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 projects resulting in new construction would not create significant energy impacts, and, as such, do not require a detailed energy assessment. However, a proposed project's operational energy consumption should be estimated.

As described in Chapter 1, "Project Description," the reasonable worst case development scenario (RWCDS) With-Action condition for the proposed action consists of approximately 1,147 dwelling units (DUs), of which approximately 344 DUs would be affordable housing DUs (30 percent of the total); 64,807 gross square feet (gsf) of local retail space; approximately 128,128 gsf of parking space, consisting of 427 spaces, as required by zoning; and approximately 26,000 sf of publicly-accessible open space.

As stated in the *CEQR Technical Manual*, in lieu of a detailed assessment, which is generally limited to projects 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 action/RWCDS is disclosed in this chapter.

B. PRINCIPAL CONCLUSIONS

The proposed action/RWCDS would not result in a significant adverse impact on energy systems. Development facilitated by the proposed action is expected to create an increased demand on energy systems, including electricity and gas. It is estimated that With-Action development in the project area would result in an increase of approximately 159.4 million MBTUs[1] in its annual energy use as compared to No-Action conditions. As the project area would be vacant under RWCDS No-Action conditions, this would represent the action-generated incremental increase in annual energy consumption attributable to the proposed action. This increase in annual demand would represent approximately 0.02 percent of New York City's annual energy consumption of 1 trillion MBTUs[2] and is not expected to result in a significant adverse impact on energy systems.

[1] 1.0 BTU (British Thermal Unit) is the quantity of heat required to raise one pound of water by one degree Fahrenheit. Given the scale of numbers discussed, the *CEQR Technical Manual* converts BTUs to MBTUs, where 1 BTU = 1,000 BTUs (M referring to the Roman numeral for 1,000).

[2] See "Economic Snapshot: A Summary of New York City's Economy," NYC EDC Economic Research and Analysis, July 2013. Note: 1 trillion MBTUs is equivalent to 1 billion MMBTUs; 1 MMBTU = 1 million BTU.

Moreover, any new developments resulting from the proposed action 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 potential impacts on energy of the proposed action/RWCDS, 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 action for 2019, 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 project area under existing, No-Action, and With-Action conditions and the net change in energy consumption, which represents the proposed action's anticipated energy use.

In accordance with *CEQR Technical Manual* methodology, this chapter uses the *CEQR Technical Manual*'s Table 15-1 to estimate annual energy consumption as a result of the proposed action/RWCDS. The measure of energy use in this chapter is MBTU per square foot of building floor area per year.

D. EXISTING CONDITIONS

Energy Supply and Transmission

Consolidated Edison Company of New York, Inc. (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. As of the end of 2014, Con Edison's distribution system had a transformer capacity of 29,474 mega volt ampere (MVA), with 36,934 miles of overhead distribution lines and 98,327 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 705 MW.[3]

In 2014 (the latest year for which data is available), annual electricity usage in Con Edison's service area[4] totaled approximately 56.3 billion kilowatt hours (KWH), or 192.1 trillion BTU. In addition, Con Edison supplied approximately 154.9 trillion BTU of natural gas[5] and approximately 27.6 trillion BTU of steam in 2014. Overall, approximately 374.6 trillion BTU of energy was consumed in 2014 within Con Edison's New York City and Westchester County service area.[6]

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, 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

[3] Con Edison, *2014 Annual Report.*

[4] 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.

[5] National Grid supplies natural gas to Brooklyn including to the project area.

[6] Con Edison, *2014 Annual Report.*

existing buildings. Specifically, these laws call for annual benchmarking (requiring the submission of reports of energy performance measurements), energy audits, retro-commissioning, lighting upgrades, and sub-metering of commercial tenant space. More recently, under Local Laws 132, 133, and 134 of 2016, also known as the Local Law 84 Amendment, stricter standards were adopted including reducing the threshold for benchmarking of privately owned buildings from 50,000 square feet (sf) to 25,000 sf. Buildings covered by the updated requirement encompass nearly 350 million square feet and represent 57 percent of all building space in the City, 70 percent of the City's carbon pollution and 95 percent of its electricity use, making this law both targeted and high-impact. As an indication of the effect of benchmarking, New York's benchmarked buildings realized 6 percent energy savings and 8 percent carbon savings from 2010 to 2013.[7] By 2030, these laws are expected to reduce greenhouse gas (GHG) emissions by at least five percent citywide.[8]

The City has also taken steps to enable private property owners to install renewable energy systems on their buildings. The City Planning Commission and City Council approved the "Zone Green" zoning text amendment in 2012 to more flexibly allow rooftop solar and wind facilities, as well as better insulation.

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.[9] The Program includes, among others, customer-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

As described in Chapter 1, "Project Description," the project area is vacant and as such is considered to generate negligible energy demand under existing conditions.

[7] "Greener, Greater Mid-sized Buildings in NYC." Urban Green Council, 13 October 2016. Accessed April 2016. < http://urbangreencouncil.org/content/news/greener-greater-mid-sized-buildings-nyc>

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

[9] 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.

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

Energy Supply and Transmission

The Long-Range Transmission Plan: 2015-2025, issued by Con Edison in October 2015, 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: 2015-2025, 100 MW of energy efficiency improvements are expected to be implemented system-wide, consistent with the Public Service Commission (PSC) order.

Con Edison anticipated peak demand in the New York City and Westchester County service area to increase to approximately 14,350 MW by 2020 (a four percent increase over the 2015 estimated peak demand of 13,775 MW) and 15,050 MW by 2025 (a nine percent increase over the 2015 estimated peak demand).

No-Action Demand

As outlined in Chapter 1, "Project Description," under RWCDS No-Action conditions, the project area is projected to remain vacant. As such, similar to existing conditions, the project site would not generate any energy demand in the 2019 RWCDS No-Action condition.

According to the New York Independent System Operator's 2015 *Load & Capacity Data* report, annual energy requirements for 2019 are forecasted at approximately 158,099 gigawatt hours (GWh) (or 539.5 billion MBTU) for the statewide New York Control Area power system. Of this forecasted annual energy demand, 51,873 GWh (or 177 billion MBTU) is expected to come from NYCA Zone J (New York City).

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

Energy Supply and Transmission

As noted under "The Future without the Proposed Action," Con Edison routinely evaluates its electric transmission system and regularly updates their long-term plans to meet the forecasted demand on that system.

With-Action Demand

As described in Chapter 1, "Project Description," the RWCDS With-Action condition for the proposed action consists of approximately 1,147 dwelling units (DUs), of which approximately 344 DUs would be affordable housing DUs (30 percent of the total); 64,807 gross square feet (gsf) of local retail space; approximately 128,128 gsf of parking space, consisting of 427 spaces, as required by zoning; and approximately 26,000 sf of publicly-accessible open space.

Table 11-1 presents the RWCDS 2019 With-Action land uses anticipated in the project area under the RWCDS, as well as their associated annual energy demands. As indicated in Table 11-1, it is

estimated that energy demand from the project area would total 159.4 million MBTUs of energy annually. This increase in annual demand would represent less than 0.02 percent of the City's current annual energy consumption of 1 trillion MBTU and, therefore, is not expected to result in a significant adverse impact on energy systems.

Table 11-1, With-Action/Increment Annual Energy Consumption for the Project Area

Use	Floor Area (sf)	Average Annual Energy Use Rate (MBTU/sf)[1]	With-Action Annual Energy Use (MBTU)
Commercial	64,807	216.3	14,017,754
Large Residential (>4 Family)	1,147,202	126.7	145,350,493
		Total	***159,368,247.5***

Note: As the project area would be vacant under RWCDS No-Action conditions, the annual energy consumption under With-Action also represents the action-generated increment.
[1] From Table 15-1 of the *CEQR Technical Manual.* 1 MBTU = 1,000 BTUs

Additionally, the proposed action/RWCDS 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 in the project area, then there would be a reduction in the energy load forecasted in Table 11-1.

Based on the above information, no significant adverse energy impacts would result from the proposed action/RWCDS.