NORTHEAST

U.S. DOE

CHP TECHNICAL ASSISTANCE PARTNERSHIPS

FACT SHEET

Combined Heat and Power in Hospitals

Practical, Proven, Economic, Reliable, and Clean

Hospitals: Great for CHP

Properly designed combined heat and power (CHP) or cogeneration systems can provide power, hot water, and space heating and cooling more reliably, more efficiently, and at lower costs than traditional systems. In addition, CHP systems can allow buildings to operate independent of the grid during periods of electric power blackouts. Hospitals make ideal hosts for CHP systems, and are often able to take advantage of the full suite of CHP benefits. Several of the nation's top hospitals already benefit from installed CHP systems.[1]

Top Hospitals Using CHP

(Rankings from US News' 2013-2014 Honor Roll of the Nation's Top 18 Hospitals)

Rank	Hospital	System
1	Johns Hopkins	15 MW installed system
2	Mass. General	15 MW system study in progress
3	Mayo Clinic	5.2 MW installed system
4	Cleveland Clinic	Steam power supplied by local plant
7	NY Presbyterian	7.5 MW installed system
14	NYU Langone	8 MW system under construction
16	Indiana University	Steam power supplied by local plant

Practical

Hospitals operate 24/7, and have significant needs for electric power, heating, and cooling. Hospitals are one of the most energy-intensive businesses in the commercial sector, consuming more than twice energy per square foot as average commercial buildings. Consistent demand for high quality, highly reliable power make hospitals ideal for CHP. Hospitals and medical campuses that have installed CHP systems enjoy reduced operating costs and higher reliability of continued service during both instantaneous and lengthy electricity outages.

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[1] Johns Hopkins, The Mayo Clinic, and New York-Presbyterian all appear in US News' 2012-2013 Honor Roll. Indiana University Health, the Cleveland Clinic, and the University of Michigan's Hospitals all receive steam from local CHP and distributed generation systems, and Michigan also receive electric power during emergencies. Both NYU Langone and the Cleveland Clinic are investigating CHP systems.

Proven

More than 200 hospitals and medical campuses nationwide currently operate CHP systems. It is a proven, well understood application that is easily maintained with existing trained staff. CHP systems have an established operating performance history, and hospitals investing in CHP can expect a well-designed system to perform at very high rates of reliability over long service lives.

Economic

Efficient CHP systems operating in areas with high electric rates and lower natural gas costs have proved very attractive investments. In the Northeast, customers pay the highest electric rates in the continental U.S. High electric costs mean producing power on-site can be less expensive than buying it from the local utility. This leads to a better return on investment for CHP in the Northeast than virtually any of the other continental states. With a large spread between electric rates and natural gas rates, as is presently the case in large parts of the Northeast, and with existing state and federal incentives, a CHP investment in a hospital can yield a full payback on investment in five years or less. The CHP system's net present value offers even greater financial rewards after the payback period. When properly designed and operated, a CHP system will run reliably for up to 15 years, providing energy cost savings well after the initial investment has paid for itself.

A Life-Saving Energy Solution

In the wake of Superstorm Sandy's energy disruptions, Long Island's South Oak Hospital campus operated its CHP system from October 28 through November 13. Although LIPA was able to restore power to the facility 5 days after the storm, the grid remained unstable and LIPA requested South Oak to remain off-grid. Ultimately, South Oak operated for 15 days isolated from the grid, supplying all necessary thermal and electric power to the 300,000 square foot healthcare facility during that time.

Reliable

Recent extreme weather events, from Hurricane Irene and the October snowstorm that battered New England in 2011 to the devastation caused by Superstorm Sandy in New York and New Jersey in 2012, have turned attention to energy reliability and business continuity. These powerful storms and other events that disrupt electric distribution systems have exposed fragilities in our back-up power systems. Emergency generators may not operate as expected over the full duration of an outage, and backup power supplies may be limited by on-site fuel storage. Longer duration outages only increase the probability that emergency generators will fail to operate as specified.

In contrast, several facilities with CHP systems in the Northeast were able to maintain both power and heat during Superstorm Sandy. The majority of the New York University campus[2], One Penn Plaza (Manhattan), Princeton University (New Jersey), Salem Community College[3] (New Jersey), and Fairfield University (Connecticut) all maintained their electricity and heat from their CHP systems. Unlike emergency generators, which are "dead assets" only to be employed in critical instances, the CHP plant is a "dynamic asset", which provides economic returns while running every day.

Clean

High efficiency, low emissions CHP systems have been recognized as the centerpiece of sustainability strategies at premier hospital and university campuses such as New York Presbyterian, Yale School of Medicine & Yale-New Haven Hospital, Princeton University, Cornell University, New York University, and the University of Texas. Analysis by the Massachusetts Department of Energy Resources indicates that CHP plants that qualify for the State's Alternative Energy Credit, on average, can expect to generate a 19 percent reduction in net greenhouse gas emissions. A hospital can reduce its greenhouse gas impacts by almost 20 percent with a single investment in high efficiency CHP.

Well designed, appropriately configured CHP systems can provide an extensive list of benefits to hospitals. Such systems increase reliability and resiliency, better assure business continuity, offer deep energy efficiency reductions, and importantly, save on operating expenses and allow more resources to be devoted to patient care.

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[2] New York University's Langone Medical Center does not yet operate a CHP system, though a CHP system installation is being planned.
[3] Salem Community College functions as a Red Cross Disaster Relief Shelter.