Evangelische Diakonissenanstalt Hospital Augsburg

Hospital

When the time came to update and renovate the Evangelische Diakonissenanstalt Hospital in Augsburg, Germany, two high-pressure natural gas Capstone C65 MicroTurbines® fit the bill for the highly efficient combined heat and power (CHP) system at the 135-bed facility.

Located near Munich in south-west Bavaria, this landmark is a church sponsored diaconal institute. The hospital is part of a large medical campus that includes a nursing school, assisted living home, vocational school for nursing, conference center with hotel, and, an academy for both social and medical training. The hospital employs 250 people in six specialties, serving about 10,000 patients annually.

"The production of steam is very important to us since we use steam entirely for our central sterilization as well as for our main kitchen," explained Jörn Schattschneider, Technical Engineer for Evangelische Diakonissenanstalt Hospital.

"We researched several options to produce steam, and came to the conclusion that the conventional steam production alone was about 60 percent less efficient than the production of steam and energy would be with the Capstone microturbines," Schattschneider said. "That's why we decided to go with the Capstone technology."

Capstone microturbine systems conserve energy and cut operational costs by creating two forms of energy: electricity and heat.

The reliable CHP system achieves more than 80 percent efficiency. The system's exhaust heat produces steam for the hospital kitchen and sterilization, while thermal power is fed through the entire medical campus and creates warm water used for wintertime facility heating and showers in the summer.

Each year the microturbines produce about 800,000kW-hours of energy, and save the hospital about €130,000 in

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Power Profile

Customer
Evangelische Diakonissenanstalt Hospital Augsburg

Location
Augsburg, Germany

Commissioned
June 2010

Fuel
Pipeline Natural Gas

Technologies
- Two 65kW Capstone microturbines configured in a CHP application
- 3,000 MBTU/hr Heat Exchanger

Two 65kW Capstone microturbines configured in a CHP application and a 3,000 MBTU/hr Heat Exchanger supply thermal power and electricity to the hospital.

energy costs.

"The most interesting part of our system is certainly the heat exchanger," Schattschneider said. "We installed an exchanger that is capable of producing heat in two stages. One is the production of hot water that is 180°C (356°F) and also carries 15-bar pressure as well as regular water of 90/60°C (194/140°F). That really is a great way to use the entire exhaust air, and with that, reach an efficiency of over 80 percent."

In Germany, heated water is provided in both hot and warm levels. Hot water above 110°C (230°F) is pressurized so it cannot expand to steam. At the hospital the hot water is produced in the first stage of the heat exchanger (designed for pressures up to 16-bar). Warm water, with temperatures below 110°C (230°F), is produced in the second stage of the heat exchanger.

Augsburg has been on the cutting edge of technological advances for centuries and today is the third largest economic and industrial center of Bavaria, and home to many research institutions and technology companies.

"The hospital is equipped with the most modern technological and medical equipment for the diagnosis, monitoring and treatment of medical conditions and patient safety," said Max von Doderer, Managing Director of Microturbine Süd GmbH, a division of Capstone's local distributor, E-quad Power Systems GmbH, who installed the system and provides routine maintenance. "In addition to cost-savings, the reliable Capstone microturbines meet the very high standards of the hospital and allows management to worry less about power reliability and focus on what they do best, provide high-quality healthcare."

With over sixty percent of the Augsburg landscape comprised of agriculture use and forests, the significant environmental benefits of the CHP application also played a role in the hospital's decision. A Capstone CHP system provides a tremendous reduction in NOx emissions compared with traditional sources of electrical and heat energy, and, also significantly reduces CO2 emissions compared to traditional systems. Unlike traditional generators, low-maintenance microturbines do not require oil, lubricants or coolants because of Capstone's patented air-bearing technology – thus further reducing the microturbines' environmental impact beyond just low emissions.

Installation of the Capstone microturbines is equivalent to removing 700 cars from the road or planting 730 acres of forest.

"It was very important to us from the beginning to also focus on the ecological aspects of our new project," said Schattschneider. "It wasn't a problem at all to obtain permits since the Capstone turbines create a very pure and clean exhaust quality, and the energy efficiency is very good. The maintenance results are great and the turbines only need to be serviced about once every year. All we can say is that the gas microturbines are exceptionally reliable."