Government/Municipal

Revico Wastewater Treatment Plant

Cognac, the lavish spirit noted for its double-distillation process and high position on the social ladder, is only labeled "Cognac" if produced in the stunning Cognac region of France. For 300 years, producers of the fine spirit have boasted that the region's stable climate, green hills, nearby ocean, and meandering Charente River described by Henri IV as "the loveliest in my kingdom" contribute to Cognac's exquisite taste.

While these astounding microclimate characteristics remain today, distillation of this fine brandy produces millions of gallons of vinasse, a foul-smelling, sludge-like amber liquid rich in organic materials. Until a few decades ago, the vinasse simply was spread across surrounding land, which harmed wildlife and seeped into nearby rivers.

As concern about the pollution created by vinasse began to escalate, Cognac producers in the region knew they had to take action to stem the flow of the effluent.

In 1971, several distilleries joined to create Revico, a wastewater treatment plant that collects the vinasse, removes harmful substances, and releases clean water into nearby waterways. To dispose of the 300 million liters of vinasse produced each year by 140 distilleries, Revico installed four 5,000-cubic-meter (176,573-cubic-feet) anaerobic digesters that break down the waste matter. Water from the material is separated from the sludge, treated, and released.

At a glance

Location

Cognac, France

Commissioned

November 2009

Fuel

Digester gas – methane

Technologies

- A C800 Power Package with a heat recovery module (HRM) used in a combined heat and power (CHP) application.
- Four 5,000-cubic-meter (176,573-cubic-feet) anaerobic digesters.

Results

- C800 CHP Power Package produces 3,000MW-hours (MWh) of electricity and 4,000MWh of thermal energy.
- Thermal energy heats 4 anaerobic digesters that breakdown the vinasse waste material.
- Thermal energy also warms the city of Cognac's large greenhouse.
- Energy efficiency exceeds 80%.
- Energy generated is sold to utility Électricité de France (EDF).
- Electricity sales to EDF generate €400,000 – €500,000 per year.

During the process to break down the vinasse sludge, bacteria in the digesters produce significant amounts of methane biogas. Rather than just flaring the methane into the atmosphere,
Revico captured the methane and used it to fuel three boilers that produced steam, which created electricity and heat to operate the digesters and power the entire Revico facility.

Recently, Revico officials decided to update the facility's onsite-boiler system. They turned to Verdesis, a Capstone Turbine Corporation distributor in Europe. After several months of research and cost analysis, Verdesis suggested Revico install a methane-fueled Capstone C800 CHP Power Package. The Power Package, which produces clean-and-green electricity to run the entire plant and thermal heat to operate the four onsite digesters, is extremely reliable, quiet, and easily fits in a small space.

In November 2009, the Capstone C800 CHP Power Package was commissioned to serve as the powerhouse for the plant. The innovative energy system converts waste methane gas into thermal energy and electricity. In addition to the C800, the installation includes a Capstone-designed HRM mounted inside the container of the power package.

"We chose the Capstone C800 because Capstone microturbines are the low-maintenance solution to help reduce energy costs and offer the best technical solution with regards to the seasonal activity of Revico," said Xavier Lombard, Verdesis CEO.

Today, Revico uses a single, methane-fueled C800 to generate 3,000MWh of electricity and 4,000MWh of thermal energy that heats the four digesters used to breakdown the vinasse. In addition, thermal energy warms a large nearby greenhouse the city of Cognac uses to grow flowers that adorn city streets. Lombard said that the cogeneration system's efficiency exceeds 80 percent, while availability of the Capstone C800 nears an astonishing 97 percent.

The C800 produces enough electricity onsite that Revico is able to sell power to EDF, the country's main utility, through a connection to the grid. Nicolas Pouillaude, Revico's President, estimates the sale of electricity to the grid will generate €400,000 – €500,000 per year for a joint venture created between Revico and Verdesis.

"We were very satisfied with how quickly we were able to produce electricity from the C800 microturbine without a long testing period," Pouillaude said. "We've had great success with our investment in the Capstone microturbine. For many years, Revico has been a pioneer in environmental protection in the region. With the Capstone C800, we continue to be first-in-class in protecting the region's environment. In fact, French and European officials consider the innovative Capstone turbine system so environmentally friendly they offered Revico a significant subsidy to install the system."

A C800 Power Package is fueled by methane from the treatment of sludge waste (from grape skins and stems) following the distillation of wine to make Cognac.

The Capstone C800 operates nine months annually – from November to July – processing approximately 80 truckloads of vinasse each day during peak season.

To complete the process, the by-product of the digester system is combined with "green waste" (branches, leaves, and flowers) from the Cognac region and placed on surrounding land to compost and improve the soil quality.

"We're very careful, not only with the production of Cognac but with the environment," Pouillaude said. "We're very attentive to the way we make Cognac. The greener we are, the better we are. Capstone's C800 turbine and the company's support have allowed us to produce an outstanding product in the best way possible." ■

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