PROJECT PROFILE

Fresh Venture Foods

633-kW CHP System

WESTERN CHP TECHNICAL ASSISTANCE PARTNERSHIPS

Quick Facts

LOCATION: Santa Maria, California
MARKET SECTOR: Food Processing
FACILITY SIZE: 75,000 square feet
FACILITY PEAK LOAD: 1,100 kilowatts (kW)
EQUIPMENT: 633 kW engine generator CHP package (JMC 312) and 125 refrigeration ton absorption chiller
FUEL: Natural gas
USE OF THERMAL ENERGY: Food processing refrigeration and hot water for clean-up
CHP TOTAL EFFICIENCY: 74.7% HHV
ENVIRONMENTAL BENEFITS: Offsets 630 tons of CO_2 and 2.6 tons of NO_x annually
TOTAL PROJECT COST: $2,796,800
YEARLY ENERGY SAVINGS: $190,000
CHP IN OPERATION SINCE: 2016

Site Description

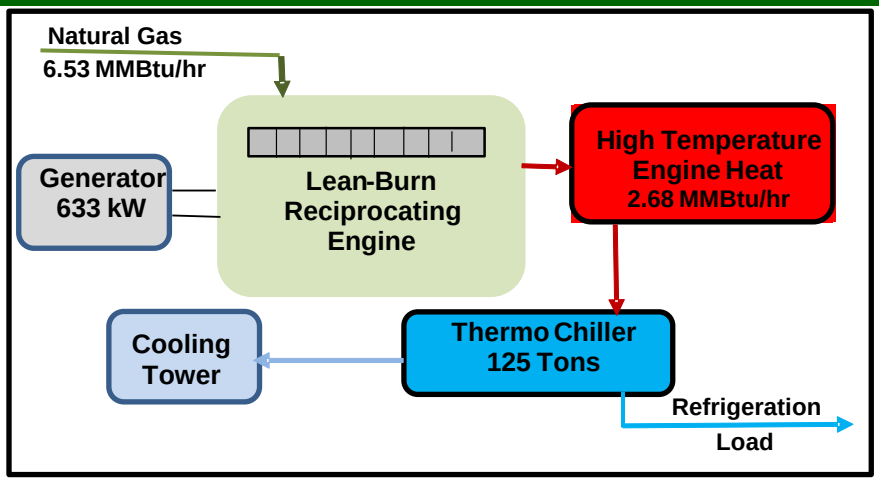
Fresh Venture Foods is a refrigerated food processing facility in Santa Maria, California that provides processing, packing and shipping services to regional growers of broccoli, cauliflower, spinach, carrots, and other vegetables. Fresh Venture was established in 2013 as a joint venture between Babé Farms and Gold Coast Packing to consolidate their processing operations into a 75,000 square-foot cooler and processing facility. Today, Fresh Venture is a premier service provider in the food service industry with partners across the U.S. including retail, food service, and restaurants. Fresh Venture's portfolio includes value-added commodities, roots, and specialty items.

Reasons for CHP

Following a comprehensive energy study to control operating costs and reduce its carbon footprint, Fresh Venture decided on a compact and efficient combined heat and power (CHP) system consisting of a natural gas reciprocating engine generator with heat recovery that drives an absorption refrigeration system. Other considered generation options required too much space and/or did not meet Fresh Venture's investment hurdle rate. According to Gary Burk, Fresh Venture's Managing Partner, "With space constraints at the site and anticipating value in the ability to run isolated from the grid, the engine-based CHP system provided us with the most cost-effective clean solution."

CHP Equipment &Configuration

PHOTO COURTESY OF WESTERN ENERGY SYSTEMS



CHP System Energy Flow Diagram
(Courtesy of Western Energy Systems)

The Jenbacher JMC-312 unit was supplied by Western Energy Systems. The CHP refrigeration system consists of 1) the engine generator, switchgear, controls, and heat recovery circuits all contained in a sound-attenuated enclosure; and 2) the ThermoChiller assembly including the water-ammonia solution tank, the vapor ammonia generator, engine glycol and exhaust heat exchangers, pumps, cooling tower, controls, and engine exhaust after-treatment equipment.

The Jenbacher engine is paired with a Stamford 480-volt generator rated at 633 kW output. The package is equipped for operation off-grid. The closed loop selective catalyst reduction and oxidation catalyst emission control system supplied by Steuler and coupled with Jenbacher's lean-burn engine technology maintains NOx emissions below the permit requirement of 4 ppm at 15% O2.

The Energy Concepts 125-ton ThermoChiller ammonia absorption refrigeration plant is thermally driven by the high temperature engine cooling circuit that recovers heat from the first stage intercooler, engine jacket, and exhaust. A 20°F glycol solution exits the chiller to serve the refrigeration needs. The low temperature heat circuit from the engine lube oil and second stage intercooler is available for hot water wash-downs and sanitation.

CHP Operation

The CHP system runs at full capacity 24 hours per day, five to six days a week except when shut down for scheduled and unscheduled maintenance. All the generated electricity is used at the site and none is exported back to the grid. The ThermoChiller is base loaded with supplemental refrigeration provided by the electric ammonia refrigeration units.

Key Takeaways

- The addition of a cold storage tank increased thermal utilization during a few hours for plant cleaning and maintenance every night and enabled a quick startup of the refrigeration system in the mornings.
- The low-NOx engine was fitted with a high effectiveness oxidation catalyst and selective catalytic reduction (SCR) system to meet some of the state's most stringent air emissions standards.

For More Information

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