NORTHEAST

U.S. DOE

CHP Technical Assistance Partnerships

PROJECT PROFILE

Green Mountain Coffee Roasters

280 kW CHP System

Quick Facts

LOCATION: Waterbury, Vermont
EQUIPMENT: 280 kW Waukesha engine
Heat exchangers on exhaust stack and cooling system
ADDITIONAL EQUIPMENT:
Backup/supplemental boiler 90 kW Waukesha engine
FUEL: Propane
HEAT RECOVERY APPLICATIONS:
Space heating Domestic hot water Process hot water
TOTAL PROJECT COST: $ 500,000
CHP IN OPERATION SINCE: 2002-2003
SYSTEM DESIGN AND INSTALLATION: Northern Power Systems Waitsfield, Vermont

Project Overview

Coffee roasting is an energy intensive process in which reliable power is critical. The coffee beans are brought to a very high temperature approaching flash point, and if power is lost during that process they can go exothermic and cause a fire. To ensure a reliable electricity supply, Green Mountain Coffee Roasters installed a CHP system in 1999 at their corporate headquarters and main processing facility in Waterbury, VT. They were particularly motivated by the possibility of power outages associated with Y2K.

Then in 2003, when the larger roasting equipment was being upgraded, a new, larger CHP system was installed. This 280 kW 480 volt system uses a Waukesha engine to provide approximately 25% of the electricity and most of the heat and hot water required by the facility.

The facility employs 500 people and operates 24 hours a day, 7 days a week. The production and distribution buildings, which together are served by the CHP system, total 162,000 square feet in size.

The total cost for purchase and installation was approximately $500,000. A $50,000 grant to support the project was provided by the Propane Education & Research Council.

The 90 kW 208 volt system that was installed in 1999 is now in standby mode. It no longer meets emission standards, but could be upgraded with a catalytic converter to meet standards. It is used in emergencies to power phones and computers.

Energy Overview

The 280 kW Waukesha engine is fueled with propane. Northern Power Systems was the project developer.

An air to water heat exchanger on the exhaust stack provides hot water to heat the plant. A water to water heat exchanger on the engine cooling system provides domestic hot water and hot water for use in processing and equipment cleaning.

Operation of the CHP system varies based on activity in the plant. It is

run whenever the roasting process takes place, which is currently approximately 14 hours per day, 7 days a week, but at times it has been run continuously.

The system is able to meet most of the plant's heat and hot water demand. A boiler is used for supplemental and backup heating.

Normally both the CHP system and the electric grid are used to power the facility. The coffee roasting process is on a critical load panel. The grid is monitored, and in case of any problems, the critical panel is isolated so the roasting process is powered solely by the CHP system.

Early in 2006, gas flow meters were installed in the plant to help to monitor system performance in the future and to better understand the cost benefits of the CHP system.

The system efficiency peaks at approximately 70% in the winter when all of the thermal output can be used.

Most of the system maintenance is handled internally. A representative from Waukesha comes in for major work on the engine, and Northern Power Systems comes in for any major electrical issues.

Benefits

- The CHP system provides increased electric reliability and therefore increases safety by reducing the risk of fire.
- The environmental benefits of efficient energy generation with CHP are in line with Green Mountain Coffee's commitment to environmental and social responsibility.

Challenges

- It took longer than expected to initially get the system on-line.

For More Information

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