

J920 FleXtra gas engines deliver enhanced flexibility, greater efficiency, and lower emissions

Acea Produzione SpA, Tor di Valle, Rome, Italy

“The two Jenbacher J920 FleXtra gas engines run only when power and heat demand is high and when the cost of generation is lower than the cost of electricity from the grid. The engines easily can be shut down within minutes if plenty of solar or wind power is provided on the grid and enough heat is available from storage. Because the engines can go from start to full output in less than five minutes, they provide exceptional operating flexibility for frequent starts and stops.”*

Giovanni Papaleo,
Head of ACEA Energy Industrial Area



Background

Italian utility Acea Produzione SpA, a subsidiary of Acea SpA – one of Italy’s principal multi-utilities – supplies energy, water, and other environmental services in southwestern Rome. The utility recently modernized its largest district heating power plant – the 1990 Tor di Valle combined cycle heat and power plant – to improve its operating flexibility and energy efficiency as well as reduce its environmental impact. The district heating power plant originally was constructed as a gas turbine combined cycle (GTCC) plant with heat extraction providing about 120 MW of power and 70 MW of heat to the nearby Torrino area district heating network.

Solution

The existing district heating power plant modernization resulted into a new 19 MW combined heat and power (CHP) plant with two of INNIO’s* 9.5 MW Jenbacher J920 FleXtra gas engines, plus three 23 MW auxiliary gas boilers, six 215 cubic meter (m³) heat storage tanks, and associated balance of plant systems to connect to the existing district heating system. Jenbacher gas engines, auxiliary gas boilers, and other balance of plant equipment were installed in the existing modernized engine hall.

Solutions

In addition to the gas engines, INNIO's business supplied related engineering and associated balance-of-plant equipment, while Cefla – an Italian industrial engineering supplier – developed the engineering of the plant, providing project management, ensuring equipment supplies and overseeing installation of the entire plant, including the civil infrastructure.

The gas engines are integrated with a thermal energy storage system consisting of six 215 m³ outdoor heat storage tanks. The storage system helps ensure a continuous supply of heat without the need to increase electric power generation in times of low power demand from gas engines. Acea's two Jenbacher J920 FleXtra gas engines are connected to INNIO's myPlant* Asset Performance Management (APM) platform. The myPlant APM solution actively monitors all key engine parameters and supplies analytics that can predict component life, allowing operators

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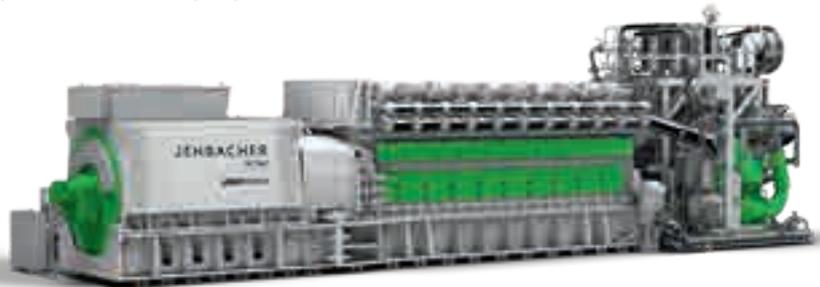
Results

The modernized 19 MW Tor di Valle CHP plant began commercial operation near the end of 2017, supplying electricity to Acea's nearby sewage treatment plant and Rome's distribution grid. Heat is used for the local district heating network to supply about 40,000 residential customers in the Torrino area.

The Jenbacher J920 FleXtra units – expected to run as much as 5,000 to 6,000 operating hours per year – support the plant's ability to achieve a high fuel utilization and total efficiency above 80%, so it qualifies for white certificates from the Italian government. Compared to the older GTCC plant, the new gas engine CHP plant reduces the annual CO₂ emissions by about 16,000 tons per year.

Customer advantages

- Total efficiency higher than 80%
- Economical CHP from two 9.5 MW Jenbacher J920 FleXtra gas engines
- Less than 5-minute startup time and quick shutdown capability
- Reduced CO₂ emissions – by approximately 16,000 tons annually



Key technical data

PREVIOUS GTCC PLANT

Number and type of units	2 x gas turbine, 1 x steam turbine
Electrical output	~120 MW
Thermal output	~70 MW
Start time	~120 minutes

MODERNIZED GAS ENGINE CHP PLANT

Number and type of units	2 x Jenbacher J920 FleXtra gas engines
Electrical output	19 MW
Thermal output	14.6 MW
Total efficiency / fuel utilization	> 80%
Start time	5 minutes
Heat from peak gas boilers	3 x 23 MW
Heat storage system	6 x 215 m ³