

University Medical Center



- ▶ **\$12.5 million cogeneration facility with natural gas-fired turbines**
- ▶ **Supplies electric power and steam to 32-building campus**
- ▶ **Two heat-recovery boilers**
- ▶ **Two absorption chillers, 4,600 tons absorption cooling**
- ▶ **Major teaching hospital**
- ▶ **Chicago, Illinois area**

Medical Center Improves Reliability with Natural Gas-Fired Cogeneration Plant

Faced with the need to replace 50-year-old natural gas steam boilers with costly new ones, a major university medical center instead invested in a cogeneration facility that generates nearly all its electricity and creates low-cost steam as a byproduct.

In addition, the \$12.5 million facility provides critical power reliability for the 536-bed hospital and surrounding 70-acre medical campus. The plant's two Taurus™ 60 natural gas turbine generator sets from Solar® Turbines provide 10,000 kW of electricity and can operate stand-alone in the event of a utility power outage. Intermittent power problems were a key reason for the medical center's decision to invest in onsite power generation.

"We were having some intermittent power problems," says the medical center's vice president of engineering and facilities. "We need 100 percent reliable power." Hospital codes require uninterrupted electric power. Power reliability is critical in a tertiary care facility such as this one, which has a burn and shock trauma institute, neonatal and perinatal care, and many other vital medical services.

Energy savings a motivator

The opportunity to save on energy costs was also a motivating factor, according to the vice-president of engineering and facilities.

"Rather than just replace the boilers, it made sense for [the] medical center to go to cogeneration," says Ron Demski, P.E., Project Manager with the engineering firm EME, LLC of Chicago, Illinois. "By making just an incrementally greater investment, they were able to make electricity and steam from the turbine exhaust heat."





"The combination of the electricity and steam is cheaper than if we were buying the electricity and running our [old] boilers," he points out, adding that replacing a single one of the old boilers would have cost \$3 million.

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In the event of the loss of utility power, the plant is designed to operate in what is called an "island mode," disconnected from the utility, according to Demski. The hospital also has small diesel generators for additional back-up power.

For added flexibility and cost savings, the medical center relies on real-time energy monitoring so it can choose to generate

electricity or purchase it from the local utility if the price becomes more advantageous. In addition, the generators offer a reduction in NO_x emissions compared to the old boilers.

Solar Turbines was the prime EPC (Engineering, Procurement and Construction) contractor for the project and EME was subcontracted to provide engineering and design services. The Taurus gas turbine generator sets provide 72 percent of the campus' electrical load during summer months, 100 percent during the winter. They are housed in a new 6,000-sq.-ft. metal-sided building that adjoins the existing boiler plant. Two single-screw compressors made by SCFM Compression Systems Co., used to boost the pressure of incoming natural gas to the level required by the turbines, are housed in a separate building.

Heat-recovery boilers produce steam

Exhaust from the turbines goes to two Deltak heat-recovery boilers capable of producing a combined 180,000 pounds per hour of steam. This steam is used for comfort heating, medical equipment sterilization, food preparation, and the operation of several absorption chillers, both Carrier and York units, that supply a total 4,600 tons of cooling during the summer months. The heat-recovery boilers also provide domestic hot water for 32 buildings on the medical center campus, and are capable of "fresh air firing," continuing to make steam even if the turbines are out of service, according to the medical center.

Another reason the Solar gas turbine generator sets were attractive was because of the company's extensive parts and service infrastructure in the United States.



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