PROJECT PROFILE

MID-ATLANTIC CHP TECHNICAL ASSISTANCE PARTNERSHIPS

Hershey Medical Center

7.5 MW CHP System

Hershey Medical Center Campus

Quick Facts

LOCATION: Hershey, PA
MARKET SECTOR: Hospital
FACILITY SIZE: 7.5 megawatts (MW)
FACILITY PEAK LOAD: 22 MW
EQUIPMENT: Combustion Turbine
FUEL: Natural Gas
USE OF THERMAL ENERGY: Steam for Sterilization, Heating, Domestic Hot Water and Reheat
CHP TOTAL EFFICIENCY: 70.7% (unfired HRSG)
ENVIRONMENTAL BENEFITS: Reduce greenhouse gases and air pollutants
NET PROJECT COST: $21 million
YEARLY ENERGY SAVINGS: $2.57 million
PAYBACK: 8 years
CHP IN OPERATION SINCE: 2018

Site Description

Penn State Hershey Medical Center was established in 1963 on a 550-acre campus and has 548 licensed beds. Penn State Hershey Medical Center is known as the premier provider of medical care in the central Pennsylvania area, recognized as the number four hospital in the state and home to PA's only medical facility accredited as both an adult and pediatric Level 1 Trauma Center. Demonstrating their commitment to both top notch patient care and sustainability, the medical center invested in a cogeneration facility to minimize their energy footprint.

Reasons for CHP

Ready to replace their aging electrical infrastructure, Penn State examined their ability to withstand extreme weather conditions and other external forces, and determined that they needed to fortify their systems and considered cogeneration as a solution. Located at the southwest corner of the Hershey campus, the natural gas-fired CHP plant generates 54% of the hospital campus power usage and 96% of the steam usage, while providing the hospital with the benefit of reduced annual utility costs, improved energy supply resiliency, and contribution to lower carbon emissions. The CHP plant reduces campus carbon emissions by 83,120 metric tons, equivalent to the annual residential electric use of 27,662 people. It is worth noting that through Act 129, the state's energy efficiency resource program, Hershey Medical Center has received just under $1.5 million in incentives for the CHP project ($940,000 grant from the Commonwealth of Pennsylvania and another $500,000 from PPL, the local utility).

CHP Plant and Load Management System

Bette & Cring, with Cogen Power Technologies, designed and constructed the CHP Plant based on one 7.5 MW Solar Turbines Taurus 70 combustion gas turbine generator and one Rentech heat recovery steam generator with duct firing capability to supply 80,000 lb/hr steam. The majority of steam is required for climate control, cooking, hot water generation and sterilization of medical equipment. The CHP plant has load shedding and black start capability to support hospital islanding operation and to maintain hospital services during utility grid outage. As part of the CHP project, the existing central utility plant power distribution substation was replaced in-situ with minimum interruption to the power supply services to the campus. The CHP plant is equipped with a Load Management System (LMS) and a suite of advanced controls that allows the CHP plant to properly interface with the grid and the building load. The LMS monitors power flow across the utility tie and maintains the import setpoint. In the event of a grid failure, the LMS is designed to disconnect from the grid, safely shut down the CHP plant, shed predetermined loads, and start the 1 MW Caterpillar diesel generator to permit the restart of the CHP plant. The LMS manages the stability of the Medical Center islanded microgrid, operating all available distributed generators and continuously calculating the amount of shed load required by measuring the amount of lost power generation capacity less any required spinning reserve necessary to start inductive loads.

The 7.5 MW Combustion Turbine Prime Mover

PHOTO COURTESY OF COGEN POWER TECHNOLOGIES

Artist's Cutaway Rendering of the CHP Plant

PHOTO COURTESY OF CHA CANADA THE PROJECT ENGINEERING FIRM

Lessons to Share

Hershey Medical Center received a $940,000 grant from Pennsylvania's Department of Community and Economic Development to offset investment costs. Additionally, the project qualified for a $500,000 incentive through PPL's ACT 129 program. Often, these grants are critically import in delivering the required financial return to move CHP projects forward in Pennsylvania, particularly during current economic conditions.

> ***"The CHP plant has a much higher efficiency than our previous boiler system and saves important operating costs. The CHP plant also provides increased resiliency as it will serve as a backup for us in case of an emergency or a power outage"***
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> **Kevin Kanoff, C.E.M., Campus Energy Engineer**

For More Information

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CoGen Power is a Recognized Packager and Solution Provider in the U.S. DOE Packaged CHP Systems eCatalog:
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