

The Challenge

Nestled in the heart of Valpolicella is one of Italy's largest meat processing companies, Salumificio Fratelli Coati. This fourth-generation family business has been highly successful in applying technological innovation to the traditional art of curing meat.

The process of curing meats requires energy for various stages of production. Beyond powering the plant and the various processing equipment, electricity is also needed to provide steam for the cooking ovens, freezing water for cold rooms and hot water for cleaning the machines. Typically, the company purchases power from the utility network. It also produces steam through traditional boilers and uses electric chillers for access to freezing water.

Wanting to improve energy efficiency at its new production site in Arbizzano-Negrar (VR), Salumificio Coati, installed a combined cooling heat and power (CCHP) system based around Capstone Microturbine technology. As the first of its kind in Italy's meat processing industry, the new system is helping the company achieve efficiency goals while providing reliable power, significant cost savings and environmental benefits.

The Solution

The site's new CCHP system includes a natural gas-powered Capstone C1000 Signature Series package with "Grid Connect." Using this particular configuration allows the three energy vectors to be produced autonomously, thereby providing maximum heat recovery from the exhaust fumes exiting the microturbines. The exhaust is used as combustion air in air vein burners and then channeled to a heat recovery steam boiler for the production of about 3 tons per hour of steam at 9 barg.

After the boiler, the exhaust passes through an exhaust-superheated water exchanger before moving on to an ammonia absorption refrigeration unit where freezing water is produced at -6°C (21.2°F) for a capacity of about

Power Profile

Customer

Salumificio Fratelli Coati

Location

Valpolicella, Italy

Commissioned

June 2018

Fuel


Natural Gas

Technologies

- Capstone C1000 Signature Series Microturbine (Grid Connect)
- Absorption Chiller

Capstone Turbine Distributor

IBT Europe GmbH



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— Dario Babuin, Supply Chain Manager
IBT Europe GmbH



A high-pressure natural gas-fueled Capstone C1000S microturbine in a CCHP application provides 80% overall efficiency at the Salumificio Fratelli Coati facility.

600 kW. Before being released, the exhaust is further cooled in a hot-water-heat exchanger that is used to heat the facility's water to about 70°C (158°F).

Even during times when the turbines are unavailable (i.e. during maintenance), the system has been configured to continue to produce steam, freezing water and hot water by allowing air retrieved through the intake to feed into the burner through a special fan. This extra support allows the plant to have maximum flexibility and continuity in the plant's operations.

The Results

The various processes required by a food processing plant make it an ideal candidate for a high efficiency, microturbine-based system. Since all the energy carriers used in the Salumificio Coati system are process fluids, the plant's energy demands of roughly 8,400 annual operating hours are practically constant throughout the year.

From the earliest planning stages, the new system was designed to employ a high number of heat recovery stages. This allows for maximum energy capture from the microturbine's exhaust. As a result, the CCHP system provides about 80% overall energy efficiency. This amounts to energy savings of around 9,600 MWh per year, with an annual cost savings of approximately €714,000. The new system also saves 830 TOEs (tonnes of oil equivalent) every year, which makes for a strong environmental benefit: 2,400 tonnes in avoided CO₂ emissions.

"We are very proud of this application as it is the first CCHP plant in Italy," said Dario Babuin, IBT Europe's Supply Chain Manager. "By maximizing the production plant's energy efficiency, the facility will be able to realize a return on their investment in roughly 3 years." ■

Capstone C1000S Microturbine



A C1000S HPNG provides up to 1MW of electrical/thermal generation and can be paralleled to generate up to 10MW of clean-and-green power.