A. INTRODUCTION

This chapter describes the effects that the proposed action may have on energy consumption. Although present uses at the projected development sites create some demand for energy, development resulting from the proposed action would place an increased overall demand on energy services. As discussed in this chapter, the proposed action would create new demands on energy, but the additional demand would not be large enough to constitute significant adverse impacts on these services.

As discussed in Chapter 1, "Project Description," a reasonable worst-case development scenario (RWCDS) for development associated with the proposed action by 2013 has been identified, with net increases of 4,708 DUs, ~~292,676~~ 195,215 sf of retail space, and 198,726 sf of museum space, and net decreases of ~~816,847~~ 796,947 sf of office, 131,100 sf of hotel, ~~40,809~~ 74,818 sf storage/manufacturing, ~~318,580~~ 225,940 sf of parking/auto related uses, and ~~25,064~~ 4,080 sf of vacant space on the 25 projected development sites. The proposed action also includes the site selection and acquisition of the High Line to create a publicly accessible ~~6.7~~ 5.9-acre open space.

The creation of the High Line open space, which extends south of the rezoning area boundary to Gansevoort Street and also includes the post office spur extending east of Tenth Avenue at W. 30th Street, would have only minimal effects on energy consumption. Energy uses likely would be limited to lighting, power for elevators, and heating for ancillary structures. This is not expected to be significant and is not considered in the analysis of future energy conditions.

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 Manhattan, Con Edison supplies electricity and natural gas.

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

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. Con Edison has sold many of its power generating facilities and is now primarily involved in energy distribution.

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

According to the New York Independent System Operator (NYISO) *2004 Load & Capacity Data* report, the peak electrical demand for New York City in Summer 2003 was 10,240 Megawatts (MW), and the peak demand for Summer 2004 is forecasted at 11,150 MW.[2] Typically the electricity generated within the City is sufficient to satisfy the demand. However, during the peak summer demand period, needed electricity must be supplemented by the transmission grid across the Northeast. Con Edison's distribution grid has a finite capacity, and during heavy demand periods, the transmission grid is strained. There is an ongoing service and distribution improvement program for Con Edison infrastructure which upgrades localized areas that are continually high demand zones. Electricity required for these local hot zones are supplied by other regions of New York City or from sources elsewhere within the larger grid, if necessary.

Con Edison provides the electrical power transmission system for the City through a series of substations. Transmission substations receive electricity from the generating stations through the transmission system and reduce the voltage to a level that can be delivered to area substations. Area substations receive electricity from a transmission substation and reduce the voltage to a level that can be delivered into the distribution system or "grid" in the streets. In the distribution system, the electricity's voltage is reduced further to be delivered 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 would 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 are located in the five boroughs, providing electric generation resources to New York City. According to NYISO's *Locational Installed Capacity Requirements Study* for the 2004-2005 capability year, New York City has an existing installed capacity of 8,811 MW (not

[2] New York Independent System Operator *2004 Load & Capacity Data*, revised 06/08/04 – www.nyiso.com/services/planning.html

including Special Case Resources).[3] The power plants located within Manhattan have a combined capacity of approximately 522 MW, or approximately 6 percent of the City's capacity.[4]

In addition to the electrical distribution network serving the City, Con Edison maintains the gas and steam utilities. Steam mains still serve parts of the City, primarily for heating uses. Including the insulation surrounding the steam lines, these mains range from 24-inches to 48-inches. Gas infrastructure, ranging from 4-inch to 24-inch mains, supply natural gas for heating and cooking uses within the proposed action area. Typically, these gas lines are located between two to four feet below the street. Con Edison's gas transmission and distributions facilities are used to deliver natural gas to the proposed action and this would be the case with in the future with the proposed action.

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. 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), introduced in June of 2001, directed 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. The NYPA has purchased and constructed 11 new 44-MW, natural gas-fired, simple cycle turbine generating units (10 of which are located within New York City).

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. As the energy demand increases over time, additional in-city generation would be needed to satisfy this requirement.

Plans for new electrical power generation facilities are typically reviewed by the New York State Board on Electric Generation Siting and the Environment (Siting Board) under Article X of the Public Service Law. Article X, enacted in 1992 and modified in 1998, established a comprehensive permitting process for the siting of electric generating facilities of 80 MWs of capacity and above.

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[3] NYISO *Locational Installed Capacity Requirements Study Covering the New York Control Area For the 2004-2005 Capability Year*, February 20, 2004. 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."

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

Article X expired on December 31, 2002. Power plant applications that were submitted before the expiration of the law are still eligible for review. Nine projects were certified under Article X before the law expired, including Con Edison's East River repowering project at East 14th Street in Manhattan.

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 MWs 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. A number of proposals to extend and modify the Article X law were introduced in the State Senate and Assembly during the 2003 legislative session and have been reintroduced in 2004. Currently, plants capable of generating up to 1,430 MWs are under construction. Of these projects, approximately 40 percent of the combined electrical generating capacity is located within the City, and all proposed plants are anticipated to be constructed and operating by 2005. Because 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 2013.

Existing Demand

In estimating the existing annual energy consumption at the 25 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. Its use 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 25 projected development sites is estimated to be approximately ~~79.98~~ 83.18 billion BTUs for all heating, cooling, and electric power.

TABLE 15-1, Estimated Annual Energy Consumption on Projected Development Sites Under Existing Conditions

USE	Consumption Rates *	EXISTING	
		SF	Annual Energy Use (million BTUs*)
Storage/Manufacturing	44,100 BTUs/sf/yr	518,598	22,870
Parking/Auto	27,400 BTUs/sf/yr	416,692	11,417
Vacant	0 BTUs/sf/yr	82,883	0
Community Facility	76,400 BTUs/sf/yr	28,838	2,203
Residential	145,500 BTUs/sf/yr	101,000	14,696
Commercial	55,800 BTUs/sf/yr	573,437	31,998
TOTAL			**83,184**

* Based on the following assumptions:
Storage/Manufacturing: utilize rate for "warehouse and storage" in *CEQR Technical Manual* Table 3N-1.
Parking/Auto: utilize rate for "parking garage" in *CEQR Technical Manual* Table 3N-1.
Community Facility: utilize rate for "education" in *CEQR Technical Manual* Table 3N-1.
Residential: utilize rate for "lodging" in *CEQR Technical Manual* Table 3N-1. Assume 1,000 sf/DU average size of existing dwelling unit.
Commercial utilize rate for "mercantile and service" in *CEQR Technical Manual* Table 3N-1.

C. FUTURE WITHOUT THE PROPOSED ACTION

If the proposed action is not implemented, the identified 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 2, "Land Use, Zoning and Public Policy," DCP has identified 9 of the 25 projected development sites on which new development, through conversion or new construction, is expected in the future without the proposed action by 2013.

With new development in the proposed action area, the No-Action RWCDS is expected to result in higher energy consumption on the projected development sites in the future without the proposed action than under existing conditions.

As noted above, currently plants capable of generating 1,430 MWs are under construction. In addition, standard upgrades and/or reinforcements of the system are expected to be undertaken as necessary by the various energy suppliers. According to the NYISO *2004 Load & Capacity Data* report, the forecasted summer peak load for New York City in the analysis year of 2013 is expected to be 12,396 MW, and the annual energy requirements are forecasted at approximately 61,375 gigawatt hours (GWH).[5]

[5] New York Independent System Operator *2004 Load & Capacity Data*, revised 06/08/04 – www.nyiso.com/services/planning.html

In the future without the proposed action, it is expected that the 25 projected development sites would contain 101 DUs, ~~271,578~~ 378,913 sf of retail, ~~976,847~~ 956,947 sf of office space, 131,100 sf of hotel space, ~~40,809~~ 74,818 sf of storage/manufacturing uses, ~~395,005~~ 302,365 sf of parking/auto related uses, 28,838 sf of community facility space, and ~~25,064~~ 4,080 sf of vacant area. This No-Action development includes existing uses expected to remain in the future without the proposed action and some new as-of-right commercial development.

Table 15-2 summarizes the annual energy consumption for each use under No-Action conditions and compares it to existing conditions. The same assumptions utilized for existing conditions were applied in calculating energy consumption on the 25 projected development sites in the future without the proposed action. As shown in Table 15-2, it is estimated that the 25 projected development sites would use approximately ~~139.8~~ 143.2 billion BTUs of energy annually in the future without the proposed action in 2013.

TABLE 15-2, Estimated Annual Energy Consumption on Projected Development Sites Under 2013 No-Action Conditions, Compared to Existing Conditions

USE	Consumption Rates	EXISTING		NO-ACTION	
		SF	Annual Energy Use (million BTUs)	SF	Annual Energy Use (million BTUs)
Storage/Manufacturing	44,100 BTUs/sf/yr	518,598	22,870	74,818	3,299
Parking/Auto	27,400 BTUs/sf/yr	416,692	11,417	302,365	8,285
Vacant	0 BTUs/sf/yr	82,883	0	4,080	0
Community Facility	76,400 BTUs/sf/yr	28,838	2,203	28,838	2,203
Residential (1)	145,500 BTUs/sf/yr	101,000	14,696	232,100	33,771
Commercial (2)	55,800 BTUs/sf/yr	573,437	31,998	378,913	21,143
Office (3)	77,900 BTUs/sf/yr	--	--	956,947	74,546
TOTAL			**83,184**		**143,248**

Notes:
(1) No-Action residential energy consumption includes 131,100 of hotel use.
(2) Under No-Action conditions, the RWCDS provides a breakout between retail and commercial uses. Retail utilizes the same assumption as general commercial under existing conditions, "mercantile and service."
(3) Office utilizes the assumed rate for "office" in *CEQR Technical Manual* Table 3N.

D. FUTURE WITH THE PROPOSED ACTION

In the future with the proposed action in 2013, all of the storage/manufacturing, hotel, and vacant uses, and a substantial portion of the office and parking/auto uses anticipated on the 25 projected development sites under No-Action conditions would be replaced by increased residential, retail, and community facility uses. As described in Chapter 1, "Project Description," it is expected that under With-Action conditions, the projected development sites would contain 4,809 DUs, ~~564,254~~ 574,128 sf retail, 160,000 sf office, 76,425 sf parking/auto, and 227,564 sf community facility space. The

incremental difference between the With-Action and No-Action energy demand serves as the basis for the impact analyses. The net incremental change in projected development is summarized above in the "Introduction" section.

Projected development resulting from the proposed action 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 the projected development sites would incorporate all required energy conservation measures, including meeting the Code's requirements relating to energy efficiency and combined thermal transmittance. Electricity and gas supplied by Con Ed or other power companies, would continue to provide heating, cooling, and lighting to West Chelsea.

The same assumptions utilized for the various uses under No-Action conditions were applied in calculating estimated annual energy consumption on the 25 projected development sites in the future with the proposed action. Table 15-3 shows the energy expected to be consumed by the projected development sites in the future with the proposed action, comparing it to the future without the proposed action, and identifying the incremental change in energy consumption associated with the proposed action.

TABLE 15-3, Estimated Annual Energy Consumption on Projected Development Sites Under 2013 With-Action Conditions, Compared to No-Action Conditions, With Incremental Change Associated with Proposed Action

USE	NO-ACTION		WITH-ACTION		INCREMENTAL
	SF	Annual Energy Use (million BTUs)	SF	Annual Energy Use (million BTUs)	Annual Energy Use (million BTUs)
Storage/Manufacturing	74,818	3,299	0	0	-3,299
Parking/Auto	302,365	8,285	76,425	2,094	-6,191
Vacant	4,080	0	0	0	0
Community Facility	28,838	2,203	227,564	17,386	15,183
Residential	232,100	33,771	3,628,585	527,959	494,188
Commercial	378,913	21,143	574,128	32,036	10,893
Office	956,947	74,546	160,000	12,464	-62,082
TOTAL		**143,247**		**591,939**	**448,692**

Refer to Tables 15-1 and 15-2 for notes. Note: totals may not add due to rounding.

Based on the above assumptions, it is estimated that the 25 projected development sites would use approximately ~~591.4~~ 591.9 billion BTUs of energy annually in the future with the proposed action. Therefore, the proposed action would result in an incremental increase of approximately ~~451.5~~ 448.7 billion BTUs in annual energy use compared to No-Action conditions. This annual incremental demand on an hourly basis would represent approximately 0.12 percent of the City's forecasted peak

summer load of 12,396 MW in 2013, and an infinitesimal amount of the City's forecasted annual energy requirements for 2013, and is therefore not expected to be a significant additional load. As such, the operational energy demand from the proposed action would not have significant adverse impacts.

In addition to electric energy consumption, it is likely that most of the projected developments would use natural gas for heating and cooling energy needs.

E. BASE FAR SCENARIO

The Base FAR Scenario is expected to result in less residential development than the proposed action, as it would permit lower density development. As discussed in Chapter 1, "Project Description," the Base FAR Scenario RWCDS is expected to generate a net increase of 3,041 DUs on the projected development sites, or approximately 1,667 fewer dwelling units than the proposed action. The Base FAR Scenario is expected to result in the same amount of projected development for non-residential uses. As this scenario would generate the same amount of non-residential development and less residential development than the proposed action, it would commensurately generate less demand on the energy supply system. Specifically, as shown in Table 15-4, the Base FAR Scenario would use approximately ~~374.5~~ 375 billion BTUs of energy annually. Therefore, the Base FAR Scenario would result in an incremental increase of approximately ~~234.6~~ 231.8 billion BTUs in annual energy use compared to No-Action conditions. This would be 216.9 billion BTUs less in annual energy use than the incremental increase generated by the proposed action. The Base FAR Scenario annual incremental demand on an hourly basis would represent approximately 0.06 percent of the City's forecasted peak summer load of 12,396 MW in 2013, and an infinitesimal amount of the City's forecasted annual energy requirements for 2013, and is therefore not expected to be a significant additional load. As such, the operational energy demand from the proposed action would not have significant adverse impacts.

TABLE 15-4, Estimated Annual Energy Consumption on Projected Development Sites Under 2013 Base FAR Scenario Conditions, Compared to No-Action Conditions, With Incremental Change Associated with Base FAR Scenario

USE	NO-ACTION	BASE FAR SCENARIO		BASE FAR SCENARIO INCREMENT	WITH-ACTION INCREMENT
	Annual Energy Use (million BTUs)	SF	Annual Energy Use (million BTUs)	Annual Energy Use (million BTUs)	Annual Energy Use (million BTUs)
Storage/Mfg.	3,299	0	0	-3,299	-3,299
Parking/Auto	8,285	76,425	2,094	-6,191	-6,191
Vacant	0	0	0	0	0
Community Facility	2,203	227,564	17,386	15,183	15,183
Residential	33,771	2,137,659	311,029	277,258	494,188
Commercial	21,143	574,128	32,036	10,893	10,893
Office	74,546	160,000	12,464	-62,082	-62,082
TOTAL	**143,247**		**375,009**	**231,762**	**448,692**

Refer to Table 15-3 for No-Action and With-Action programs.

F. CONCLUSION

The proposed action is not anticipated to result in significant adverse energy impacts. Consumption of electrical energy on the projected development sites would experience a net increase of approximately ~~451.5~~ 448.7 billion BTUs in annual energy use compared to No-Action conditions. This annual incremental demand on an hourly basis would represent approximately 0.12 percent of the City's forecasted peak summer load of 12,396 MW in 2013, and an infinitesimal amount of the City's forecasted annual energy requirements for 2013. This relatively small incremental demand is not large enough to significantly impact the ability of the City's energy system to deliver electricity. Additional demand for natural gas for home heating and cooking is not expected to adversely affect the energy system. The Base FAR Scenario, which would result in less residential development and therefore less energy consumption, also would not result in significant adverse energy impacts.