



EMWD Microturbine Energy System

480 kW On-Site CHP Microturbine System

Site Description

The Eastern Municipal Water District (EMWD) headquarters utilizes a Microturbine Energy System which powers a 50 acre campus. The campus is composed of 110,000 square feet administrative office space and 80,000 square feet are for maintenance shops and warehouses. The site contains more than 620 EMWD employees which are spread out throughout the facility. The site contains a microturbine absorption chiller system to meet the needs of the facility.

Project Profile

After a competitive application process in 2002, EMWD received five 60 kW Capstone microturbines from SCAQMD and an additional four in 2004 via an unsolicited proposal for power generation coupled with waste water recovery absorption cooling. In 2005, the microturbine and the waste heat recovery cooling system started up and stayed in start up mode for an additional two years. In 2007, the start-up phase of the system was complete and began full operation. The system is currently still in operation with constant improvements to increase capacity and energy efficiency.

The site utilizes natural gas in the turbines to meet the 1300 kW peak load of the system. The cost of operation from 2004 to date is about \$1,093, but the maintenance costs are about \$100,000. Some of the maintenance include preventative maintenance as well as corrective maintenance. In addition, about \$70,000 was put into improvements for the facility as the facility continues to grow and improve.

Historically, the building demand was about 3.3 million kWh/year at a rate of \$0.1696/kWh which was costing EMWD annually \$559,680. When the microturbine system was installed the demand dropped to about 2,607,230 kWh annually at a rate of \$0.0996/kWh. From this, the annual savings are calculated to be around \$300,000 annually, giving an original payback of about four years. After the system was actually installed and utilized, the microturbine was producing 3,661,940 kWh annually at \$0.25/kWh and the chiller at 2,160,000 kWh at \$0.25/kWh. Once gas and main-tenance costs were taken into consideration, the payback was actually about two years rather than four.

Quick Facts

LOCATION: Riverside County, California
MARKET SECTOR: Mixed-Use Development
TOTAL PROJECT COST: \$1,200,000
PAYBACK PERIOD: 2.5 Years
MONTHLY ENERGY BILL SAVINGS: \$42,000
EQUIPMENT: 9 60 kW Capstone Microturbines,
 3,000 MBTU/hr Heat Exchanger, 150 ton
 Absorption Chiller, 300 ton Evaporation
 Tower
FUEL: Natural gas
FACILITY SIZE: 50 acre campus: 110,000 square
 feet administrative offices, 80,00 square
 feet maintenance shops
FACILITY PEAK LOAD: 1300 kW
**FACILITY AVERAGE ELECTRICAL POWER
 DEMAND:** 380 kW
CHP IN OPERATION SINCE: 2002



EMWD Capstone Microturbines

Operation and Maintenance Challenges

Due to the complexity of the system, diligent operation and maintenance are required. Some of the issues faced were loss of turbine efficiency in the summer, chiller operation limited by heat input, keeping the turbines online 24/7, and the system control and integration issues. The turbines had problems early on in the project, but Captstone replaced them under warranty at no cost for the first three years. In order to enhance the project reliability, new natural gas compressors are being implemented and an alternative cooling water treatment is being developed. In addition, building energy management systems are being upgraded and supplemental heat is being integrated for improved chiller operation.

*‘EMWD’s significant electrical load coupled with capacity issues with the regional electrical power grid and the cost of electrical power led the Distric to pursue alternative sources of electrical power supply including the use of fuel cell technology, digester gas, microturbines, and energy.’
optimization software*



Microturbine Facility



Heat Exchangers and NG Compressors

Eastern Municipal Water District Going Green

EMWD is making an effort to reduce their reliance on natural gas and use more biogas. In addition, EMWD enrolled with EnerNOC demand response to reduce approximately 1.5 MW of the energy usage. In order to do this, they shut down pumps at two of the main water treatment plants, which are major electricity using equipment.

For More Information

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For Additional CHP Pacific Projects Profiles:

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