East New York Rezoning Proposal
Chapter 12: Energy

A. INTRODUCTION

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 6,312 dwelling units (DU), including 3,447 affordable DU; 557,290 sf of commercial uses; 457,870 sf of community facility uses; and 1,138 accessory parking spaces; as well as a net reduction of 27,035 sf of industrial uses (compared to 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 on energy systems. Development facilitated by the Proposed Actions is expected to create an increased demand on energy systems, including electricity and gas. It is estimated that With-Action development on the 80 projected development sites would result in an increase of approximately one trillion British thermal units (BTUs) over No-Action conditions. This increase in annual demand would represent approximately 0.6 percent of the City's forecasted future annual energy requirement of 179 trillion BTU and, therefore, is not expected to result in a significant adverse impact on energy systems. Moreover, 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 conditioning 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 relating to energy efficiency and combined thermal transmittance.

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 2030, 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 proposed development sites identified in the RWCDS for the Proposed Actions under existing, No-Action, and With-Action conditions (the "projected development sites") and the net change in energy consumption, which represents the Proposed Actions' anticipated energy use. As the calculation of energy demand is a density-based analysis, only the anticipated development on the 80 projected development sites form the basis for this assessment.

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 on 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 square foot 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

Con Edison delivers electricity to all of New York City (except the Rockaway area in Queens) and almost all of Westchester County, for a total service area of approximately 660 square miles, comprising a population of more than 9.2 million residents. The electrical energy is supplied from a variety of sources that originate both within and outside New York City. These include non-renewable sources, such as oil, natural gas, coal fuel, and uranium; and renewable sources, such as hydroelectricity and, to a much lesser extent, biomass fuels, solar power, and wind power. New York City's electrical demands are met by a combination of sources, including electricity generated within New York City, at locations across the northeast, and from places as far away as Canada.

Con Edison provides the electrical power transmission for the City through a series of area and transmission substations. 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 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 area substation serves one or more distinct geographic area, 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.

Con Edison currently has 62 area distribution substations and various distribution facilities located throughout New York City and Westchester County. In 2013, Con Edison's distribution system had a transformer capacity of 29,125 mega volt ampere (MVA), with 36,782 miles of overhead distribution lines and 97,120 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 702 MW.[2]

In 2013 (the latest year for which data is available), annual electricity usage in Con Edison's service area[3] totaled approximately 56.9 billion kilowatt hours (KWH), or 194.2 trillion BTU. In addition, Con Edison supplied

[1] One BTU is the quantity of heat required to raise one pound of water by one degree Fahrenheit.
[2] Con Edison, *2013 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.

approximately 139 trillion BTU of natural gas[4] and approximately 26.3 trillion BTU of steam in 2013. Overall, approximately 359.5 trillion BTU of energy was consumed in 2013 within Con Edison's New York City and Westchester County service area.[5]

According to the Con Edison *2014 Annual Report*, the peak electrical demand for New York City in summer 2014 was 12,198 megawatts. The Con Edison system peak of 13,322 megawatts was set in July 2013. Con Edison forecasts an average annual growth of the peak electric demand in its service area over the next five years to be approximately 0.9 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 survive the two worst (non-simultaneous) contingencies will not result in equipment loading that exceeds the designated emergency rating of that equipment, will not result in the loss of any customer service, and 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 the built area in the City. Through the enactment of one of those laws, beginning in 2011, privately owned buildings over 50,000 square feet were required to submit reports of energy performance measurements in a process called "benchmarking." Though 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 five percent citywide.[6]

The City has also taken steps to enable private property owners to install renewable energy systems on their buildings. The City Planning Commission recently approved the "Zone Green" proposal to amend the City's zoning resolution to more flexibly allow rooftop solar and wind facilities, as well as better insulation. In addition, as discussed in the "Public Policy" section in Chapter 2, "Land Use, Zoning, and Public Policy," the rezoning area is located within the Greenpoint-Greenway Solar Empowerment Zone, one of five such zones citywide in which special benefits are available to support the installation of solar panels for electricity as well as hot water. The Solar Empowerment Zones are strategically selected areas where solar power systems are most beneficial and technically viable and where development of solar power is encouraged. The zones were designed to reduce peak electricity demand and the associated pollution from dirty plants that operate when demand is at its highest, while also potentially deferring or eliminating the need for costly upgrades to the electrical system. The zones were selected by the Solar America City Partnership and an advisory group consisting of representatives from several City agencies, Con Edison, the New York Department of Public Service, the New York State Energy Research and Development Authority (NYSERDA), and the New York Power Authority (NYPA).

In December 2014, New York State Public Service Commission approved a plan proposed by Con Edison, the Brooklyn Queens Demand Management ("BQDM") Program, that allows Con Edison to make up to $200 Million in investments in customer side solutions and non-traditional utility side solutions that provide load relief in targeted areas (i.e., areas served by Ridgewood, Richmond Hill and Crown Heights electrical networks) and reduce reliance on the power grid, thus enabling the deferral of major infrastructure investment of around $1 Billion. The BQDM Program cover areas where power consumption has increased in recent years.[7] The Program includes, among others, customer-

[4] National Grid supplies natural gas to Brooklyn including to the East New York rezoning area.
[5] Con Edison, *2013 Annual Report.*
[6] PlaNYC, adopted in 2007 and updated in April 2011; Energy Chapter, page 107.
[7] BQDM Program areas refer to north central and eastern Brooklyn neighborhoods, including parts of Greenpoint, East Williamsburg, Bushwick, Bedford-Stuyvesant, Crown Heights, East Flatbush, Brownsville, and East New York, and southwestern Queens neighborhoods, including parts of Richmond Hill, Howard Beach, Broad Channel, Ozone Park, South Ozone Park, Woodhaven and Kew Gardens.

side energy efficiency, demand management, and distributed generation solutions, as well as utility side non-traditional solutions. Con Edison expects 52 MW of load relief provided through the BQDM Program by 2018 with approximately 41 MW expected from customer side solutions and 11 MW from utility side non-traditional solutions. The BQDM Program was developed out of a need to address forecasted overloads of subtransmission feeders serving the Brownsville No. 1 and No. 2 substations in Brooklyn. The BQDM Program, together with other infrastructure investments and management of the distribution system, will allow Con Edison to defer the need for a new substation until a current forecast of 2026.

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 12-1, below, current annual energy use on the 80 projected development sites is estimated to be approximately 140.3 billion BTU for all heating, cooling, and electric power. This is equivalent to less than 0.04 percent of the total annual energy consumption in 2013 within Con Edison's New York City and Westchester County service area.

TABLE 12-1
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]	314,452	216.3	68,015,968
Industrial	54,276	554.3	30,085,187
Institutional	67,995	250.7	17,046,347
Large Residential (>4 Family)	163,908	126.7	20,767,144
Small Residential (1-4 Family)	46,232	94.0	4,345,808
		Total	***140,260,453***

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

E. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO-ACTION CONDITION)

Energy Supply and Transmission

The Long-Range Transmission Plan: 2014-2024, issued by Con Edison in September 2014, laid out the plan for the Con Edison transmission system, based on a detailed evaluation of transmission load areas over a ten-year period. As outlined in *The Long-Range Transmission Plan: 2014-2024*, the Gowanus Transmission Station is expected to be reconfigured in the year 2023 in order to support two new area stations that will be established in the year 2024: the Gateway Park Area Station, served from the Gowanus station, supporting 100 MW of load; and the Nevins Area Station, served from the Gowanus Station, supporting 80 MW of load. In addition, 100 MW of energy efficiency improvements are expected to be implemented system-wide in the 2030 No-Action condition, consistent with the Public Service Commission (PSC) order. *The Long-Range Transmission Plan: 2014-2024* also identified the need for system reinforcements to the Greenwood/Staten Island 138 kV transmission load area, which includes the rezoning area.

Con Edison anticipated peak demand in the New York City and Westchester County service area to increase to approximately 15,175 MW by 2024, an 11 percent increase over the estimated peak demand of 13,675 MW in 2014.

As noted above under "Recent Energy Conservation Directives," Con Edison has established the BQDM Program and is making other infrastructure investments to address the projected overloads of subtransmission feeders serving

the Brownsville No. 1 and No. 2 substations in Brooklyn. Based on the current demand forecast, these actions will allow Con Edison to defer the need for a new substation until 2026. The proposed rezoning area is served by the Brownsville substations and the current forecast does not include the specific development projected to occur as the result of the Proposed Actions.

No-Action Demand

Energy consumption under the No-Action condition would increase compared to existing conditions. Annual energy consumption estimates for each use under No-Action conditions are provided in Table 12-2. As shown in Table 12-2, it is estimated that energy demand from the 80 projected development sites would total 320.9 billion BTUs of energy annually. This represents an increase of approximately 180.7 billion BTUs over existing conditions.

TABLE 12-2
No-Action Annual Energy Consumption for the Projected Development Sites

Use	Floor Area (sf)	Average Annual Energy Use Rate (MBTU/sf)[1]	No-Action Annual Energy Use (MBTU)
Commercial[2]	653,099	216.3	141,265,314
Industrial	125,886	554.3	69,778,610
Institutional	156,972	250.7	39,352,880
Large Residential (>4 Family)	529,542	126.7	67,092,930
Small Residential (1-4 Family)	36,682	94.0	3,448,108
		Total	***320,937,841***

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

According to the New York Independent System Operator's *2014 Load & Capacity Data* report, annual energy requirements for 2024 are forecasted at approximately 165,721 GWh (or 565 trillion BTU). Of this forecasted annual energy demand, 52,556 GWh (or 179 trillion BTU) is expected to come from Zone J (New York City). The anticipated 180.7 billion BTU increase in annual energy consumption due to anticipated development on the projected developments site under the 2030 No-Action condition therefore represents approximately 0.1 percent of New York City's forecasted future total annual energy demand.

F. THE FUTURE WITH THE PROPOSED ACTIONS (WITH-ACTION CONDITION)

Energy Supply and Transmission

As noted under "The Future without the Proposed Actions," Con Edison routinely evaluates its electric transmission system and regularly updates their long-term plans to meet the forecasted demand on that system. Con Edison is utilizing alternatives such as the BQDM Program to help defer large investments such as substations. Based on that long range planning, Con Edison currently forecasts the need for a new substation by 2026. Development projected as the result of the Proposed Actions may potentially lead to utilizing additional alternatives or impacting the schedule for a new substation; however, development would occur on a site-by-site basis over time and Con Edison would have sufficient advance notice of such development to incorporate them in their long-term plans. Therefore, the Proposed Actions would not adversely affect the electric transmission system serving the area.

With-Action Demand

As described in Chapter 1, "Project Description," under the RWCDS, the total development expected to occur on the 80 projected development sites in the With-Action condition would consist of approximately 8,825,138 sf of floor area, including 6,901,057 sf of residential floor area (6,862 DU), 1,210,389 sf of commercial uses, 98,851 sf of industrial uses, and 614,842 sf of community facility uses. Compared to the No-Action condition, under the RWCDS it is anticipated that the Proposed Actions would result in a net increase of 6,312 DU, including 3,447 affordable DU; 557,290 sf of commercial uses; and 457,870 sf of community facility uses; as well as a net reduction of 27,035 sf of industrial uses.

Table 12-3 presents the With-Action land uses anticipated on the 80 projected development sites under the RWCDS, as well as their associated annual energy demands. As indicated in Table 12-3, it is estimated that energy demand from the 80 projected development sites would total 1.3 trillion BTUs of energy annually. This represents an increase of approximately one trillion BTUs over No-Action conditions. This increase in annual demand would represent approximately 0.6 percent of the City's forecasted annual energy requirement of 179 trillion BTU for 2024 and, therefore, is not expected to result in a significant adverse impact on energy systems.

TABLE 12-3
With-Action Annual Energy Consumption for the Projected Development Sites

Use	Floor Area (sf)	Average Annual Energy Use Rate (MBTU/sf)[1]	With-Action Annual Energy Use (MBTU)	Incremental Annual Energy Use (MBTU) over No-Action Conditions
Commercial[2]	1,210,389	216.3	261,807,141	+120,541,827
Industrial	98,851	554.3	54,793,109	-14,985,501
Institutional	614,842	250.7	154,140,889	+114,788,009
Large Residential (>4 Family)	6,901,057	126.7	874,363,922	+807,270,992
Small Residential (1-4 Family)	0	94.0	0	-3,448,108
		Total	***1,345,105,061***	***+1,024,167,220***

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

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 conditioning 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 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, then there would be a reduction in the energy load forested in Table 12-3.

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