



San Diego VA Hospital

4.6 MW CHP System



Quick Facts

LOCATION: San Diego, CA
MARKET SECTOR: Hospital
FACILITY SIZE: 1,030,000 square feet
FACILITY PEAK LOAD: 6.8 MW
EQUIPMENT: 4.6 MW Solar Turbines
 Mercury™ 50 gas turbine, absorption chiller
FUEL: Natural Gas
USE OF THERMAL ENERGY: Space and
 autoclave heating, absorption chilling
 and domestic hot water
CHP TOTAL EFFICIENCY: 64%
ENVIRONMENTAL BENEFITS: Less than 5ppm
 NOx
TOTAL PROJECT COST: \$4 M
YEARLY ENERGY SAVINGS: \$1-1.5 M
PAYBACK: 4 years
CHP IN OPERATION SINCE: 2005

Site Description

The Veteran's Affairs San Diego Healthcare System (VASDHS) provides health care to more than 240,000 veterans in San Diego and Imperial Valley counties. The San Diego VA Hospital has 304 hospital beds; 510,000 annual outpatient visits; 54,000 enrolled patients; 7000 admissions; and 2000 full-time employees. VASDHS is affiliated with the University of California, San Diego School of Medicine. The site covered by the project includes the VA Hospital complex which consists of the Main Hospital Building, the Spinal Cord Injury Building, and the Central Heating and Cooling Plant. The Joint Commission has recognized VASDHS as a 2013 Top Performer on key quality measures.

Reasons for CHP

The San Diego VA Hospital chose to develop a CHP system for its facilities for four main reasons: energy reliability; energy efficiency; pollution reduction; and cost savings. This strategic decision was instrumental in ensuring that, unlike other San Diego County facilities that experienced total loss of all electric power in September 2011 during a county wide power outage, the San Diego VA Hospital was able to maintain power for all outlets, clinical diagnostic equipment, and air conditioning and ventilation in its facilities during the outage. The installed CHP system is also equipped with a recuperator, which provides more energy to electrical power generation and less to heating, which matches the Medical Center Campus load profile extremely well. The CHP systems replaced two older gas turbines, substantially reducing emissions and generating \$4.2 million in emissions offset credits.

CHP Equipment & Configuration

This CHP system includes a 4.6 MW Mercury™ 50 gas turbine (GT), heat recovery steam generator, 500 ton double effect absorption chiller, cooling tower, and variable frequency drives (VFDs) on air handlers throughout the hospital.

The gas turbine utilizes an ultra-lean premix combustion producing <5 ppm NOx and does not require exhaust after-treatment.

The heat recovery steam generator is from Energy Recovery International (ERI) and is sized to provide 13,000 PPH of steam at 150 psig.



CHP Operation

The system runs 24 hours per day, 7 days per week and 365 days per year. There is no variation in operational time but output varies according to the Medical Center's electrical load demand. The unit has 98% reliability and there is no power exported to the grid due to the local utility contract. The overall efficiency of the CHP system is 64%.

The unit was owned by Honeywell Business Solutions until January 2015 when it became fully-owned by the hospital. The VA paid for principal and interest as well as a preventative maintenance contract on a monthly basis during the 10-year agreement. The VA pays for natural gas and benefits from the electricity and steam generated. The unit was subject to measurement and verification (M&V). The M&V report is compiled and supplied by Honeywell during the contract period.

Lessons To Share

- A well designed site will complete energy efficiency improvements prior to designing their CHP system.
- Consider utility peak loads, facility peak demand & summertime ambient temperatures.
- Verify heating & electrical load profiles at the facility to avoid wasting heat.
- A unit that does not require Selective Catalytic Reduction (SCR) or Urea to achieve pollution reduction can decrease first costs and ongoing maintenance/operational costs.

"The Mercury 50 gas turbine was an ideal fit for the hospital because of its recuperated exhaust heat design. I've been very impressed with the reliability and I've been very happy with the system."

- Bill Dias, Assistant Chief/Operations Engineer at VASDHS

For More Information

U.S. DOE PACIFIC CHP TECHNICAL ASSISTANCE PARTNERSHIP

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