



Combined Heat and Power System: 717 Fifth Avenue



Improving Electrical Quality and Reliability using a Combined Heat and Power system with a Synchronous Generator

Manhattan, New York County

Seven-one-seven 5th Avenue is a commercial office building, owned by Equity Office Properties, in midtown Manhattan. The building was built in 1958, encompassing 450,000 sq. ft. The Property is currently 94% occupied and has a peak electrical demand of 1,800 kW in the winter and 2,100 kW in the summer.

The building was the first in midtown Manhattan to install a Combined Heat and Power (CHP) system with a grid-interconnected synchronous generator, developed by Distributed Energy Systems. Synchronous generators (as opposed to induction generators) can run interconnected in parallel with the grid, or islanded without the grid. Use of a CHP system consisting of a synchronous generator provides special value by (1) producing energy on a regular basis to minimize electrical consumption from the grid and to satisfy a thermal load, (2) enabling the facility to consume electrical energy from the grid when the generator is turned off (for maintenance, etc.), and (3) serving as a very reliable emergency generator when there is an area-wide grid outage.

The CHP system will provide improved electrical quality and reliability, while lowering the operational costs. The low-emission CHP system will use waste heat recovery equipment to effectively supplement, or in some cases completely offset, the Property's existing heating and cooling equipment. It is estimated that the building will be able to "capture" at

least 50% of the CHP system's rejected heat for a minimum overall system efficiency of 61 %. The peak load reduction is approximately 1,600 kW. Operation of the CHP system is forecasted to result in over \$500,000 annual net energy savings, and yield a payback of approximately 6 years.

As an added benefit, this CHP system also will provide a significant benefit to the New York City local distribution grid by reducing load on the grid during the critical summer peak hours.

Benefits Include:

- Reduction in energy consumption and costs
- Peak load reduction
- Better energy reliability



New York State
Energy Research and
Development Authority