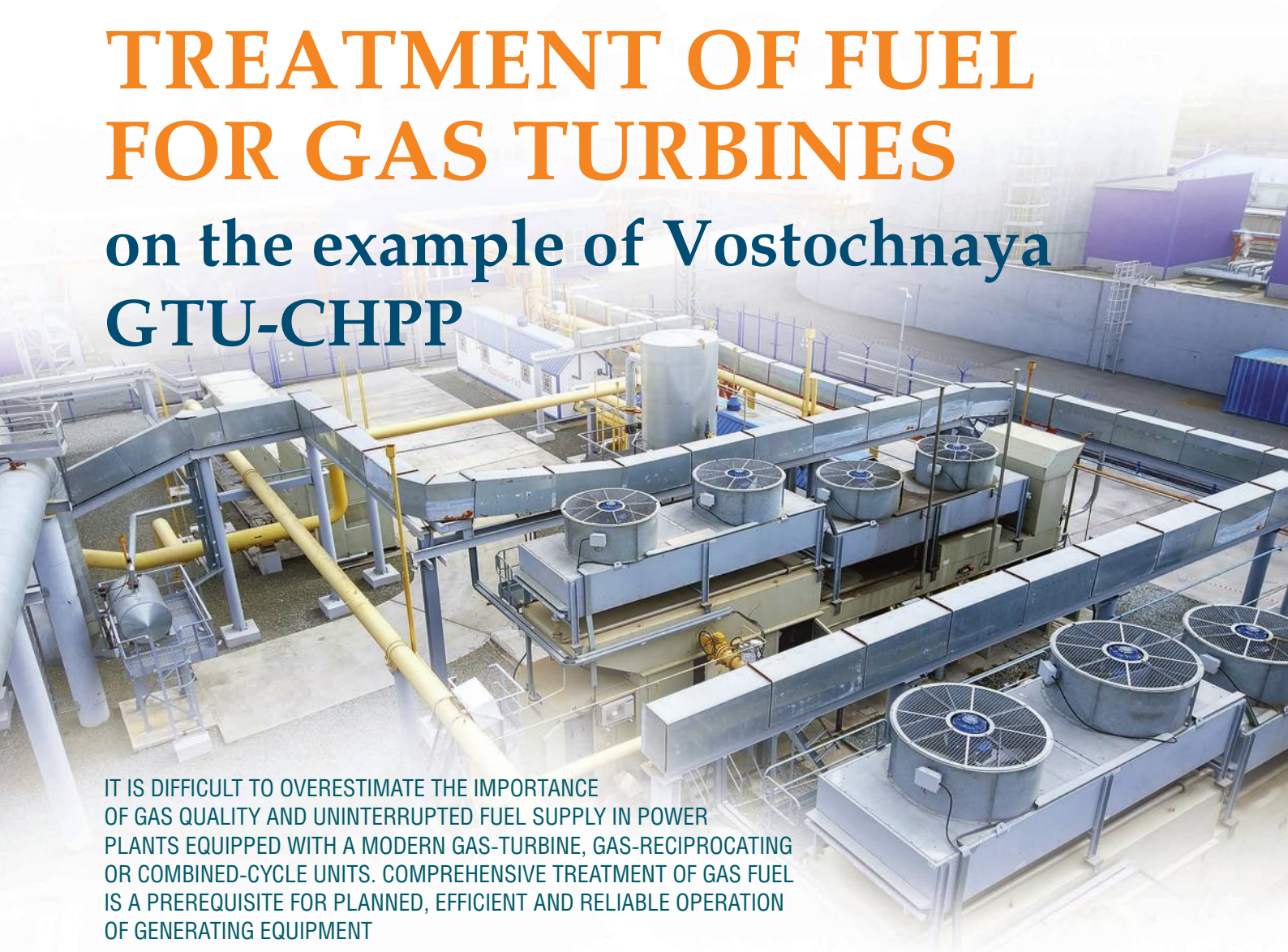


COMPREHENSIVE TREATMENT OF FUEL FOR GAS TURBINES

on the example of Vostochnaya GTU-CHPP



IT IS DIFFICULT TO OVERESTIMATE THE IMPORTANCE OF GAS QUALITY AND UNINTERRUPTED FUEL SUPPLY IN POWER PLANTS EQUIPPED WITH A MODERN GAS-TURBINE, GAS-RECIPROCATING OR COMBINED-CYCLE UNITS. COMPREHENSIVE TREATMENT OF GAS FUEL IS A PREREQUISITE FOR PLANNED, EFFICIENT AND RELIABLE OPERATION OF GENERATING EQUIPMENT

KEYWORDS: *gas treatment, generating equipment, gas turbine, power plant, automation.*

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A power plant based on gas turbine technologies was built by RusHydro in the Vladivostok and put into operation on September 10, 2018. Vostochnaya GTU-CHPP is the first large power facility created in the last 47 years in the capital of the Primorye Territory.

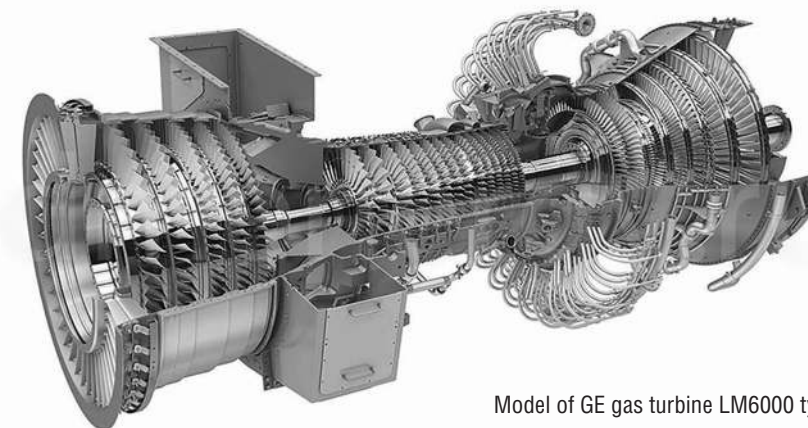
RusHydro Group is one of the largest Russian energy holdings that provide reliable energy supply to many consumers in the country, including the Far Eastern Federal Area. To this end, RusHydro implements high-quality and efficient equipment, innovative technologies and advanced solutions

VOSTOCHNAYA GTU-CHPP. PREHISTORY

The history of the appearance of the CHPP dates back to the late 1960s. Then, a coal-fired heating

plant operated on its site. In the late 1970s, the heating plant was closed for environmental reasons, and its capacity was replaced by the Central Steam-Water Boiler. In the CSWB, steam of Vladivostok CHPP-2 was used to receive hot water; it was supplied via a 7 km long steam pipeline.

Such solution had obvious drawbacks – the boiler station was a dependent energy source, and the extended steam pipeline gave significant losses of heat. Nevertheless, the CSWB was operated for more than 30 years, and only after the full depletion of



Model of GE gas turbine LM6000 type

the resource of its equipment was followed by the decision to create a new power facility.

The need to build a power plant was also caused by an increase in urban electricity and heat consumption and the construction of new residential areas Snegovaya Pad and Patrokl.

THE POWER PLANT TODAY

The new power plant, operating in cogeneration mode, provides up to 20% of Vladivostok's electricity needs as well as the need for heat and hot water of a number of enterprises and more than 50 thousand apartments in several districts of the city. Additionally, the commissioning of the CHPP created a significant energy reserve for the projected residential areas of the developing city.

Vostochnaya GTU-CHPP has an electric capacity of 139.5 MW and a thermal capacity of 432 Gcal/h. The projected annual electricity output is 791 million kWh, heat – 1.377 million Gcal.

GENERATING EQUIPMENT

Power plant is equipped with efficient equipment with high technical indicators. There are three air-craft derivative GE gas turbine units – GTUs of the type LM6000 PF DLE with a power boost system SPRINT. This technology helps to reduce the temperature in the combustion

chamber of the turbine due to the spraying of fine-dispersed water dust. In this case, the compressor compresses and supplies more air, that increases the output capacity of the turbine. The unit electric capacity of gas turbine units at Vostochnaya CHPP is 46.5 MW.

Each GTU is equipped with a combustion chamber type DLE with a system for dry suppression of nitrogen oxide emissions in the entire power range. This allows maintaining a low level of emissions even with incomplete loading of the turbine. The units are equipped with modular, multi-stage air filtration systems with an anti-icing system that ensures reliable operation of the GTU in winter conditions.

The LM6000 range of turbines is the leader in the capacity segment of 40+ MW. Currently, there are over the 1,300 LM6000 GTU operating in the world, which have worked more than 40 million hours with 99.8% reliability. These units are characterized by compact size (about 5 m in length), record-breaking fast launch (5 min) and full capacity reaching (less than 10 min), fuel effectiveness and high efficiency in a simple cycle (up to 42%)

From turbines, exhausted hot gases enter waste-heat boilers, where heat the water – this increases the overall efficiency of fuel use. To issue heat, three peak water-heating boilers were installed, and for the production of steam for industrial purposes – two steam boilers.

Waste-heat boilers were manufactured by Power Machines PJSC, peak water-heating boilers – Dorogobuzhkotlomash JSC, steam boilers – Entroros LLC, power transformers – Togliatti Transformer LLC and SVEL Group JSC.

Main fuel for the power plant is natural gas.



Vostochnaya GTU-CHPP in the Vladivostok