

At a glance

Location

Fiano Romano, Lazio, Italy

Commissioned

Summer 2015

Fuel

Methane

Technologies

- Capstone C800 microturbine
- Hot water heat exchanger
- 250-Ton (365kW) exhaust-fired ammonia absorption chiller

Customer

- CONAD (Consorzio Nazionale Dettaglianti) food retailer
- Building: A 75,000-square-meter (807,293-square-foot) logistics center

Results

- Save about 47 euros (about US\$51) per hour with a total primary energy savings of 4,000 MWh and 350 Tep per year.
- Reduce carbon emissions by 800 metric tons per year (the equivalent to removing 147 passenger vehicles from the road).

CONAD

CONAD, also known as Consorzio Nazionale Dettaglianti, was founded in 1962 as a cooperative system of entrepreneurs, dealing in large-scale food distribution. Today the Italian retail store brand operates one of the largest supermarket chains in Italy and business cooperatives across various other European countries.

In 2014, CONAD began looking at power generation technologies to reduce greenhouse gas emissions and energy consumption at one of their major distribution platforms in Fiano Romano. Being a big name food retailer, the company needed a low emission technology that is also reliable and able to effectively manage their cold chain, a temperature-controlled supply chain, for their logistics center. With both energy and cost savings in consideration, CONAD turned to IBT Group, Capstone Turbine's Italian distributor, to design and implement a combined cooling, heating and power (CCHP) solution for trigeneration.

Achieving Efficiency without Sacrificing Manageability

The foundation of the trigeneration energy system is a single 800kWe Capstone C800 microturbine that uses methane gas to produce electricity for all necessary food storage and distribution activities. A custom heat recovery module harnesses the thermal energy generated from the microturbine exhaust to heat water for washing and provide space heating for the warehouse and adjacent offices.



A 365kW ammonia absorption chiller produces chilled water to both refrigerate the warehouse and provide air conditioning to the adjacent offices. Any excess electricity produced can easily be fed into the grid and sold through the national utility system.

"We are very proud about this new application that we have developed," commented Ilario Vigani, CEO of IBT Group. "CONAD is the first giant food retailer to adopt Capstone's innovative, low emission and oil-free gas turbine technology, allowing them to operate a temperature-controlled cold chain with significant energy savings compared to other technologies."

Cost Savings through Reliable Power Generation

The microturbine power plant, which was completed in summer of 2015, is able to maximize the overall energy efficiency of CONAD's logistics center with peaks over 85 percent for over 8,000 operating hours. The CCHP system saves CONAD about 47 euros (about US\$51) per hour with a total primary energy savings of 4,000 MWh and 350 Tep (thermoelectric power) per year. The system also reduces the company's carbon emissions by 800 tons per year.

"We decided to invest in the cold chain not only because we want to reduce CO₂ and other greenhouse emissions, but especially to significantly reduce the energy consumption to allow us to offer concrete support to our members in order to translate it into real savings for our customers," said Danilo Toppetti, general manager of PAC 2000A-CONAD, the largest cooperative within CONAD consortium. "We hope that CONAD, nationally, may decide to apply this technology to other distribution centers soon."

Capstone microturbines are ideal for CCHP applications because the clean exhaust can be put to use in just about any application. The C800 microturbine energy system is made up of four Capstone C200 microturbines outfitted in an ISO container. Internal redundancy enables each C200 to be shut down for maintenance without any interruption in power generation. Even in the event of a utility power outage, the Capstone C800 microturbine will maintain complete functionality and operate without any fluctuations in power generation. ■



"We hope that CONAD, nationally, may decide to apply this technology to other distribution centers soon."

— Danilo Toppetti, General Manager,
PAC 2000A-CONAD