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# CHP Application

# Northwest Community Hospital 3.45 MW CHP Application

## Fact Sheet

In September of 1997, a 3.45 megawatt Cooling, Heating, and Power (CHP) system was placed into operation by Ballard Engineering for Northwest Community Hospital (NCH) of Arlington Heights, Illinois. The CHP system was part of a new 20,612 sq. ft. Central Utility Plant that provided the 750,000 sq. ft. health care facility with cooling, heating and power. The new plant contained the 3.45 MW CHP system, a high-pressure steam plant, and a chilled water plant. By centralizing all of the utilities in one location, the hospital accrued significant energy savings, as well as improved maintenance efficiency.

### QUICK FACTS

Installed Cost:	\$2.1 Million
Annual Savings:	\$722,000*
Simple Payback:	2.9 Years
Current Savings:	\$554,000**
Generating Capacity:	3.45 Megawatts
Operation Since:	August, 1997
Facility Size:	750,000 sq. ft.
Number of Beds:	360 beds (Licensed for 500)

\* Annual Savings during first three years of operation  
\*\* Current Savings lower in 2002 due to engine overhaul



### REASONS FOR CHP "HOSPITAL EXPANSION" "ENERGY SAVINGS" "POWER RELIABILITY"

There was an immediate need to act on a decision to replace the current decentralized chiller and steam boiler plant system, some of the equipment being over 30 years old. The current and future infrastructure needs of the hospital were not met due to the aging equipment and a 210,000 sq. ft.

hospital expansion. A completed economic analysis supported a centralized utility plant including the CHP application which would provide peak load shaving.

#### Additional benefits:

- Greatly reduced dependence on electric utility - rates were extremely high
- Provided "safety net" of back up electric power to ComEd and emergency generators
- CHP system allowed the hospital to take advantage of ComEd's voluntary peak electric reduction program during critical summer power shortages
- Provided NCH with most cost efficient use of electric power, steam and chilled water

## SYSTEM EQUIPMENT

- 3 Waukesha 1150 kW, 1,200 RPM natural gas fired engines
- 3 Cain heat recovery units producing 6,000 lb./hr. total of 125 psig steam for heating and cooling
- 3 - 600 H.P. fire-tube dry back two pass boilers with non-condensing exhaust heat recovery (one unit for redundancy)
- Programmable logic controller controlling CHP system for optimum economic performance
- 1 - 850 ton two stage steam absorption chiller
- 2 - 1,250 ton electric centrifugal chillers
- 1 - 240 ton rooftop compression chiller for winter cooling requirements in north wing surgical suites
- Tunnel connecting central utility plant to hospital facility; used as conduit for all piping tie-ins to existing steam, chilled water, piping, etc. into hospital rooms

## CHP OPERATION

The 3.45 MW CHP system peak shaves during ComEd's 9AM - 6PM On-Peak Demand period, providing the greatest economic opportunity to Northwest Community Hospital.

The three primary chillers operate in sequence, utilizing the absorption chiller as the base load chiller. The centrifugal chillers automatically begin operation as the cooling load increases during peak hours. This sequence saves the hospital 500 kW in demand charges and significant peak energy costs.

## CHP APPROVAL PROCESS

The process began with the hospital's vision and risk assessment of the existing infrastructure system (age of equipment/reliability, efficiencies, maintenance costs and utility costs)

- Initial stage included searching for a design-build team with experience in mechanical and CHP design/construction (Ballard Engineering)
- The team consisted of NCH Senior Management, Facility Staff and Ballard Engineering
- Several options were considered including centralized vs. decentralized heating and cooling and CHP vs. no CHP
- The Board of Directors approved the project in December of 1995
- Authorization was granted by the Illinois Health Facilities Planning Board in Oct. 1996
- Construction began immediately; the Central Utility CHP Plant was operational in August 1996

## ADDITIONAL FACTS

- In 1998, the Central Utility Plant received an ASHRAE Excellence in Engineering Award for its innovative energy saving design.
- The Central Utility Plant project was financed through a favorable bond rating of A++. (A lease back agreement was considered, but bond rates were favorable and NCH opted to own the building and equipment)

For further information contact

Energy Resources Center  
851 S. Morgan Street  
Chicago, IL 60607-7054

Phone: (312) 413-5448  
Fax: (312) 996-5620  
www.CHPCenterMW.org

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