MID-ATLANTIC

CHP TECHNICAL ASSISTANCE PARTNERSHIPS

PROJECT PROFILE

Monogram Snacks

400 kW Biogas CHP System

PHOTO COURTESY OF MONOGRAM SNACKS

Quick Facts

LOCATION: Martinsville, Virginia
MARKET SECTOR: Food Processing/Waste Water Treatment
FACILITY SIZE: 400 kW
THERMAL HEAT RECOVERY: 1.4 MMBTU/hr
EQUIPMENT: Reciprocating Engine
FUEL: Digester Syn Gas
USE OF THERMAL ENERGY: Digester Heating
CHP TOTAL EFFICIENCY: 82%
ENVIRONMENTAL BENEFITS: reduced liquid waste stream's pollutants and reduced net carbon emissions by 2,687 metric tons/year
TOTAL PROJECT COST: $12 million
CHP IN OPERATION SINCE: 2017

Site Description

Founded in 2004 with the purchase of King Cotton and Circle B brand meats from Sara Lee Corporation, Monogram Foods manufactures and markets top-quality food products. Among these are a full range of meat snacks, corn dogs, pre-cooked bacon, smoked sausage, appetizers and other value-added meats. Monogram Snacks Martinsville is a 92,000 square foot processing plant that produces shelf-stable jerky, meat sticks and picked products. Monogram added 56,000 square feet in 2016 and announced more production expansion in 2018.

Reasons for CHP

As a byproduct of producing beef jerky and other pickled products, Monogram Snacks has leftover oils and fats that require proper disposal. In the past, that liquid waste stream was sent to the local wastewater treatment plant in Martinsville, Virginia. But with increased production, the food processing plant started incurring high monthly surcharges from the Henry County Public Service Authority for processing Monogram's wastewater, which exceeded levels of total suspended solids (TSS) and biological oxygen demand (BOD). To solve this problem, Monogram decided to install an anerobic digester to pre-process Monogram's wastewater and incorporate CHP to improve the project economics.

- Process Wastewater – 75,000 gallons per day
- Grease - 3,000 gallons per week
- Inedible Solid Wastes from Production (35% solids) - 19,000 pounds per week
- Imported Wastes from Milk Processor (5% solids) - 6,000 gallons per week

CHP Equipment, Configuration and Operation

Anerobic Digester (far left), 400 kW Packaged CHP system (right side blue Module, Gas Flair (far right)

PHOTO COURTESY OF AMERICAN BIOGAS COUNCIL

The engine-generator is equipped with both jacket and exhaust gas heat recovery systems and recovers 1.4 MMBTU/hr (409 kW_{th}) of hot water heat energy, which is used to heat the digester via an external spiral heat exchanger. Approximately 90% of this heat is used in the digester to heat the incoming process wastewater.

After startup, the Monogram production plant was not yet operating at full capacity and producing enough waste to fully utilize the Clean Energy Plant (CEP). As a result, the CEP has contracted to accept and treat wastes from a chicken processor, which will enable it to produce 105 standard cubic feet per minute of biogas containing 68% methane and allow the engine-generator to operate continuously at its full-rated capacity of 400 kW. Based upon 8,000 hours of operation a year, the generator will produce a total of 3,200,000 kWh of renewable electricity.

Project Financing

Creative financing allowed the project to leverage and utilize:
New Market Tax Credits – a federal program that provides an incentive for investment in low-income communities. Investors receive a tax credit against their federal income tax.
CHP Investment Tax Credit - allows project owners or investors to be eligible for 10% Federal investment tax credit for installing CHP equipment placed in service 2024.
Renewable Energy Certificates (RECs) - a market-based credit issued by the utility when one megawatt-hour (MWh) of electricity is generated and delivered from a renewable energy resource.

Lessons to Share

A result of increased production, the food processing plant started incurring high monthly surcharges from the Public Service Authority for processing Monogram's wastewater, which exceeded levels of total suspended solids (TSS) and biological oxygen demand (BOD). This led to the need to find a solution that would prove less costly in the long term which led to construction of an in-house wastewater pretreatment facility in May 2016.

"With the addition of our bioenergy production capacity, Monogram now has the ability to capture and convert that methane gas into a renewable form of electrical energy," noted Brian Neal, Manager of Environmental Health And Safety for Monogram Snacks.

For More Information

U.S. DOE MID-ATLANTIC CHP TECHNICAL ASSISTANCE PARTNERSHIP (CHP TAP)
www.machptap.org

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