

## **A. INTRODUCTION**

This energy analysis focuses on consumption and on the transmission of energy. The *CEQR Technical Manual* recommends performing a detailed assessment of energy impacts for actions that could significantly affect the transmission or generation of energy or that generate substantial indirect consumption of energy (such as a new roadway).

Present uses at the Project Site create some demand for energy. It is expected that new development resulting from the Proposed Actions would place an increased overall demand on energy services at the Project Site. This chapter provides an analysis of that added demand. As discussed in greater detail in this chapter, although the development of the Project Site 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 increase demands on electricity and gas; however, relative to the capacity of these systems and the current levels of use in New York City, the increases in demand would be inconsequential. Therefore, the Proposed Actions would not result in a significant adverse 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 2013, 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<sup>1</sup>

### 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 to 2007 period, New York City has an existing installed annual generating capacity of 10,364 megawatts (MW)<sup>2</sup> (or 1,183 kilowatt hours). In 2007, annual electricity usage totaled approximately 58.3 million megawatt hours (MWH), or 199 trillion British thermal units (BTUs), in Con Edison’s delivery area. The peak demand for electrical power was 12,807 MW on August 8, 2007.<sup>3</sup> 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 further to a level that can be delivered into the distribution system or “grid” throughout the City. 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,

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<sup>1</sup> 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.

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

<sup>3</sup> Con Edison Website <http://www.coned.com>, 2008

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 2008 *Load & Capacity Data* report, the peak electrical demand for New York City in the summer of 2007 was 11,350 megawatts (MW).<sup>1</sup>

#### **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, nonprofit 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 MW 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 MW must be located in New York City. Currently, plants capable of generating up to 1,000 MW are under construction. Because of the existing supply and the addition of these projects, it is expected that an adequate generating capacity would be available in the New York City metropolitan area through the Proposed Actions' analysis year of 2013.

#### **EXISTING DEMANDS**

In estimating the existing annual energy consumption at the Project Site, 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 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

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<sup>1</sup> New York Independent System Operator 2008 Load & Capacity Data, [www.nyiso.com/public/webdocs/services/planning/planning\\_data\\_reference\\_documents/2008\\_GoldBook\\_PUBLIC.pdf](http://www.nyiso.com/public/webdocs/services/planning/planning_data_reference_documents/2008_GoldBook_PUBLIC.pdf), Historic Summer Non-Coincident Peak Demand by Zone

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 (KWH), etc.) and consumption (e.g., tons per day, cubic feet per minute, etc.). BTUs and kilowatts (KW) measure different types of quantities. A BTU measures heat (energy), while a KW (1000 watts) measures power (energy per unit time). In general 1 BTU equals 0.0002928 KWH and 1 KW is equivalent to 3,413 BTUs per hour.

As shown in **Table 14-1**, current annual energy use on the Project Site is estimated to be approximately 3,169 million BTUs for all heating, cooling, and electric power.

**Table 14-1**  
**Existing Estimated Annual Energy Consumption**

Use	Consumption Rates (BTUs/sf/yr) <sup>1</sup>	Existing	
		Area (sf)	Annual Energy Use (million BTUs) <sup>2</sup>
Horse Stable <sup>3</sup>	44,100	10,000	441
Public School <sup>4</sup>	76,400	29,930	2,287
Total			3,169
<b>Notes:</b>			
1 Based on rates provided in the <i>CEQR Technical Manual</i> Table 3N-1.			
2 1 KW is equivalent to 3,413 BTUs per hour.			
3 Utilized rate for "Warehouse & Storage" in <i>CEQR Technical Manual</i> Table 3N-1, of 44,100 BTUs/sf/year since rates for a stable are not provided.			
4 Utilized rate for "Education" in <i>CEQR Technical Manual</i> Table 3N-1, of 76,400 BTUs/sf/year.			

It should be noted that, for the purposes of this analysis it was assumed that the existing parking lots and a vacant warehouse located on the Project Site consume minimal energy.

## **D. THE FUTURE WITHOUT THE PROPOSED ACTIONS**

In the future without the Proposed Actions, no changes to land uses are anticipated to occur on the Project Site. Therefore, it is expected that no change in energy demand would occur on the Project Site.

## **E. PROBABLE IMPACTS OF THE PROPOSED ACTIONS**

As discussed in Chapter 1, "Project Description," the Proposed Actions are expected to result in new residential development, a commercial development, and a new public school on the Project Site. **Table 14-2** shows the energy expected to be consumed by the Project Site in the Future with the Proposed Actions. It is estimated that the Project Site would use approximately 165,106 million BTUs (48,343 megawatt hours) of energy annually in the future with the Proposed Actions, an additional increase of approximately 162,819 million BTUs when compared to conditions in the Future without the Proposed Actions. This new demand would represent less than 1 percent of the City's forecasted peak summer load of 35,651 MW in 2013<sup>1</sup>, and an infinitesimal amount of the City's forecasted annual energy requirements for 2013, and therefore is not expected to be a significant impact on energy systems.

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<sup>1</sup> NYISO Planning, *2008 Load and Capacity Data Report* 2008-06-26

**Table 14-2**

**Future With the Proposed Actions: Estimated Energy Consumption**

Use	Consumption Rates (BTUs/sf/yr) <sup>1</sup>	No Build		Build		Energy Use Increment (million BTUs)
		Area (sf)	Annual Energy Use (million BTUs) <sup>2</sup>	Area (sf)	Annual Energy Use (million BTUs) <sup>2</sup>	
Residential	145,500	0	0	1,076,651	156,653	156,653
Commercial	55,800	0	0	17,500	977	977
Public School	76,400	29,930	2,287	97,850	7,476	5,189
Horse Stable	44,100	10,000	441	0	0	(441)
<b>Total</b>			<b>3,169</b>	1,192,001	<b>165,106</b>	<b>162,819</b>
<b>Notes:</b>						
1 Based on rates provided in the <i>CEQR Technical Manual</i> 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 for 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.

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. \*