Chapter 15: Energy

A. INTRODUCTION

Although present uses at the projected development sites create some demand for energy, 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. This chapter has been updated since the Draft Environmental Impact Statement to reflect changes to the Reasonable Worst-Case Development Scenario as described in Chapter 1, "Project Description."

B. EXISTING CONDITIONS

THE ENERGY SYSTEM[1]

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

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 Edison 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.

[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.

According to the New York Independent System Operator (NYISO) *2005 Load & Capacity Data* report, the peak electrical demand for New York City in summer 2004 was 9,769 Megawatts (MW), and the peak demand for summer 2005 was forecast at 11,315 MW.[1] 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 Edison 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 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 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 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 *Locational Installed Capacity Requirements Study* for the 2005-2006 capability year, New York City has an existing installed capacity of 9,887 MW (not including Special Case Resources).[2] The power plants located within Queens have a combined capacity of approximately 5,345 MW, or approximately 54 percent of the City's capacity.[3]

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.[4]

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

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[1] New York Independent System Operator 2005 Load & Capacity Data, www.nyiso.com/services/planning.html

[2] NYISO Locational Installed Capacity Requirements Study Covering the New York Control Area For 3 the 2005-2006 Capability Year, February 17, 2005, revised 3/23/05. According to the Study, Special Case Resources (SCRs) are "loads capable of being interrupted, and distributed generators, rated at 100 kW or higher, that are not directly telemetered."

[3] Source: "NYC Electric Generation Resources" information provided on Con Edison's website –4 www.coned.com/PublicIssues/

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

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 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 2015.

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 is estimated to be approximately 162 billion BTUs for all heating, cooling, and electric power.

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

Use	Consumption Rates[1]	Existing	
		SF	Annual Energy Use (million BTUs)
Commercial	55,800 BTUs/sf/yr	1,113,645	62,141
Industrial/Manufacturing	44,100 BTUs/sf/yr	420,728	18,554
Community Facilities	76,400 BTUs/sf/yr	70,000	5,348
Residential	145,500 BTUs/sf/yr	197,773	28,776
		Total	114,819

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

C. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO BUILD)

In the No Build scenario, 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 in the future without the proposed actions, as part of the RWCDS, which anticipates new dwelling units as well as additional commercial space.

As discussed below, the No Build scenario would result in higher energy consumption on the 186 projected development sites than under existing conditions. In the No Build Scenario, it is expected that the projected development sites would contain 1,816 dwelling units (DUs), 1,663,485 square feet of commercial/retail space, 214,344 square feet of community facility space, and 500,646 square feet of industrial/manufacturing space.

Table 15-2 summarizes the annual energy consumption for each use under No Build conditions below, and compares it to existing conditions. The same assumptions utilized for existing conditions 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 186 projected development sites would use approximately 400 billion BTUs of energy annually in the future without the proposed actions.

Table 15-2
Estimated Annual Energy Consumption on Projected Development Sites Under No Build Conditions, Compared to Existing Conditions

Use	Consumption Rates[1]	Existing		No Build	
		SF	Annual Energy Use (million BTUs)	SF	Annual Energy Use (million BTUs)
Commercial	55,800 BTUs/sf/yr	1,113,645	62,141	1,663,485	87,720
Industrial/Manufacturing	44,100 BTUs/sf/yr	420,728	18,554	500,646	31,5334
Community Facilities	76,400 BTUs/sf/yr	70,000	5,348	214,344	16,376
Residential	145,500 BTUs/sf/yr	197,773	28,776	1,816,669	264,325
Total			114,819		399,955

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

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 Edison with respect to in-City distribution. According to the NYISO *2005 Load & Capacity Data* report, the forecasted summer peak load for New York City in the analysis year of 2015 is expected to be 12,648 MW, and the annual energy requirements are forecasted at approximately 59,717 gigawatt hours (GWH).[1]

D. THE FUTURE WITH THE PROPOSED ACTION (BUILD)

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, which would replace existing uses or enlarge allowable development from what could occur under the No Build scenario. In the future with the proposed actions, it is anticipated that a total of approximately 5,380 dwelling units, approximately 4,771,199 square feet of commercial space (including 899,625 square feet of local retail space), and 459,524 square feet of community facility space would be developed on the projected development sites.

The same assumptions utilized for the various uses under future No Build conditions were applied in calculating estimated annual energy consumption on the projected development sites in the future with the proposed action. Table 15-3 shows the energy expected to be consumed by each of the projected development sites in the future with the proposed action. Compared with the No Build scenario, the projected incremental (net) change that would result from the proposed actions at the projected development sites is 3,565 dwelling units, 3,107,714 square feet of commercial space, 245,180 square feet of community facility space and a reduction of 379,752 square feet of industrial/manufacturing/warehouse space.

Based on the above assumptions, it is estimated that the projected development sites would use approximately 1.05 trillion BTUs of energy annually in the future with the proposed actions. Therefore, the proposed actions would result in an incremental increase of approximately 0.65 trillion BTUs in annual energy use compared to No Build conditions. This annual increase in demand would represent approximately 0.17 percent of the City's forecasted peak summer load of 12,648 MW in 2015, and an infinitesimal amount of the City's forecasted annual energy requirements for 2015, and therefore is not expected to be a significant impact on energy systems.

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 the 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.

As part of this analysis, Con Edison has identified a number of service upgrades to better serve the Jamaica community in light of the existing need and the growth expected under the proposed actions. Details of these upgrades will be included in the FEIS.

[1] New York Independent System Operator 2005 Load & Capacity Data, www.nyiso.com/services /planning.html

Table 15-3
Estimated Energy Consumption on Projected Development Sites Under Build Conditions, Compared to No Build Conditions

Use	Consumption Rates	No-Action		With-Action		Energy Use Increment
		SF	Annual Energy Use (million BTUs)	SF	Annual Energy Use (million BTUs)	
Commercial	55,800 BTUs/sf/yr	1,663,485	87,720	4,771,199	252,165	164,445
Industrial/ Manufacturing	44,100 BTUs/sf/yr	500,646	31,5334	120,894	5,331	(26,204)
Community Facilities	76,400 BTUs/sf/yr	214,344	16,376	459,524	35,108	18,732
Residential	145,500 BTUs/sf/yr	1,816,669	264,325	5,410,171	760,918	496,593
Total			**399,955**		**1,053,522**	**653,566**

Note:
Based on the following assumptions:
Commercial use: utilize rate for "Mercantile & Service" in CEQR Technical Manual Table 3N-1, of 55,800 BTUs per sf per year.
Industrial/Manufacturing: utilize rate for "Warehouse & Storage" in CEQR Technical Manual Table 3N-1, of 44,100 BTUs per sf per year.
Community Facility use: utilize rate for “Education” in CEQR Technical Manual Table 3N-1, of 76,400 BTUs per sf per year.
Residential Use: utilize rate for "Lodging" in CEQR Technical Manual Table 3N-1, of 145,500 BTUs per sf per year.
1 KW is equivalent to 3,413 BTUs per hour

E. CONCLUSIONS

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. The need for expansion and upgrades in service is recognized by Con Edison and a number of measures are under consideration to improve that service.

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