Chapter 13: Energy

A. INTRODUCTION

This chapter describes the effects of the Proposed Actions on energy consumption. New building and alteration projects are subject to the New York City Energy Conservation Code (NYCECC), which comprises the 2010 Energy Conservation Construction Codes of New York State (ECCCNYS) in addition to a series of local laws. Therefore, according to the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, a detailed assessment of energy impacts would be limited to projects that may significantly affect the transmission or generation of energy. Most actions resulting in new construction would not create significant energy impacts, and, as such, do not require a detailed energy assessment. However, a proposed action's operational energy consumption should be estimated.

As described in Chapter 1, "Project Description," under the reasonable worst-case development scenario (RWCDS), the Proposed Actions would facilitate the incremental development of approximately 3,488 dwelling units; approximately 165,575 square-feet (sf) of commercial retail, which includes office, local retail, destination retail, grocery, and restaurant use; approximately 105,042 sf of community facility use; and approximately 132,394 sf of manufacturing use. The Proposed Actions would also result in a net reduction of 10,592 sf of auto-related space; 32,974 sf of hotel space; and 57,614 sf of commercial storage space (as compared with No Action conditions).

As stated in the *CEQR Technical Manual*, in lieu of a detailed assessment, which is generally limited to actions that may significantly affect the transmission or generation of energy, the amount of energy that would be consumed annually as a result of the day-to-day operation of the buildings and uses resulting from the Proposed Actions is disclosed in this chapter.

B. PRINCIPAL CONCLUSIONS

The Proposed Actions would not result in a significant adverse impact related to energy systems. Development assumed in connection with the Future with the Proposed Actions (the With Action Condition), would result in increased demand of approximately 516,576,883 British Thermal Units (BTUs) of energy per year as compared with future conditions without the Proposed Actions (the No Action Condition). This increase in annual demand represents approximately 0.1 percent of the projected service demand for New York City in the 2027 analysis year. The Proposed Actions would generate an incremental increase in energy demand that would be considered negligible when compared with the overall demand within Consolidated Edison's (Con Edison's) New York City and Westchester County service area. Any new development resulting from the Proposed Actions would be required to comply with the NYCECC, which governs performance requirements of heating, ventilation, and air condition systems, as well as the exterior building envelope of new buildings. In compliance with this code, new developments must meet standards for energy conservation, which include requirements related to energy efficiency and combined thermal transmittance.

Therefore, no significant adverse impacts related to energy are expected to occur.

C. METHODOLOGY

To assess the Proposed Actions' potential impacts on energy, this chapter:

- Presents data on the existing energy distribution system and estimated energy usage for existing conditions;
- Determines future energy demands without and with the Proposed Actions for 2027, using energy consumption rates for typical land uses provided in the *CEQR Technical Manual*; and
- Assesses the effects of this incremental energy demand on the local distribution system and regional energy supplies.

This chapter calculates the annual energy consumption of the projected development sites identified in the RWCDS for the Proposed Actions under existing, No Action, and With Action conditions and the net change in energy consumption, which represents the Proposed Actions' anticipated energy use. Only anticipated development on the 69 projected development sites form the basis for this assessment of energy demand.

According to the *CEQR Technical Manual*, if a project such as the Proposed Actions, would rezone an area where projected development would occur on development sites not controlled by the applicant, detailed energy modeling would likely not be possible. For such projects, it is appropriate to estimate the project's energy consumption based Table 15-1 of the *CEQR Technical Manual*, which provides the average annual energy consumption rates in New York City for various land uses. Therefore, this chapter uses the *CEQR Technical Manual's* Table 15-1 to estimate annual energy consumption as a result of the Proposed Actions. The measure of energy use in this chapter is BTU per sf of building floor area per year.[1] The assumptions utilized in calculating energy consumption for the existing conditions were also applied to the projected development sites under the No Action and With Action Conditions.

D. EXISTING CONDITIONS

ENERGY SUPPLY AND TRANSMISSION

Within New York City, electricity is generated and delivered to most users by Con Edison as well as a number of independent power companies. Electrical energy in New York City is drawn from a variety of sources that originate both within and outside the City. These include non-renewable sources, such as oil, natural gas, and coal fuel; and renewable sources, such as hydroelectricity and, to a much lesser extent, biomass fuels, solar power, and wind power. Electricity consumed in New York City is generated in various locations, including sites within New York City, locations across the Northeast, and places as far away as Canada.

Con Edison distributes power throughout New York City and Westchester County, for a total service area of approximately 600 square miles, serving a population of over 9 million people. Transmission substations receive electricity from the regional high voltage transmission system and reduce the voltage to a level that can be delivered to area substations. Area substations

[1] One BTU is the quantity of heat required to raise one pound of water by one degree Fahrenheit.

further reduce the voltage to a level that can be delivered to the distribution system, or the street "grid." Within the grid, voltage is further reduced for delivery to customers. Each substation serves one or more distinct geographic areas, called networks, which are isolated from the rest of the local distribution system. If service is lost at a specific substation or substations, the network functions to isolate any problems from other parts of the city. Substations are also designed to have sufficient capacity for the network to grow.

Con Edison currently has 62 area distribution substations and various distribution facilities located throughout New York City and Westchester County. As of the end of 2015, Con Edison's distribution system had a transformer capacity of 29,762 mega volt ampere (MVA), with 36,929 miles of overhead distribution lines and 97,286 miles of underground distribution lines. The underground distribution lines represent the longest underground electric delivery system in the country. Con Edison's electric generating facilities consist of plants located in Manhattan with an aggregate capacity of 724 megawatts (MW).[2]

In 2015 (the latest year for which data is available), annual electricity usage in Con Edison's service area[3] totaled approximately 57.0 billion kilowatt hours (KWH), or 194.5 trillion BTU. In addition, Con Edison supplied approximately 156.4 trillion BTU of natural gas[3] and approximately 28.2 trillion BTU of steam in 2015. Overall, approximately 379.1 trillion BTU of energy was consumed in 2015 within Con Edison's New York City and Westchester County service area.[3]

According to the *Con Edison 2015 Annual Report*, the peak electrical demand for New York City in summer 2015 was 12,316 megawatts. Con Edison forecasts a 2016 service area peak demand of 13,650 MW and an average annual growth of the peak electric demand in its service area over the next five years to be approximately 0.2 percent per year. Con Edison is required by North American Electric Reliability Corporation (NERC), Northeast Power Coordinating Council (NPCC), and New York State Reliability Council (NYSRC) rules to maintain its transmission system so to do the following: survive the two worst (non-simultaneous) contingencies that will not result in equipment loading exceeding the designated emergency rating of that equipment, will not result in the loss of any customer service, and following corrective actions, will not result in equipment loading that exceeds the designated normal rating of that equipment.

RECENT ENERGY CONSERVATION DIRECTIVES

In December 2009, the City Council passed four laws, collectively known as the Greener, Greater Buildings Plan (GGBP), that required energy efficiency upgrades and energy transparency in large existing buildings. Specifically, these laws call for annual benchmarking, energy audits, retro-commissioning, lighting upgrades, and sub-metering of commercial tenant space. Three out of these four laws only affect the City's largest 16,000 properties, both public and private, that comprise half of the built area in the City. Through the enactment of one of those laws, beginning in 2011, privately owned buildings over 50,000 sf were required to submit reports of energy performance measurements in a process called "benchmarking." Though

[2] Con Edison, *2015 Annual Report.*

[3] The Con Edison service area includes electricity to all of New York City (except the Rockaway Peninsula in Queens) and most of Westchester County; gas to Manhattan, the Bronx, northern Queens, and most of Westchester; and steam from the Battery to 96th Street in Manhattan.

buildings of this size represent just two percent of the total number of buildings in the City, they are responsible for approximately 45 percent of total energy consumption, making this law both targeted and high-impact. By 2030, these laws are expected to reduce greenhouse gas (GHG) emissions by at least 5 percent citywide.[4]

As discussed in the "Public Policy" section in Chapter 2, "Land Use, Zoning, and Public Policy," the Project Area is subject to the goals of OneNYC. OneNYC is the Mayor's plan to promote growth, sustainability, resiliency, and equity, as the City seeks to address the challenges of climate change with a multifaceted approach. In order to make New York City the most sustainable big cities in the world, which is one of the stated goals of OneNYC, the Department of City Planning (DCP) is working to reduce New York City's energy consumption and its contribution to climate change. One of the most ambition goals of OneNYC is to reduce greenhouse gas emissions by 80 percent by 2050, which includes requiring substantial shifts in the City's power generation system and reduction of the carbon footprint of buildings.

EXISTING DEMAND

In estimating the existing annual energy consumption at the projected development sites, the rates provided in Table 15-1 of the *CEQR Technical Manual* were utilized. As presented in **Table 13-1**, current annual energy use on the 68 projected development sites is estimated to be approximately 207,152,789 BTU for all heating, cooling, and electric power. This is equivalent to less than 0.1 percent of the total annual energy consumption in 2015 within Con Edison's New York City and Westchester County Service Area.

Table 13-1
Existing Annual Energy Consumption for the Projected Development Sites

Use	Floor Area (sf)	Average Annual Energy Use Rate (MBTU/sf)[1]	Existing Annual Energy Use (MBTU)
Commercial[2]	537,677	216.3	116,299,535.1
Industrial	33,847	554.3	18,761,392.1
Institutional	0	250.7	0
Large Residential (>4 Family)	563,200	126.7	71,357,440.0
Small Residential (1-4 Family)	7,813	94.0	734,422.0
Total			**207,152,789**

Notes:
[1] From Table 15-1 of the *CEQR Technical Manual.*
[2] Includes retail, supermarket, restaurant, office, hotel, auto-related, and storage/garage uses.
Sources: 2014 *CEQR Technical Manual*.

E. THE FUTURE WITHOUT THE PROPOSED ACTIONS

Energy consumption under the No Action Condition would increase compared with Existing Conditions. Annual energy consumption estimates for each use under No Action Conditions are provided in **Table 13-2**. As shown in the table, it is estimated that energy demand from the 68 projected development sites would total approximately 434,806,829 billion BTUs of energy annually. This represents an increase of approximately 227,654,040 billion BTUs over Existing Conditions.

[4] PlaNYC, adopted in 2007 and updated in April 2011; Energy Chapter, page 107.

Table 13-2
No Action Annual Energy Consumption for the Projected Development Sites

Use	Floor Area (sf)	Average Annual Energy Use Rate (MBTU/sf)[1]	Existing Annual Energy Use (MBTU)
Commercial[2]	562,368	216.3	121,640,090.3
Industrial	22,777	554.3	12,625,291.1
Institutional	7,395	250.7	1,853,926.5
Large Residential (>4 Family)	2,357,439	126.7	298,687,521.3
Small Residential (1-4 Family)		94.0	0
Total			**434,806,829**

Notes:
[1] From Table 15-1 of the *CEQR Technical Manual.*
[2] Includes retail, supermarket, restaurant, office, hotel, auto-related, and storage/garage uses.
Sources: 2014 *CEQR Technical Manual.*

According to the New York Independent Systems Operator's (NYISO) 2016 *Load and Capacity Data* report, annual energy requirements for 2027[5] are forecast at approximately 156,777 Gigawatt hours (GWh) (or 534 trillion BTU). Of this forecast annual energy demand, 50,066 GWh (or 171 trillion BTU) is expected to come from Zone J, which includes New York City. The anticipated 464 million BTU increase in annual energy consumption due to anticipated development on the projected development sites under the 2026 No Action Condition therefore represents less than approximately 0.01 percent of New York City's forecast future total annual energy demand.

F. THE FUTURE WITH THE PROPOSED ACTIONS

Table 13-3 presents the land uses as anticipated under With Action Conditions on the 68 projected development sites under the RWCDS, as well as their associated annual energy demands. As indicated in **Table 13-3**, it is estimated that energy demand from the 68 projected development sites would total 951,383,712 million BTUs of energy annually. This represents an increase of less than approximately 0.01 percent of the City's forecasted annual energy requirement of 171 trillion BTU for 2027; therefore, the Proposed Actions are not expected to result in a significant adverse impact on energy systems.

[5] NYISO's 2016 *Load and Capacity Data* report forecast annual energy requirements up until the year 2026, a year before the proposed build year (2027) of the Proposed Actions. Therefore, the forecast energy requirements for 2026 were used as the basis of the No Action and With Action Conditions.

Table 13-3
With Action Annual Energy Consumption for the Projected Development Sites

Use	Floor Area (sf)	Average Annual Energy Use Rate (MBTU/sf)[1]	Existing Annual Energy Use (MBTU)
Commercial[2]	727,322	216.3	157,319,835.1
Industrial	155,171	554.3	86,011,285.3
Institutional	112,437	250.7	28,187,955.9
Large Residential (>4 Family)	5,365,940	126.7	679,864,636.0
Small Residential (1-4 Family)	0	94.0	0
Total			**951,383,712**

Notes:
[1] From Table 15-1 of the *CEQR Technical Manual.*
[2] Includes retail, supermarket, restaurant, office, hotel, auto-related, and storage/garage uses.
Sources: 2014 *CEQR Technical Manual,*

Additionally, any new developments resulting from the Proposed Actions would be required to comply with the NYCECC, which governs performance requirements of heating, ventilation, and air condition systems, as well as the exterior building envelope of new buildings. In compliance with this code, new development must meet standards for energy conservation, which include requirements relating to energy efficiency and combined thermal transmittance. In addition, should there be a voluntary utilization of higher performance standard designs on the projected development sites, there would then be a reduction in the forecast energy load as shown in **Table 13-3**.

Based on the above information, no significant adverse energy impacts would result from the Proposed Actions. ✷