Chapter 15: Energy

A. INTRODUCTION

Although present uses at the projected development sites create some demand for energy, new development resulting from the proposed actions would place an increased overall demand on energy services. This chapter provides a detailed analysis of that added demand. As discussed in greater detail in this chapter, although the development of the projected sites would create substantial new energy demands, this increase is not large enough to result in significant adverse impacts on energy systems.

PRINCIPAL CONCLUSIONS

The proposed actions would not have a significant adverse impact on energy systems and services. The proposed actions would increase demands on electricity and gas; however, relative to the capacity of these systems and the current levels of service within New York City, the increases in demand would be insignificant. It is therefore concluded that the demands of the proposed actions would not result in a significant impact on the supplies of electricity and gas in the city or the region as a whole.

B. METHODOLOGY

As discussed below, this chapter:

- Presents data on the existing energy distribution system and estimated energy usage for existing conditions;
- Determines future energy demands with the proposed actions for 2017, using energy consumption rates for typical land uses provided in the *CEQR Technical Manual* and other available literature sources; and
- Assesses the effects of this incremental energy demand on the local distribution system and regional energy supplies.

C. EXISTING CONDITIONS[1]

ENERGY PROVIDERS

Consolidated Edison ("Con Ed"), along with other transmission companies, delivers electricity to New York City and almost all of Westchester County. The electricity is generated by Con Ed as well as a number of independent power companies, including KeySpan Energy Delivery.

The New York Power Authority (NYPA) is the governing authority responsible for overseeing power distribution across the state. The recent deregulation of the energy market across New York State has led to the transition of formerly government-regulated utilities to independently owned energy generators. As a result, Con Ed has sold many of its power generating facilities and is now primarily involved in energy distribution.

Electrical energy in New York City is generated from a variety of sources both within and outside the city and includes non-renewable sources such as oil, natural gas, coal, and nuclear fuel, and renewable sources like hydroelectric, and to a lesser extent biomass fuels, solar, and wind power. New York City's energy is produced within the city, locations across the Northeast, and from places as far away as Canada. Once electrical energy is generated in the form of high voltage electrical power, a transmission grid conveys high voltage electrical power to New York city for distribution. The interconnected power grid extending across New York State and the Northeast allows for power to be imported from other regions as demand requires. Substations located throughout the city convert high-voltage electrical to low-voltage electrical power for distribution to end users.

According to the New York Independent System Operator's (NYISO) *Revised Locational Installed Capacity Requirements Study* for the 2006-2007 period, New York City has an existing installed annual generating capacity of 10,364 megawatts (MW)[2] (1,183 KWH). Typically, electricity generated within the city is sufficient to satisfy the demand. However, during the peak summer demand period, this electricity must be supplemented by the Northeast transmission grid. As a result, there is an ongoing service and distribution improvement program for Con Ed infrastructure that upgrades localized areas that are continually high demand zones. Electricity required for these zones is supplied by other regions of New York City or from sources elsewhere within the larger grid if necessary.

Con Ed 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 or "grid" in the 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 networks is that if one substation goes out of service, the problem can be localized to that network area and would not

[1] Unless otherwise noted, information in this section is excerpted from the No. 7 Subway Extension – 1 Hudson Yards Rezoning and Development Program Draft Generic Environmental Impact Statement, June 2004, Chapter 17: Energy.

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

spread to other parts of the city. Substations are designed to have sufficient capacity for the network to grow.

A number of power plants in the five boroughs provide electricity to New York City. According to NYISO's *2007 Load & Capacity Data* report, the peak electrical demand for New York City in the summer of 2006 was 11,350 megawatts (MW).[1]

KeySpan Energy Delivery includes the natural gas business formerly known as Brooklyn Union Gas, and is the fifth largest gas utility in the United States. KeySpan Energy Delivery provides natural gas service to more than 2.6 million customers in the New York City boroughs of Brooklyn, Queens and Staten Island, in Nassau and Suffolk Counties on Long Island and in Massachusetts and New Hampshire. The company operates more than 21,000 miles of gas mains in its service territory, and owns and operates generating plants on Long Island and New York City with total capacity of more than 6,600 megawatts.[2]

RECENT ENERGY CONSERVATION DIRECTIVES

In 2001, New York State began taking measures to address the increasing capacity needs of the metropolitan New York City region. The NYISO implemented the Emergency Demand Response and the Day-Ahead Demand Bidding programs to reduce utility electrical power demand during peak load periods. New York State Governor's Executive Order No. 111 (EO 111), was introduced in June of 2001, directing state agencies, state authorities and other affected entities to address energy efficiency, renewable energy, green building practices, and alternate fuel vehicles. EO 111 identified the New York State Energy Research and Development Authority (NYSERDA) as the organization responsible for coordinating and assisting agencies and other affected entities with their responsibilities. The NYSERDA and other utilities have implemented programs to encourage businesses to reduce energy usage and increase energy efficiency. In addition to the energy conservation techniques, in accordance with the EO 111, the NYPA constructed 11 new 44-MW, natural gas-fired, simple cycle turbine generating units, 10 of which are located within New York City, for emergency power generation.

The independent, non-profit New York State Reliability Council (NYSRC) has determined that a minimum of 80 percent of the city's peak load must be provided by generating sources within the city to maintain compliance with the criteria established by the regional and national reliability councils. Presently, there is sufficient capacity within the city to meet this 80 percent local energy generation requirement. However, as the energy demand increases over time, additional in-city generation would be needed to satisfy this requirement.

The NYISO, which manages the safety and reliability of the state's electric transmission system, reported in March 2003 that the State requires between 5,000 and 7,000 megawatts of new power over the next five years to maintain a reliable supply of electricity. Of that amount, the NYISO estimates 2,000 to 3,000 MWs must be located in New York City. Currently, plants capable of generating up to 1,000 MWs are under construction. This entire combined electrical generating capacity is located within the city, and all proposed plants are anticipated to be

[1] New York Independent System Operator 2007 Load & Capacity Data, www.nyiso.com/public/webdocs/services/planning/planning_data_reference_documents/2007_GoldBook_PUBLIC.pdf, Historic Summer Non-Coincident Peak Demand by Zone

[2] Source: Keyspan Energy website: 5 http://www.keyspanenergy.com/corpinfo/about/facts_all.jsp

constructed and operating by 2006. Because of the existing supply and the addition of these projects, it is expected that an adequate generating capacity, which would exceed projected demands, would be available in the New York City metropolitan area through the proposed action's analysis year of 2017.

EXISTING DEMANDS

In estimating the existing annual energy consumption at the projected development sites, the rates provided in Table 3N-1 of the *CEQR Technical Manual* were utilized. The measure of energy used in the analysis is BTUs per year. One BTU, or British Thermal Unit, is the quantity of heat required to raise the temperature of one pound of water one Fahrenheit degree. According to the *CEQR Technical Manual*, this unit of measure can be used to compare consumption of energy from different sources (e.g., gasoline, hydroelectric power, etc.), taking into consideration how efficiently those sources are converted to energy. Use of this methodology 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.). In general 1 kilowatt (KW) is equivalent to 3,413 BTUs per hour. As shown in Table 15-1, current annual energy use on the projected development sites—including enlargement sites—is estimated to be approximately 73,817 million BTUs (or 21.6 KW) for all heating, cooling, and electric power.

Table 15-1
Existing Estimated Annual Energy Consumption on Projected Development Sites

Use	Consumption Rates (BTUs/sf/yr)[1]	Existing	
		Area (sf)	Annual Energy Use (million BTUs)[2]
Residential	145,500	234,529 (300 DUs)	34,124
Retail	55,800	331,816	18,515
Office	77,900	109,751	8,550
Other Commercial[3]	55,800	226,302	12,628
		Total	**73,817**

Notes:
1 Based on rates provided in the *CEQR Technical Manual* Table 3N-1.
2 1 KW is equivalent to 3,413 BTUs per hour.
3 Utilized rate for "Mercantile & Service" in *CEQR Technical Manual* Table 3N-1, of 55,800 BTUs/sf/year.

D. THE FUTURE WITHOUT THE PROPOSED ACTIONS

In the future without the proposed actions, the projected development sites are assumed to either remain unchanged from existing conditions, or become occupied by uses that are as-of-right under existing zoning. As discussed in Chapter 1, "Project Description," DCP has identified development that would occur on these sites in the future without the proposed actions, as part of the RWCDS, including new dwelling units (DUs) as well as additional commercial space.

As discussed below, energy consumption on the projected development sites would increase in the future without the proposed actions. It is expected that the projected development sites would contain 2,534 residential units (including 244 units on the projected enlargement sites, no change from existing conditions) and 450,928 square feet of commercial space. The net difference between the existing conditions and conditions in the future without the proposed actions is an

increase of 2,234 dwelling units, an increase of 58,195 square feet of retail space, a decrease of 109,751 square feet of office space, and an increase of 60,919 square feet of hotel space.

Table 15-2 summarizes the annual energy consumption for each use in the existing and No Build conditions. The same assumptions utilized for the existing condition were applied in calculating energy consumption on the projected development sites in the future without the proposed actions. As shown in Table 15-2, it is estimated that the projected development sites would use 389,752 million BTUs (or 114.2 KW) of energy annually in the future without the proposed actions.

Table 15-2
Future Without the Proposed Actions: Estimated Annual Energy Consumption on Projected Development Sites (No Build)

Use	Consumption Rates (BTUs/sf/yr)[1]	Existing		No Build	
		Area (sf)	Annual Energy Use (million BTUs)[2]	Area (sf)	Annual Energy Use (million BTUs)[2]
Residential	145,500	234,529 (300 DUs)	34,124	2,468,210 (2,534 DUs)	359,125
Retail	55,800	331,816	18,515	390,011	21,763
Office	77,900	109,751	8,550	0	0
Other Commercial[3]	55,800	226,302	12,628	0	0
Hotel	145,500	0	0	60,919	8,864
		Total	**73,817**		**389,752**

Notes:
1 Based on rates provided in the *CEQR Technical Manual* Table 3N-1.
2 1 KW is equivalent to 3,413 BTUs per hour.
3 Utilized rate for "Mercantile & Service" in *CEQR Technical Manual* Table 3N-1, of 55,800 BTUs/sf/year.

No major changes to the energy supply or infrastructure are expected to occur in the future without the proposed actions. Standard upgrades and/or reinforcements of the system are expected to be undertaken as necessary by the various energy suppliers and Con Ed with respect to in-city distribution. According to the NYISO *2007 Load & Capacity Data* report, the forecasted summer peak load for New York City in the analysis year of 2017 is expected to be 13,360 MW, and the annual energy requirements are forecasted at approximately 63,977 gigawatt hours (GWH).[1]

E. PROBABLE IMPACTS OF THE PROPOSED ACTIONS

As discussed in Chapter 1, "Project Description," the proposed actions are expected to result in new residential and commercial development on the projected development sites. Overall, total development on the projected development sites would consist of 3,917 residential units and 376,489 square feet of commercial space, a net increase in 1,383 residential units and a 74,439-square-foot decrease in the total amount of commercial space.

The same assumptions were applied to anticipated uses on the projected development sites in the future without and with the proposed actions. Table 15-3 shows the energy expected to be

[1] New York Independent System Operator 2007 Load & Capacity Data.

consumed by the projected development sites in the future with the proposed actions. Based on the above assumptions, it is estimated that the projected development sites would use approximately 579,650 million BTUs (or 169.8 KW) of energy annually in the future with the proposed actions, an incremental increase of approximately 189,900 million BTUs (or 54.0 KW) when compared to conditions in the future without the proposed actions. This annual increase in demand would represent less than one percent of the city's forecasted peak summer load of 13,360 MW in 2017, and an infinitesimal amount of the city's forecasted annual energy requirements for 2017, and therefore is not expected to be a significant impact on energy systems.

Table 15-3
Future With the Proposed Actions: Estimated Energy Consumption on Projected Development Sites (Build)

Use	Consumption Rates (BTUs/sf/yr)[1]	No Build		Build		Energy Use Increment (million BTUs)[2]
		Area (sf)	Annual Energy Use (million BTUs)[2]	Area (sf)	Annual Energy Use (million BTUs)[2]	
Residential	145,500	2,468,210 (2,534 DUs)	359,125	3,839,737 (3,917 DUs)	558,642	199,517
Retail	55,800	390,011	21,763	376,491	21,008	-755
Hotel	145,500	60,919	8,864	0	0	-8,864
Total			**389,752**		**579,650**	**189,898**

Notes:
1 Based on rates provided in the *CEQR Technical Manual* Table 3N-1.
2 1 KW is equivalent to 3,413 BTUs per hour.

Any new development resulting from the proposed actions would be required to comply with the New York State Conservation Construction Code, which governs performance requirements of heating, ventilation, and air conditioning systems, as well as the exterior building envelope of new buildings. In compliance with this code, the buildings to be constructed on all development sites must incorporate the required energy conservation measures, including meeting code requirements relating to energy efficiency and combined thermal transmittance.

F. CONCLUSION

The proposed actions would create an increased demand on energy systems including electricity and gas. However, relative to the capacity of these systems and the current levels of service within New York City, these increases in demand are minor. Electrical and gas connections are readily available in the local streets. Any new development under the proposed actions would be required to comply with the New York State Conservation Construction Code.

For these reasons, the proposed actions are not expected to adversely impact energy systems. ✷