Combined Heat and Power System Saves Educational Facility Money

BACKGROUND
Cooper Union constructed a new nine story 175,000 square foot academic building on its campus in Lower Manhattan's East Village. The new building integrated an energy efficient combined heat and power (CHP) system with exceptional architecture and materials that maximize energy efficiencies and cost savings for environmental sustainability. The combined heat and power (CHP) system produces electricity and hot water for space heating and cooling.

THE APPLICATION
The co-generation system is a 250 kW Elite Energy CHP module, a nominal 80 ton Thermax hot water source absorption chiller with the associated pumps, heat exchanger and controls. The system operates off the existing gas service in the building and in parallel with the electric service provided by the utility. The system produces hot water up to 196 degrees F. The control system will modulate the dump valve to monitor temperature return to the co-generation unit so that it does not exceed 165 degrees F.

CHP SYSTEM AND EQUIPMENT
The CHP plant operates in electric load following mode and runs at full output the majority of the time. Power output from the system only decreases over night when the facility load decreases. The chiller will operate if the ambient temperature is greater than 50 degrees F. If the temperature is less than 45 degrees, the chiller will stop and the heating loop will be used as a heat sink for excess heat after the chiller cycle.

“In its form and function, the new academic building will be a living 'classroom' for environmental leadership.”
- Thom Mayne
  Architect and winner of 2005 Pritzker Architecture Prize

EDUCATIONAL FACILITY
Company Name
Cooper Union 41 Cooper Square
Location
New York, NY
System Installation Year
2013
Data Collection
Beginning February 2013
Generating Capacity
250 kW
CHP Equipment
One Elite Energy CHP 250kW
Heat Recovery Application
Space Heating and Cooling
Type of Fuel
Natural Gas
ECONOMICS AND ENVIRONMENTAL BENEFITS

The CHP system at Cooper Union provides a more efficient use of fuel with lower greenhouse emissions. It reduces power demand charges from the utility and the additional thermal energy is free. Because CHP systems are located on-site at the energy consumer, the distribution losses that central power plants experience are eliminated. Monitored data are being collected from the site and are available in an hourly format on NYSERDA’s DG/CHP website starting from February 2013.

SUMMARY OF BENEFITS

- Reduced CO2 emissions
- Lower reliance upon the grid
- Reduced carbon footprint

ADDITIONAL RESOURCES

- Developer/Engineer: http://www.sourceone-energy.com
- Equipment Manufacturer: http://www.e3nv.com
- DG/CHP Resources: chp.nyserda.ny.gov