# Monitoring Plan for CHP System at EOP 717 5th Avenue

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# 1 Introduction

## *1.1 Purpose*

The purpose of this document is to describe the system used to monitor and report the performance of the CHP system currently being installed by Northern Power Systems in the building at 717 5th Avenue, New York, a property of Equity Office Partners (EOP) in order to comply with the guidelines described in the NYSERDA document "Monitoring and Data Collection Standard for Distributed Generation/Combined Heat and Power Systems."

# 2 System Description

## *2.1 System Overview*

Synchronous generators (as opposed to induction generators) can run interconnected in parallel with the grid, or islanded without the grid. Use of a Combined Heat and Power (CHP) system consisting of a synchronous generator interconnected in parallel with the grid 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.

A premier 26-story, 450,000 sq. ft. class "A" commercial building at 717 5th Avenue in Midtown Manhattan will serve as the host site for a first-of-its-kind synchronous generator CHP system interconnected in parallel with Con Edison's Manhattan secondary network grid. The building is a classic late 1950s high-rise design with a 15-story low-rise portion and a 26-story tower. It 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 purchases steam from Con Edison throughout the year. During the heating season, the Con Edison steam is used by the building's core area air-handlers and the steam is also converted to hot water and distributed to the building's perimeter induction units. During the cooling season, the building utilizes one (1) 450-ton steam-driven absorption chiller rated at 450-tons, and two (2) electric-driven centrifugal chillers rated at 450-tons each. When the building calls for cooling, normal operation is to first run the absorption chiller using the Con Edison steam, and to supplement that by cycling between the two electric chillers as necessary. The steam absorption chiller averages 95% of its capacity during operations, while the two centrifugal chillers average 50% of capacity.

Through this project, a CHP system will be installed on the building's 15th floor "set-back" surrounded by a sound-attenuated enclosure, and will consist of a pair of natural gas-fired internal combustion engine generators and an absorption chiller. The recovered heat will be used for comfort space heating and comfort space cooling. In the event of a Con Edison power grid failure, the CHP system will automatically power down as required by the interconnect agreement with Con Edison; once the interlock separating the CHP system from Con Edison is activated, the CHP system can be restarted and will be capable of operating grid isolated with sufficient capacity to carry the majority of building loads after some minor load shedding of HVAC systems.

This project is forecasted to provide peak load reduction of approximately 1,600 kW, and result in over $500,000 in annual net energy savings for the host site facility (representing a simple payback of approximately 6 years). It is forecasted that the new system will have an overall annual fuel use efficiency of approximately 61%. Technology transfer and publicity will emphasize wide dissemination of the project results to highlight the efficacy of this CHP system.

The CHP System is defined as two (2) natural gas-fired lean-burn internal combustion synchronous engine generators, Catepillar G3516 LE, rated at 800 kW each, with oxidation catalysts for control of carbon monoxide (CO) and non-methane hydrocarbons (NMHC) emissions, interconnected with and operating in parallel with the local electric utility grid, one (1) waste-heat-driven absorption chiller rated at 300-tons, and Balance of Plant (BOP) including a system to provide recovered heat in the form of space

heating and space cooling for occupied spaces of the building, or as most-recently modified in writing with consent of the Contractor and NYSERDA Contract Administrator.