

Tomatoes and Cucumbers from Siberia with Greenhouses and MWM Gas Gensets

Growing fruits and vegetables in the coldest inhabited place on earth requires smart technology and, most importantly, a reliable autonomous energy supply.



Northeastern Siberia, where the region of Yakutia is located, is famous for its natural resources such as precious metals, crude oil, natural gas and diamonds. The ground in this region, which is exposed to temperatures ranging from -50 to +50 °C, is frozen throughout the year. Previously, growing vegetables under permafrost conditions had been impossible, so the region depended on expensive fruit and vegetable imports from China. Meanwhile, however, the Yakuts are able to purchase locally grown tomatoes, cucumbers and other fruits and vegetables that are grown all-year-round in the gigantic Sayuri greenhouse complex.

Under these adverse conditions, reliable, permanent heat and power supply is a must, as even short interruptions could destroy an entire crop or the actual plants. Knowing that only the most reliable,

durable power gensets would be suitable for deployment at such a critical location, the operator of the Sayuri agricultural complex opted for two 1-MW Cat gensets and subsequently an MWM TCG 2020 V20 genset with an electrical output of 2 MW. The latter was supplied and installed by the MWM distributor Electrosystems Ltd. in the form of a containerized cogeneration power plant. In order to ensure reliable operation of the container under permafrost conditions, Electrosystems modified its container with additional layers of insulation in the container hull, special material and metals, and additional heating systems in the external water circuits. An air circulation system in the container and special combustion air pre-heating systems ensure hassle-free operation even when the temperatures are extremely low.

Greatly Improved Plant Efficiency Thanks to MWM Gas Genset

The MWM TCG 2020 V20 passed its test in the first winter when the engine took on the main load without any interruptions despite temperatures of 60 °C below zero. Thanks to the efficient combined heat and power generation with natural gas, the operators were able to almost halve the energy costs per kWh compared to what they would have had to pay for the energy from the local power grid.

The energy supply with an on-site power plant also enables the quick and flexible reaction to production or climate changes without depending on an external energy provider. With a total of three gas gensets, the power and heat supply of the cultivation complex can be duly adapted.



Opening ceremony of the Agricultural Complex Sayuri.

Affordable Fruits and Vegetables Thanks to Autonomous Energy Supply

Since the go-live in August 2020, the MWM gas genset has run without any problems and outages. In view of the positive experiences with the MWM TCG 2020 V20, Sayuri's management plans to get another genset of the same type to further ensure a smooth power supply of the facilities once the expansion work is completed. "We are impressed by the outstanding reliability of the MWM gas engine, which never failed during the entire winter season", says Valery Garipov, company spokesman of Sayuri.



Sayuri Ltd.

Location:	Syrdakh – Yakutsk, Sakha Region
Country:	Russia
Contact:	Valery Garipov
Operator:	Sayuri Ltd.



Technical data CHP

Go-live:	August 2020
Engine type:	MWM TCG 2020 V20
Generator:	Marelli
Control:	TEM-EVO
Gas type:	Natural gas
Plant builder:	Electrosystems Ltd.
Electrical efficiency:	43.5%
Thermal efficiency:	43.6%
Electrical output (total):	2,000 kW
Thermal output (total):	2,005 kW
Total efficiency:	87.1%



Huge Greenhouse Complex

The project was developed and rolled out in several stages by the regional administration of Yakutsk and JSB Almazergienbank with the support of the government of the Republic of Sakha (Yakutia) and the Japanese investor Hokkaido Corporation. The rollout took place in several stages. In the first phase, a pilot greenhouse with an area of 1,000 m² was commissioned in December 2016. By 2020, the greenhouse area was expanded to 3.2 ha. In 2021, the Sayuri greenhouse complex is to produce some 1,250 t of cucumbers and about 230 t of tomatoes. When the expansion project is completed in 2022, the production output is to be boosted by another 40 percent.

All photos: © Sayuri

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