



**MIDWEST  
CHP  
APPLICATION  
CENTER**  
In Partnership with  
the US DOE

combined heat & power in district heating

# Franciscan Sisters of Perpetual Adoration

## 100 kW & 150 kW Steam Turbine Generators

### Project Profile

#### Quick Facts

**Location:**

La Crosse, Wisconsin

**Projected Annual Energy Savings:**

\$55,000

**Installed Cost:**

\$450,000

**Estimated Payback:**

8 Years

**CHP Generating Capacity:**

150 kW

**Prime Movers:**

(2) Turbosteam backpressure steam turbine-generators  
(100 kW and 150 kW units)

**Initial System Online:**

December, 2002

**Facility Size:**

1,300,000 square feet

#### Project Overview

The Franciscan Sisters of Perpetual Adoration (FSPA) operate a medium sized district heating plant located in La Crosse, Wisconsin. The plant has been in operation since 1905 and today provides heat to Franciscan Skemp Healthcare Medical Center, Viterbo University, and St. Rose Convent, over 1.3 millions square feet of building space. In 1996, FSPA began implementing a Combined Heat and Power (CHP) application to the district heating plant to take advantage of the high pressure steam and its potential to generate on-site electricity to the convent. In 2002, a 150 kW backpressure steam turbine was installed on-site followed by another 100 kW turbine installation in 2003. The total project estimates \$55,000 annual savings and an eight year simple payback.



*The chapel of St. Rose Convent*

#### The CHP Solution at FSPA

During a major upgrade to the steam plant in the early 1990's, consideration was given to the installation of a backpressure steam generator to produce on-site electricity. The CHP notion was well received by the FSPA since the Order places a high value on efficiency, conservation and environmentally friendly concepts:

- **Environmental Impact**

CHP technologies reduce annual plant emissions by 410 tons of CO<sub>2</sub>, 4675 lbs. of SO<sub>x</sub> and 4391 lbs. of NO<sub>x</sub>.

- **Leadership Role in the Community**

FSPA desires to take a leadership role in the community, using a CHP installation as a model for other local businesses.

- **Energy Savings**

FSPA plans to reduce their energy costs \$55,000 annually.

## What is Combined Heat and Power?

Combined Heat and Power (CHP) refers to an integrated system that is located at or near a building or facility. The CHP system provides at least a portion of the building's electric load and utilizes the thermal energy from the electric generation equipment to provide space heating, space cooling, domestic hot water, dehumidification, sterilization, and/or process heat.

## What is a backpressure steam turbine-generator?

A backpressure steam turbine-generator is a pressure reducing component of high-pressure steam making the steam suitable for producing hot water or steam that goes to radiators or various processes. The wasted energy is captured by the turbine as electricity. The back pressure turbine can often replace the static reducing valve.

## Additional Facts

**First Cost** ... 10% of the installation costs for the 100 kW turbine-generator were supplied by Wisconsin's Focus On Energy fund, a state public benefits program that promotes energy efficiency, reliability, renewable energy and environmental energy benefits.

**Benefits...** The CHP system serves 100% of the heating needs of the convent, medical center and university and 40% of the St. Rose Convent's electric load (approx. 935,000 kWh of total 2,828,000 kWh)

## For further information contact

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*150 kW Turbosteam backpressure steam turbine generator*



*Control room at St. Rose Convent*



*Underground tunnels transporting steam*

**\$55,000  
Annual  
Energy  
Savings**

**Estimated  
8 Year  
Simple  
Payback**

**10% of  
Installation  
Costs for  
100 kW  
Turbine  
Supplied by  
State Funded  
Program**

