CHAPTER 14: ENERGY

A. INTRODUCTION

This chapter describes the effects that the proposed project would have on energy consumption within the rezoning area. The analyses utilized in this chapter follow the guidelines contained in Section 3N of the *CEQR Technical Manual*. Although present uses on the projected development sites create a level of energy demand, development that could potentially result from the proposed project would result in an associated increase in energy demand. As discussed in this chapter, the proposed project would create additional energy demand; however this additional demand would not be large enough to constitute a significant adverse impact to the provision of energy to the rezoning area and to the city as a whole.

B. OVERVIEW

Unlike many states, New York does not rely heavily on any one fuel for the generation of electricity. Nuclear power, produced at New York's four nuclear plants, is the leading generation fuel, typically accounting for about three-tenths of the state's generation capacity. However, four other energy sources (natural gas, hydroelectric, coal, and petroleum) each account for a substantial share of the power generated in the state. New York is also a major net importer of electricity from neighboring states and Canada.

New York is one of the top hydroelectric power producers in the country, and its hydroelectric generation is the highest of any state east of the Rocky Mountains. When New York's Robert Moses Niagara plant opened near the Niagara River in 1961, it was the largest hydroelectric generation facility in the world. Today, the 2,253-megawatt (MW) power plant is still New York's second largest electricity generator. Non-hydroelectric renewable energy sources contribute only minimally to the state power grid, although New York is one of the nation's top generators of electricity from municipal solid waste and landfill gas. The average New York household consumes about one-half the electricity of the average U.S. household, largely because few use electricity as their primary energy source for home heating and because demand for air-conditioning is low during typically mild summer months.

With respect to electricity, New York City is known as a *load pocket*, meaning that transmission lines cannot carry enough energy into the city to meet its *peak load* (the year's highest point of electricity demand). To meet the city's peak load, 80 percent of the forecasted demand must be supplied by capacity located inside the load pocket. For the balance, including reserve requirements imported over transmission lines, New York City is connected to upstate New York, to the electrical grid system in northern New Jersey, and to Long Island, as described below:

- In the north, Con Edison's overhead transmission lines connect with substations in Westchester County and run south to the city, connecting to the underground transmission system there. The effective import capability from the north is approximately 3,700 megawatts (MW).

- In the west, three lines run from Public Service Electric & Gas Company (PSE&G) substations in New Jersey under the Hudson River to Con Edison substations in Staten Island and Brooklyn. These cables have a capacity of 1,500 MW; however, because of restrictions on PSE&G's system, deliveries over the lines range from 600 MW to 1,000 MW.

- To the east, the city is interconnected to the Long Island Power Authority (LIPA) service territory through two cables. Again, the capacity of the feeders (510 MW) exceeds the ability of LIPA's transmission system to support transfers to New York City, and imports are actually limited to about 300 MW. In addition, since LIPA is also a load pocket and has high marginal energy costs, these lines are of less value to the in-City loads than are the lines from New Jersey and upstate New York.

The maximum power that can be imported into the city from the three transmission corridors described above is approximately 5,000 MW. However, the actual amount that is imported during peak load conditions is generally lower due to conditions such as transmission constraints and local reliability rules. Transmission capacity to the city has not been increased since the 1980s. The last significant upgrade to the system in New York State was the 345 kilovolt (Kv) Marcy – South Project, which was completed in 1988 and ran from the Utica area into downstate.

The following five parties own or control almost all of the in-city generation:

- Reliant Resources, NRG Energy, and KeySpan Energy own the electric plants and gas turbines divested by Con Edison.

- The New York State Power Authority (NYPA) owns the Poletti Plant and a fleet of new gas-fired combustion turbines at six locations throughout the City, and holds a long-term contract for the output of the cogeneration plant located at Kennedy International Airport.

- Con Edison owns a few generators for steam production and a few small combustion turbines, and has long-term power contracts from Cogen Technologies (currently owned by Goldman Sachs), York Warbasse, and BNY Cogen Partners.

Most generation in the city can utilize either natural gas or residual fuel oil, but some plants are limited to one fuel type. Natural gas is the cleanest fuel available for fuel-burning power plants, producing almost no sulfur and generally low emissions of nitrogen oxides. While particulate emissions from the combustion of natural gas are significantly less than for distillate oils, there is still concern with respect to the emission of fine particulate matter, especially in neighborhoods that have been shown to be at or above federal ambient standards.

Natural gas and distillate oils are the only fuels burned in combustion turbines and combined-cycle plants – the types of plants that have comprised most generation additions in the city since the 1980s. Most new in-city generation is proposed to utilize natural gas as the primary fuel, as environmental requirements limit the use of alternative fuel to 720 hours (30 days) per year. In some situations, generators have also agreed to limit their overall level of operations and to increase their use of natural gas at existing units by establishing seasonal and annual fuel mix targets.

Con Edison provides power to the city through a series of substations. Transmission substations receive electricity from the generating stations via the transmission system and reduce the voltage to a level that can be delivered to area substations. Area substations then reduce the voltage to a level that can be delivered into the distribution system within the city's streets. Within the distribution system, electrical voltage is further reduced for delivery to customers. Each area substation serves one or more distinct geographic areas, called networks, which are isolated from the rest of the local distribution system. The purpose of the network is that if one substation goes out of service, the problem can be localized to that

network area and would not spread to other parts of the city. Substations are designed to have sufficient capacity to accommodate future network growth.

The New York Independent System Operator (NYISO) was formed in 1998 as part of the restructuring of New York State's electric power industry. It is a not-for-profit entity regulated by the Federal Energy Regulatory Commission whose mission is to operate the state's bulk electricity grid and administer New York's wholesale electricity markets. The NYISO has divided the state into 11 zones, of which New York City is "Zone J".

The NYISO annually determines whether or not each of the zones within its control area meet locational installed capacity (ICAP) requirements. A locational ICAP requirement specifies the minimum amount of installed capacity that must be procured from resources situated specifically within a locality. It considers resources within the locality as well as the transmission import capability to the locality in order to meet the resource adequacy reliability criteria of the New York State Reliability Council and the Northeast Power Coordinating Council. Currently, the New York City locational ICAP requirement is eighty percent of the New York City forecast peak load for the 2006 – 2007 Capability Year.

According to the NYISO's *Revised Locational Installed Capacity Requirements Study* for the 2006-2007 Capability Year, New York City has an existing installed capacity of 10,364 MW, a peak load of 11,630 MW and an import capability of 5,320 MW, resulting in a locational ICAP of 1.35 (10,364 + 5,320/11,630)[1]. Although the city's ICAP exceeds the required eighty percent, it has a low "capacity plus import capability to expected load" ratio. As the city's energy demand increases over time, additional in-city generation would be needed to satisfy this requirement. The city's peak load is forecast to be approximately 13,360 MW in 2017, with a capacity of 9,484 MW.

KeySpan Energy provides natural gas to the rezoning area through a network of high- and low-pressure distribution mains located within city streets.

C. METHODOLOGY

To assess the proposed project's projected energy consumption, guidelines contained in the *CEQR Technical Manual* have been followed. The unit of analysis for the energy assessment is British Thermal Units (BTUs). One BTU is the quantity of heat required to raise the temperature of one pound of water one Fahrenheit degree. This unit of measure can be used to compare energy consumption from different sources (e.g., gasoline, hydroelectric power, etc.), taking into consideration how efficiently those sources are converted to energy. The use of the BTU in analysis avoids the confusion inherent in comparing different measures of output (e.g., horsepower, kilowatt hours, etc.) and consumption (e.g., tons per day, cubic feet per minute, etc.).

New structures that require heating and cooling are subject to the New York State Energy Conservation Code, which reflects state and city energy policy. Actions that include new construction or significant building renovation, then, would not create adverse energy impacts and would not warrant a detailed energy analysis. While most actions are not expected to result in significant adverse energy impacts, the *CEQR Technical Manual* recommends that a proposed action's environmental documentation disclose the anticipated energy consumption during long term operations.

[1] *Revised Locational Installed Capacity Requirements Study Covering the New York Control Area for the 2006-2007 Capability Year*, March 28, 2006.

D. EXISTING CONDITIONS

As shown in Table 14-1, the existing uses on the 40 projected development sites are estimated to currently consume approximately 17,515 million BTU's annually.

Table 14-1
Existing Annual Energy Consumption
at Projected Development Sites

Use	Consumption Rate[1] (BTUs/SF/Year)	Floor Area (SF)	Annual Energy Consumption (Million BTUs)
Retail	55,800	4,875	272
Office	77,900	31,323	2,440
Industrial/ Manufacturing	44,100	261,451	11,530
Residential	145,500	22,492	3,273
Total Annual Energy Consumption			17,515

Note:
1 Consumption rates from the *CEQR Technical Manual*.
Source: CEQR Technical Manual and NYCDCP.

E. FUTURE CONDITION WITHOUT THE PROPOSED ACTIONS

Under this scenario, the 40 projected development sites are assumed to either remain unchanged from their existing condition, or would be developed with uses that are permitted under the existing zoning regulations. Given the current zoning and existing land use trends in the area, in the future without the proposed project it is anticipated that the rezoning area would experience a slight decrease in residential units from 24 to 22, a 334,854 square foot increase in commercial floor area, an 81,470 square foot increase in community facility floor area and a 78,440 square foot decrease in industrial floor area. These changes, when added to uses currently located within the rezoning area, would result in the rezoning area containing approximately 371,052 square feet of commercial floor area, 183,011 square feet of industrial floor area, 81,470 square feet of community facility floor area and 22 dwelling units. These changes would result in an associated energy consumption of approximately 58,318 million BTUs, an increase of approximately 40,803 million BTUs over current consumption levels, as summarized in Table 14-2. The 58,318 million BTUs that would be consumed in the future without the proposed project represents approximately 0.01 percent of the city's forecast 2017 peak load of 13,360 MW.

F. FUTURE CONDITION WITH THE PROPOSED ACTIONS

Under the future condition with the proposed project, the total build out expected to occur on the 40 projected development sites includes approximately 1,555 dwelling units; 173,582 square feet of commercial floor area; 2,475 square feet of industrial floor area and 39,773 square feet of community facility floor area. Compared to the future condition without the proposed project, these figures represent a net decrease of 197,470 square feet of commercial floor area; a net decrease of 180,536 square feet of industrial floor area; and a net decrease of 41,697 square feet of community facility floor area. The associated changes in energy consumption are summarized in Table 14-3. These changes would result in an associated energy consumption of approximately 244,801 million BTUs, an increase of approximately

Table 14-2
Future Annual Energy Consumption
at Projected Development Sites
Without the Proposed Project

Use	Consumption Rate[1] (BTUs/SF/Year)	Floor Area (SF)	Future Annual Energy Consumption (Million BTUs)	Increment from Existing Condition (SF)	Increment from Existing Condition (Million BTUs)
Retail	55,800	41,884	2,337	37,009	2,065
Office	77,900	132,848	10,349	101,525	7,909
Industrial/ Manufacturing	44,100	183,011	8,071	-78,440	-3,459
Residential	145,500	19,046	2,772	-3,446	-502
Hotel	145,500	196,320	28,565	196,320	28,565
Community Facility	76,400	81,470	6,224	81,470	6,224
Total Energy Consumption			58,318	334,438	40,803

Note:
1 Consumption rates from the *CEQR Technical Manual*.
Source: CEQR Technical Manual and NYCDCP.

186,483 million BTUs over the future condition without the proposed project. The 244,801 million BTUs that would be consumed in the future with the proposed project represents approximately 0.06 percent of the city's forecast 2017 peak load of 13,360 MW.

G. CONCLUSION

The proposed project would result in energy consumption of approximately 244,801 million BTUs on the projected development sites. This total represents approximately 0.06 percent of the city's forecast 2017 peak load of 13,360 MW, which is not considered to be a significant adverse impact.

Table 14-3
Future Annual Energy Consumption
at Projected Development Sites
With the Proposed Project

Use	Consumption Rate[1] (BTUs/SF/Year)	Floor Area (SF)	Future Annual Energy Consumption (Million BTUs)	Increment from No-Build Condition (SF)	Increment from No-Build Condition (Million BTUs)
Retail	55,800	173,582	9,686	131,698	7,349
Office	77,900	0	0	-132,848	-10,349
Industrial/ Manufacturing	44,100	2,475	109	-180,536	-7,962
Residential	145,500	1,594,277	231,967	1,575,231	229,195
Hotel	145,500	0	0	-196,320	-28,565
Community Facility	76,400	39,773	3,039	-41,697	-3,185
Total Energy Consumption			244,801	1,155,528	186,483

Note:
1 Consumption rates from the *CEQR Technical Manual*.
Source: CEQR Technical Manual and NYCDCP.