Beloit Memorial Hospital
3.0 MW CHP Application

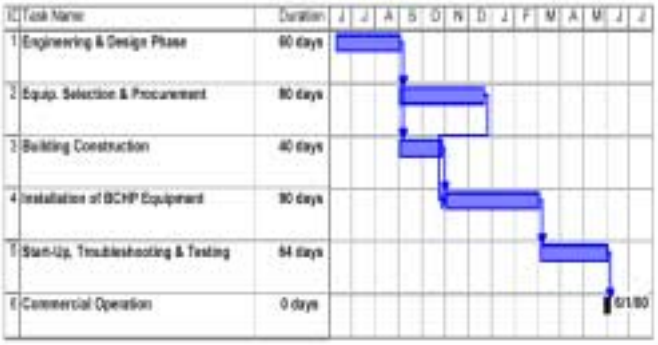
Fact Sheet

CHP Application

In the late 1990's, Beloit Memorial Hospital of Beloit, Wisconsin, was faced with the need to upgrade its electrical distribution system and to address other energy capacity issues that developed over the years since opening in 1970, Instead of simply upgrading and/or replacing the existing equipment, Beloit Memorial Hospital (BMH) decided to install a Combined Heat and Power (CHP) Plant, which also helped reduce annual energy costs. The 3.0 megawatt CHP plant provides maximum flexibility to both the hospital and the local electric and gas utility company, in regards to electricity, heating, air conditioning, and hot water usage.

QUICK FACTS

Annual Savings:	$223,000
Equipment Cost:	$1.2 Million
Simple Payback:	5.4 Years
Generation Capacity:	3.0 Megawatts
Operation Since:	June 1, 2000
Campus Size:	340,000 sq ft
	187 Beds



Design and installation schedule completed in 12 months.

REASONS FOR CHP

"UPGRADE ENERGY DISTRIBUTION"
&
"FUTURE DEREGULATION"

In general, hospitals are excellent candidates for CHP applications because they usually operate 24 hours/day, year-round, creating fairly consistent electric and thermal loads plus high thermal loads. Beloit Memorial Hospital proved a viable candidate for CHP and replaced its existing emergency generators and heating and cooling equipment with the CHP plant. The system now serves both 1) day-to-day CHP operation and 2) emergency power. Alliant (local utility) financed part of project with a low interest rate.

FUTURE DEREGULATION

BMH managed to reduce the impact of higher energy costs and susceptibility to power quality issues, especially those which could occur when deregulation becomes a reality.

ADDITIONAL ELECTRCITY

Generated electricity not needed by the hospital (up to 1.5 megawatts) is sold to the local utility. This proves beneficial to the local utility during high peak demand periods and/or when generating capacity is reduced due to equipment problems and/or maintenance.

CHP SYSTEM EQUIPMENT

- 2 Fairbanks Morse dual fuel 900 RPM, 1,500 kW engine generator sets
- One 6000 AMP tiebreaker and two 3000 AMP, 480V auto generator breakers
- One 12 kV auto main service breaker
- One 434-RT Carrier single stage hot water absorption chiller
- 7.66 MBtu/hr shell and tube heat exchanger (backup for recovered heat)
- 6.733 MBtu/hr Sondex plate and frame heat exchanger
- 6.149 MBtu/hr Sondex domestic hot water heat exchanger
- 2 Cain 2.389 MBtu/hr generator set finned tube heat recovery units
- 2 outdoor excess heat rejection radiators

CHP OPERATION

The CHP plant normally operates from approximately 8:00AM to 10:00PM Monday through Friday, 52 weeks per year. The system supplies all domestic hot water during on-peak hours and the engines always start-up on diesel, switching over to natural gas when load reaches 50%.

SCOPE OF CHP PROJECT

Ballard Engineering completed the design and construction of the 3.0 MW CHP Plant revolving around these 10 major features:

1. Remove and replace old emergency generators
2. Provide 1.5 MW power to hospital
3. Export 1.5 MW power to local utility
4. Provide heat to drive 400-ton absorption chiller or facility's heating loop
5. Provide heat for domestic hot water
6. Enable system to operate via natural gas or diesel gas in event of emergency
7. Provide instantaneous power in the event of a utility failure
8. Provide the utility company with an "on-call" system to reduce utility load or grid short falls
9. Maintain entire CHP system at 69.8% efficiency
10. Remove/replace older 12 kV cables

ADDITIONAL FACTS

- The total project cost of upgrading and replacing the existing electrical distribution equipment and installing the CHP equipment was $3 million
- Breakeven point before natural gas price was too high-priced was $9.64/MMBtu
- Heat recovery savings were 1.0¢ -1.5¢/kWhr
- Fairbanks Morse engines met 10 second start-up time requirements for emergency power generation approved by the Illinois Department of Public Health

CHP plant reduces impact of higher energy costs and power quality issues towards future deregula-tion

Dual fuel Fairbanks Morse engines meet IDPH emergency power and CHP require-ments

$223,000 Annual Energy Savings

For further information contact

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