



New York State Energy Research and Development Authority

717 Fifth Avenue Generators Provide Building HVAC

DG/CHP Program

Project Profile

Combined heat and power for Office Building



Overview

The 26-story building operated by Equity Office Properties at 717 Fifth Avenue is considered “Class-A” commercial space. Steam supplied by ConEdison was used year round to provide space heating and air conditioning. The peak electrical demand exceeded 2.1 MW at the height of the summer cooling season.

A CHP system was installed at the building to reduce its dependence on purchased utilities. Two 820 kW generators now produce 60% of the site’s electricity and offset more than half of the thermal demands while operating at a maximum CHP efficiency of 73% HHV.

Quick Facts

- Location:**
New York, NY (Con Ed)
- Installation Date:**
September 2005
- Operating Experience:**
17 months (as of March 2008)
- CHP Equipment:**
Two 820 kW IC Engines
- Generating Capacity:**
1,600 kW
- Heat Recovery Application:**
HVAC and DHW
- Design CHP Efficiency:**
73% HHV
- Type of Fuel:**
Natural Gas
- Annual Utility Savings:**
\$500,000 per year (estimated)
- Simple Payback:**
8 years (estimated)

The Application

717 Fifth Avenue offers 450,000 ft² of premier office space to tenants in the center of Manhattan. Although fully occupied, maintaining client satisfaction requires the building services meet high standards. The site’s management viewed the application of CHP technology as an economical means to help assure the expected quality could be delivered.

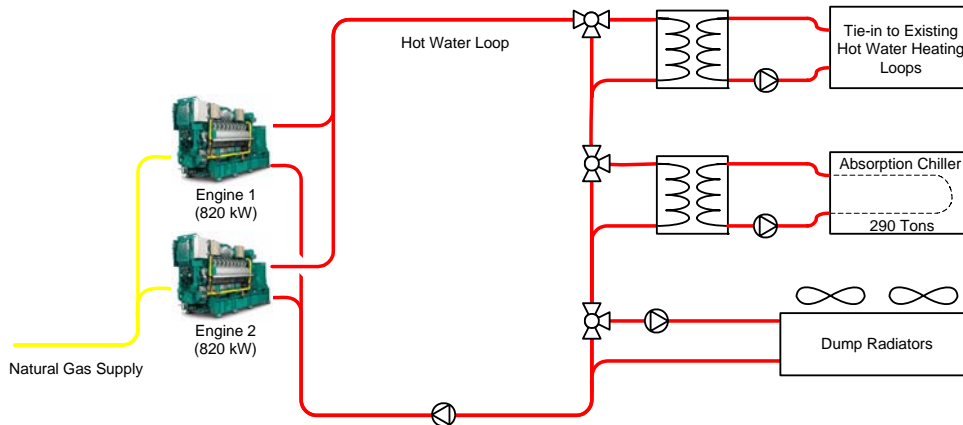
The CHP system is configured on two engine-generator sets that run during the on- and mid-peak periods reducing consumption of utility power at the most expensive time of day. Synchronous generators were used so power can still be supplied to the building in the event of a prolonged blackout. The system was built up from pre-assembled modules that form a sound attenuating structure on the 15th floor setback. Heat recovered from the engines is recovered as hot water that is used to provide space conditioning.



Engine Modules Installed Side-by-Side on Roof

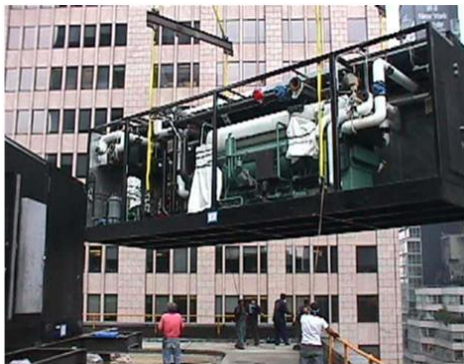
CHP System and Equipment

The engine-generator sets are both natural gas fueled and were shipped as modular skids with the related ancillaries already installed in order to minimize the work required onsite. Electricity is produced in parallel with the grid though the generators can be isolated and supplement the output of the site's emergency generator in case of a utility outage. The system's electrical output is modulated as necessary to follow the site load; no electricity is exported. Heat is recovered from each engine as hot water that can be used for spacing heating or circulated through an absorption machine to produce chilled water for air conditioning depending on seasonal requirements. Excess heat is rejected to atmosphere through radiators included on the equipment skids.



Economics and Environmental Benefits

Northern Power Systems completed the project on a turnkey basis at a cost of \$4.1 million. Preliminary results from the site indicate the consumption of electricity from the grid has been reduced by approximately 250,000 kWh per month. Net savings should exceed \$500,000 annually and yield simple payback within eight years. The CHP system's greater efficiency compared to the use of conventional utilities should help to substantially reduce emissions of carbon dioxide as well as other pollutants and greenhouse gases. Limited data from the site are available in an hourly format on NYSERDA's DG/CHP website from October 2006 through August 2007.



Absorption Machine Module Installation



Finished Sound Attenuation Enclosure

Summary of Benefits

- CHP system provides majority of required energy
- Operating schedule designed to maximize savings
- Synchronous generators allow operation independent of utility grid in emergencies

“Cogeneration provides a number of benefits to our customers, local utilities and the city of New York.”

- Frank Frankini,
Vice President of
Engineering, Equity
Office Properties

Web Links and Further Information:

Northern Power –
Developer

www.northernpower.com

Equipment Manufacturer

www.cat.com

Other DG/CHP Resources

chp.nyserda.org

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