

## St. Joseph Hospital

When officials at St. Joseph Hospital chose to be the first in Germany to install a Capstone C65 Microturbine in a combined heat and power (CHP) application, they hoped for great results. The impact four years after the system was installed is considered outstanding.

"The Capstone cogeneration system achieves a total efficiency of 85 percent and saves the hospital €22,500 (US \$28,350) annually in energy costs," said Bernhard Peters, Technical Manager for E-quad Power Systems GmbH, Capstone distributor of CHP and combined cooling, heating, and power (CCHP) systems in Germany. With the Capstone system, the hospital has reduced energy use by 30 percent when compared to the old boiler system that served the facility for 60 years.

Peters explained that the cogeneration system, commissioned in December 2006 at the regional hospital in Prüm, Germany, serves a dual purpose of supplying electricity and heat to the facility that services approximately 5,000 patients each year.

"At its peak, the Capstone unit produces 65kW of electric power and 126kW of thermal power to heat the building, along with 90°C (194°F) hot water," Peters said.



## At a glance

### Location

Prüm, Germany

### Commissioned

December 2006

### Fuel

Natural gas

### Technologies

- One Capstone C65 microturbine in a CHP application.
- 126kW gas heat exchanger that captures the microturbine's waste heat.

### Results

- The installation saves the hospital €22,500 (US \$28,350) annually in energy costs.
- The hospital's energy use has been reduced by 30%.
- The CHP system supplies electricity and heat to the 153-bed hospital that serves 5,000 patients each year.
- At its peak, the CHP system produces 65kW of electric power and 125kW of thermal power, along with 90°C (194°F) hot water.
- Total efficiency of the CHP system is 85%.
- The CHP system operates 7,500 hours per year, a significant increase over the old boiler system.
- The C65 only requires eight hours of maintenance a year.
- The hospital plans to continue its innovative green-energy efforts by installing a second Capstone C65 and an absorption chiller (for CCHP) in 2012.

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*— Bernhard Peters, Technical Manager,  
E-quad Power Systems GmbH*

“Our efforts to provide the Prüm population with high-quality, affordable medical services were forefront in our minds as we invested in this new equipment for the hospital,” said St. Joseph Director Andreas Fidelak about the Capstone installation. “We wanted to make the best decision for our patients and our bottom line.

The hospital’s technical director believed a turbine would be the best economical decision in large part because of the lower maintenance costs.”

Built in 1950, the 153-bed St. Joseph Hospital is one of five hospitals that are part of Caritas, the country’s largest welfare organization. With more than 25,000 centers and institutions under its umbrella, Caritas strives to make its organizations medically and economically efficient. Installing Capstone microturbines to replace St. Joseph’s 60-year-old boiler system furthered these goals.

In addition to 153 beds, surgery rooms, offices, and clinic space, the hospital also offers an indoor swimming/therapy pool and physiotherapy practice.

The entire cogeneration system operates many more hours than the old system – approximately 7,500 hours a year. The natural-gas fueled C65 produces between 40–65kW of electricity and only requires about eight hours of maintenance a year.

In addition to the direct cost-saving benefits of the cogeneration system, there also were government incentives for producing electrical power under efficient conditions.

Companies receive about €0.10 for every 30,000 kilowatt hours (kWh) produced under the German government’s Combined Heat and Power Law. If the hospital chooses to sell the microturbine-produced energy to the grid, it will receive €0.051 for each kWh. Under the law, CHP units are exempt from the mineral oil tax, which saves companies about €0.55/kWh over the use of systems running on traditional gas.



*The Capstone C65 cogeneration system saves the hospital €22,500 annually in energy costs.*

Refurbishment of existing power plants and installation of new smaller plants, such as the cogeneration system at St. Joseph Hospital, were part of the government’s goal to reduce greenhouse gas emissions by 23-million-metric-tons (50.7-billion-pounds) per year by December 2010. St. Joseph Hospital alone has reduced CO<sub>2</sub> emissions by more than 100-metric-tons (220,460 pounds) each year since installing the Capstone microturbine.

Given the tremendous success of the Capstone C65 microturbine and CHP system, the hospital plans to continue its innovative green energy efforts by installing a second unit, which will have an absorption chiller, turning it into a CCHP installation in 2012.

“St. Joseph has seen such a positive return on its initial investment that officials are planning for the next phase.” Peters said. “They want to be the model of a green hospital that represents ideal efficiency and cost-optimization.” ■