SOUTHEAST

U.S. DOE

CHP Technical Assistance Partnerships

PROJECT PROFILE

Marine Corps Logistics Base Albany

4 MW Landfill Gas CHP System

Project Overview

Marine Corps Logistics Base Albany (MCLB) is located just outside Albany, Georgia. The primary mission of the base is to rebuild and repair ground combat and combat support equipment and to support installations on the East Coast of the United States. Today one of MCLB Albany's most important facilities is the Marine Corps Logistics Command's Maintenance Center. The base comprises more than 3,300 acres and employs more than 2,400 civilians along with a complement of 600 active-duty Marines.

MCLB Albany was recipient of the 2015 Secretary of the Navy Energy and Water Reduction Award. The base received a $30,000 award and the right to fly the Navy Energy Conservation Flag for one year.

In 2005 MCLB Albany completed an Energy Savings Performance Contract (ESPC) with Chevron Energy Solutions (now Energy Systems Group or ESG) for a number of different Energy Conservation Measures (ECMs) and was exploring the potential of another ESPC project when they were contacted by the Dougherty County Landfill and asked about their interest in a landfill gas (LFG) project. The LFG CHP project became part of a new ESPC with ESG and started operation in 2011. The project has won numerous awards including the 2013 EPA Energy Star CHP Award. An expansion to this project is currently underway that will add 2.1MW of capacity for a total of 4MW and is expected to be operational in May 2016.

Quick Facts

LOCATION: Albany, GA
MARKET SECTOR: Military
FUEL: Landfill Gas, Natural Gas
GENERATING CAPACITY: 1.9 MW
GENERATING CAPACITY (Expansion): 2.1 MW
THERMAL OUTPUT: 3,100 lbs/hr steam
IN OPERATION SINCE: 2011, 2016
EQUIPMENT: (2) GE Jenbacher Reciprocating Engines with heat recovery
(2) 150 BHP Johnston Boilers with Webster burners
USE OF ELECTRIC ENERGY: 100% On-site
USE OF THERMAL ENERGY: Process Steam
INSTALLED COSTS: $20 million
INSTALLED COSTS (Expansion): $4.5 million
ANNUAL SAVINGS: $1,556,237
SIMPLE PAYBACK: 14 years
JOINT PROJECT BY: MCLB Albany, Dougherty County Landfill, Energy Systems Group, Georgia Power, Constellation Energy
ENVIRONMENTAL BENEFITS: GHG emissions reduction by 19,200 tons annually
EMISSIONS CONTROLS: Engine-LEANOX Combustion Control, Boilers-5:1 turndown & O_2 Trim
EFFICIENCY: 50%

Reasons for Installing Combined Heat & Power

Compliance with mandates and energy goals, such as EISA 2007 and Executive Order 13423, were motivating factors for CHP deployment. The base's commitment to sustainability is evident, as it has already reduced energy consumption by 41% exceeding the set objective of 30%. MCLB Albany has also set a goal of becoming net zero by generating onsite as much energy as it consumes and is expected to reach that goal by the summer of 2017. Another reason for installing the LFG CHP system was energy security and power reliability. In case of a blackout, the base can run in "Island Mode" and still provide power to critical assets on base.

Equipment and Configuration

Landfill gas is extracted under a vacuum from wells in the landfill and sent to a compression skid which cleans the gas through filtration, dries it, compresses it and sends to the generator facility. The LFG fuels a 1.9 MW GE Jenbacher reciprocating engine that provides approximately 19% of the base's electric needs. The waste heat from the engine jacket is sent to a heat recovery steam generator (HRSG) which produces 95psi and 350°F steam for various industrial processes at the Maintenance Center.

The 2016 CHP expansion includes a 2.1 MW GE Jenbacher engine and a second HRSG that will cover up to 40% of the base's electric demand and approximately 100% of the Maintenance Center's thermal load. The engines have dual fuel capability with natural gas being the backup fuel. The base also operates two supplemental LFG/ natural gas boilers for additional green steam. With net zero and renewable energy in mind, MCLB Albany is investigating different operating scenarios for the two engines.

1.9 MW GE Jenbacher Engine

Collaborative Partnership

The first CHP project was a collaborative partnership between MCLB Albany and the Naval Facilities Engineering Command with the Dougherty County in Georgia, and Energy Systems Group (ESG). MCLB Albany entered an ESPC with ESG for the installation of the LFG CHP project, which was bundled with other EMCs, and the operation and maintenance of the system. This project cost approximately $16million and saves the base $1.5million annually in energy costs. The expansion was funded under the Energy Conservation Improvement Program and cost $4.5million. The second engine will be operated and maintained by Constellation New Energy. The contract with Dougherty County for purchasing the LFG will provide the county with an estimated annual revenue of $144,000 after the expansion.

Landfill Gas Compression Skid

Lessons Learned & Future Plans

When employing landfill gas fueled CHP, attention must be paid to the landfill's gas production capabilities. The availability and fuel content of LFG varies considerably with ambient temperature and moisture. This dynamic is often in conflict with energy savings goals. As an example, the quantity and fuel content of LFG is lowest during the winter months when the demand for steam and thermal energy savings opportunities are the greatest. Furthermore, cybersecurity concerns impede remote monitoring and system maintenance. Scheduled plant visits for maintenance and monitoring help reduce unexpected problems and setbacks.

The net zero energy plans of MCLB Albany will be further met by a partnership with neighboring paper manufacturer Procter & Gamble and energy services company Constellation Energy that is presently under development. P&G are currently constructing a large capacity biomass boiler and steam turbine CHP system at their facility near the base and will provide steam for MCLB Albany to generate 8.5 MW of renewable electricity. High pressure steam will drive a turbine generator set and provide electricity to the MCLB grid by a new overhead distribution line. Low pressure steam from the outlet of the turbine generator will be used by P&G for their paper production line to maximize the useful output of the CHP system.

For More Information

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Date issued: 03/2016