Chapter 12: Energy

12.1 Introduction

According to the New York *City Environmental Quality Review (CEQR) Technical Manual*, new building and alteration projects are subject to the New York City Energy Conservation Code (NYCECC), which reflects State and City energy policy. 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. Therefore, this chapter provides an estimate of additional energy consumption associated with the Proposed Actions. As described in Chapter 1, "Project Description," the Jerome Avenue Rezoning consists of a series of land use actions (collectively, the "Proposed Actions") intended to facilitate the implementation of the objectives of the Jerome Avenue Neighborhood Plan (the "Plan"). The affected area comprises an approximately 92-block area primarily along Jerome Avenue and its east west commercial corridors in Bronx Community Districts (CDs) 4, 5, and 7 (the "rezoning area"). The rezoning area is generally bounded by 184th Street to the north and East 165th Street to the south, and also includes portions of 183rd Street, Burnside Avenue, Tremont Avenue, Mount Eden Avenue, 170th Street, Edward L. Grant Highway, and East 167th Street. Per the Reasonable Worst-Case Development Scenario (RWCDS), the Proposed Actions would result in an incremental development of 3,208,424 sf of residential floor area, (3,228 DUs), 20,866 sf of commercial uses, and 72,273 sf of community facility uses.

This chapter identifies the amount of energy that would be consumed as a result of the long-term operation of the buildings and uses resulting from the Proposed Actions and provides a comparison of estimates with the No-Action and With-Action conditions.

12.2 Principal Conclusions

According to the Energy assessment conducted, the Proposed Actions would not result in a significant adverse impacts related to energy systems. The estimated development in the With- Action conditions would result in an increase in annual demand of approximately 402.6 billion British thermal units (BTUs) over the No-Action condition. This increase in annual demand would be approximately 0.24 percent of New York City's (Zone J) 2026 forecasted future energy demand requirement of 171 trillion BTUs and 0.08 percent of all of Con Edison's service area's 2026 forecasted future energy demand of 535 trillion BTUs. Therefore, it is not expected to have a significant adverse impact on energy systems. In addition, any new development resulting from the Proposed Actions would be required to comply with the New

York City Energy Conservation Code (NYCECC) which governs performance requirements for heating, ventilation and air conditioning systems (HVAC) and exterior building envelope of new buildings.

12.3 Methodology

According to the *CEQR Technical Manual,* in order to assess the Proposed Actions' potential impacts on energy it is necessary to do the following:

- Present the existing data on energy distribution and usage;
- Using the *CEQR Technical Manual* for energy consumption rates by land use, determine future energy demands with and without the Proposed Actions for the analysis year 2026; and
- Assess the effect of the incremental demand on the local energy distribution system and the regional supplies.

The net increase in energy consumption of the proposed development sites identified in the RWCDS for the Proposed Actions between existing, No-Action and With-Action conditions ("projected development sites") are included in this chapter. Because the calculation of energy demand is a density-based analysis, only the development anticipated on the 45 projected development sites is included in this assessment.

The *CEQR Technical Manual* recognizes that a detailed energy model would not be possible when the Proposed Actions are a result of a rezoning and the resultant development of the sites would not be controlled by the applicant. Therefore, the Proposed Actions' energy consumption is estimated based in Table 15-1 of the *CEQR Technical Manual*, which provides the average annual energy consumption rates in New York City for various land uses. The measure of energy used in this chapter is British Thermal Units (BTUs) per year. One BTU is the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit. These energy consumption estimates are used for estimating existing conditions as well as the projected development sites with the No-Action and With-Action conditions.

12.4 Existing Conditions

ENERGY SUPPLY AND TRANSMISSION

Electricity used in New York City is generated both within and outside the City and is delivered to most New York City users by Con Edison, with a small number of users in the Rockaways receiving power from the PSE&G – Long Island. Electrical energy is supplied by both non-renewable (oil, natural gas, coal, uranium) and renewable (hydroelectricity, biomass fuels, solar and wind power) sources.

Through a series of area and transmission substations, Con Edison provides the transmission of electrical power throughout the City. Transmission substations receive electricity from the regional high voltage transmission system and reduce the voltage to a level that can be delivered to the area substations. Voltage is further reduced at these area substations to a level that can be delivered to the distribution system (known as the "grid"). Within the grid, voltage is reduced again for delivery to customers. Each area substation services a particular geographic area, known as a "network." These networks are isolated from the rest of the local distribution system so that if one network goes out of service, the outage would be localized to that network area and would not spread to other parts of the City. Substations are designed with capacity to expand the network.

Con Edison currently has 62 area distribution substations and various distribution facilities located throughout New York City and Westchester. As of December 31, 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. Con Edison's electric generating facilities consist of plants located in Manhattan with an aggregate capacity of 724 megawatts (MW).[1]

In 2015, annual electricity usage in Con Edison's service area was approximately 57.0 billion kilowatt hours (194.5 trillion BTUs). Con Edison also supplied approximately 156.4 trillion BTUs of natural gas and approximately 26.3 trillion BTUs of steam in 2015. Within Con Edison's service area, there was a total of 377.2 trillion BTUs of energy consumed in 2015.[2]

Con Edison's *2015 Annual Report*, estimates that the peak electrical demand for New York City in the summer of 2015 was 12,316 MW. The system peak of 13,322 MW was set in July of 2013. Con Edison estimates an average annual growth of the peak electric demand in its service area to be approximately 0.2 percent per year over the next five years. 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 to be able to withstand the two

[1] Con Edison, *2015 Annual Report*

[2] Con Edison Service Area: Electricity to NYC (except parts of Queens) and most of Westchester; gas to Manhattan, the Bronx, parts of Queens and most of Westchester; and steam in Manhattan south of 96th Street.

worst (non-simultaneous) contingencies without equipment loading that exceeds the designated emergency rating of that equipment and would not result in the loss of any customer service and, following corrective actions, would not result in equipment loading that exceed the designated normal rating of that equipment.

RECENT ENERGY CONSERVATION DIRECTIVES

In order to reach its aggressive sustainability goals, the City enacted the Greener Greater Building Plan (GGBP) comprised of four laws passed by City Council in 2009 to proactively address energy waste in large existing buildings. Specifically, these laws call for annual benchmarking, energy audits, retro-commissioning, lighting upgrades and sub-metering of commercial tenant space. The square footage of these properties are highly concentrated; this translates into 15,000 properties that are over 50,000 square feet, which account for almost half of New York City's square footage and as much as 48 percent of New York City's total energy use. These laws are targeted to large buildings that tend to have more sophisticated management and more financial and technical resources than smaller buildings. In September of 2014, the City committed to an 80 percent reduction of greenhouse gas emissions by 2050[3].

In April of 2012, the City Council adopted the Zone Green Text Amendment to remove zoning impediments to the construction and retrofitting of green buildings. It gives owners more choices for investments to save energy, money and improve environmental performance. The amendment allows for more flexibility for installation of things like energy efficient walls, sun control devices on the building façade, solar energy panels, rooftop equipment, wind turbines, electric car charging stations, etc.

In April of 2015, the de Blasio administration announced, “One New York: The Plan for a Stronger and Just City,” (OneNYC). OneNYC is a comprehensive plan for a sustainable and resilient city for all New Yorkers. OneNYC addresses long-term challenges facing New York City, including a population of nine million people by 2040, changing climate conditions, an evolving economy and aging infrastructure. It includes efforts to reduce greenhouse gas (GHG) emissions by upgrading buildings to be more energy efficient and powering buildings with renewable sources of energy. By doing so, homes are more affordable, and new jobs and businesses are created, in addition to advancing sustainability.

EXISTING DEMAND

The energy rates provided by Table 15-1 of the *CEQR Technical Manual* were utilized to estimate the existing annual energy consumption. Table 12-1, “Existing Annual Energy Consumption for the

[3] *One City, Built to Last: Transforming New Yok City’s Buildings for a Low-Carbon Future*, 2014.

Projected Development Sites," shows the existing annual energy of the current land uses of the 45 projected development sites. The total is estimated to be approximately 124 billion BTUs for all heating, cooling and electric power, which is equivalent to approximately 0.03 percent of the total annual energy consumption in 2015 within Con Edison's New York City service area.

Table 12-1: Existing Annual Energy Consumption for the Projected Development Sites

Land Use	Average Yearly Energy Use Rate (MBTU/sf)[1]	Floor Area (SF)	Yearly Energy Use (MBTU)
Residential[2]	126.7	80,258	10,168,689
Commercial[3]	216.3	471,512	101,988,046
Industrial[4]	554.3	0	0
Community Facility[5]	250.7	46,799	11,732,509
		Total	**123,889,244**

Notes:
[1]Energy generation is based on citywide average rates presented in Table 15-1 of the CEQR Technical Manual
[2]Residential: Data provided by Jerome Avenue Rezoning Environmental Assessment Statement, August 29, 2016.
[3]Commercial: Data provided by Jerome Avenue Rezoning Environmental Assessment Statement, August 29, 2016.
[4]Industrial use: Data provided by Jerome Avenue Rezoning Reasonable Worst-Case Development Scenario
[5]Community Facility: Data provided by Jerome Avenue Rezoning Environmental Assessment Statement, August 29, 2016.

Source: New York City Department of City Planning, 2017; CSA Group, 2017.

12.5 The Future without the Proposed Actions (No-Action Condition)

ENERGY SUPPLY AND TRANSMISSION

The Long Range Transmission Plan for 2016-2026 (The Plan) issued by Con Edison in October of 2016 lays out Con Edison's transmission system over a ten year planning horizon. According to The Plan, no deficiencies were identified within the rezoning area. No new transmission stations were found to be required for the ten-year period studied, however the Gowanus transmission station will be expanded to support two new area substations by the year 2026.

Con Edison anticipates peak demand in New York City and Westchester County area to increase to approximately 13,900 MW in 2026, a 1.8 percent increase over the peak demand of 13,650 estimated for 2016.

NO-ACTION DEMAND

Energy consumption in the No-Action condition will increase compared to existing conditions. Annual energy consumption estimates for each use in the No-Action condition are provided in Table 12-2, "No-Action Annual Energy Consumption for the Projected Development Sites." As shown in Table 12-2, it is estimated that energy demand from the 45 projected development sites will total 275.8 billion BTUs of energy annually. This represents an increase of approximately 152 billion BTUs over existing conditions.

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

Land Use	Average Yearly Energy Use Rate (MBTU/sf)[1]	Floor Area (SF)	Yearly Energy Use (MBTU)
Residential[2]	126.7	894,761	113,366,219
Commercial[3]	216.3	532,608	115,203,110
Industrial[4]	554.3	47,795	26,492,769
Community Facility[5]	250.7	82,919	20,787,793
		Total	**275,849,891**

Notes:
[1]Energy generation is based on citywide average rates presented in Table 15-1 of the CEQR Technical Manual
[2]Residential: Data provided by Jerome Avenue Rezoning Environmental Assessment Statement, August 29, 2016.
[3]Commercial: Data provided by Jerome Avenue Rezoning Environmental Assessment Statement, August 29, 2016.
[4]Industrial use: Data provided by Jerome Avenue Rezoning Environmental Assessment Statement, August 29, 2016.
[5]Community Facility: Data provided by Jerome Avenue Rezoning Environmental Assessment Statement, August 29, 2016.

Source: New York City Department of City Planning, 2017; CSA Group, 2017.

According to the *New York Independent System Operator's 2016 Load & Capacity Data report*, annual energy requirements for 2026 are forecasted at approximately 156,777 GWh (or 535 trillion BTUs). Of this forecasted annual energy demand, 50,066 GWh (or 171 trillion BTUs) is expected to come from Zone J (New York City). The anticipated 275.8 billion BTUs increase in annual energy consumption due to anticipated development on the projected developments sites in the 2026 No-Action condition therefore represents approximately 0.05 percent of Con Edison's service area's forecasted future total annual energy demand of 535 trillion BTUs and 0.16 percent of New York City's (Zone J) forecasted future total energy demand of 171 trillion BTUs.

12.6 The Future with the Proposed Actions (With-Action Condition)

ENERGY SUPPLY AND TRANSMISSION

As discussed above, Con Edison regularly updates their long-term plans to meet forecasted demand on the system and currently no new transmission substations were found to be required by 2026. While it is possible that projected developments in the With-Action plan could potentially lead to utilizing additional alternatives, upgrades or impacting the future schedule for a new substation, development would occur on a site by site basis over an extended period of time. Con Edison would have sufficient advance notice of all developments which would allow them to incorporate them into their long-term plans. Therefore, the With-Action condition would not adversely affect the electric transmission system serving the area.

WITH-ACTION DEMAND

As described in Chapter 1, "Project Description," worst case development expected to occur on the 45 projected development sites in the With-Action condition would include 4,103,185 sf of residential floor area, (4,008 DUs), 553,474 sf of commercial uses, and 155,192 sf of community facility uses. Compared to the No-Action condition, the proposed With-Action condition would result in a net increase of 3,228 DUs, 20,866 sf of commercial use and 72,273 sf of community facility uses.

Energy consumption in the With-Action condition would increase compared to existing conditions. Annual energy consumption estimates for each use in the With-Action condition are provided in Table 12-3, "With-Action Annual Energy Consumption for the Projected Development Sites." As shown in Table 12-3, it is estimated that energy demand from the 45 projected development sites would total 678.5 billion BTUs of energy annually. This represents an increase of approximately 554.5 billion BTUs over existing conditions and an increase in 402.6 billion BTUs over the No-Action condition.

The anticipated 402.6 billion BTU increase in annual energy consumption due to development in the With-Action condition therefore, represents approximately 0.24 percent of New York City's future total energy demand of 171 Trillion BTUs as well as approximately 0.08 percent of Con Edison's service area's future total annual energy demand of 535 trillion BTUs. Therefore, the With-Action condition is not expected to result in a significant impact on energy systems.

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

Land Use	Average Yearly Energy Use Rate (MBTU/sf)[1]	Floor Area (SF)	Yearly Energy Use (MBTU)	Incremental Annual Energy Use (MBTU) over No-Action Condition
Residential[2]	126.7	4,103,185	519,873,540	406,507,321
Commercial[3]	216.3	553,474	119,716,426	4,513,316
Industrial[4]	554.3	0	0	-26,492,769
Community Facility[5]	250.7	155,191	38,906,384	18,118,590
		Total	**678,496,349**	**402,646,459**

Notes:
[1]Energy generation is based on citywide average rates presented in Table 15-1 of the CEQR Technical Manual
[2]Residential: Data provided by Jerome Avenue Rezoning Reasonable Worst-Case Development Scenario.[3]Commercial: Data provided by Jerome Avenue Rezoning Reasonable Worst-Case Development Scenario.
[4]Industrial use: Data provided by Jerome Avenue Rezoning Reasonable Worst-Case Development Scenario.
[5]Community Facility: Data provided by Jerome Avenue Rezoning Reasonable Worst-Case Development Scenario.

Source: New York City Department of City Planning, 2017; CSA Group, 2017.

In addition, new developments resulting from the With-Action condition would be required to comply with the New York City Energy Conservation Code (NYCECC), which governs performance requirements of HVAC and the exterior building envelopes of any new construction. To be in compliance with NYCECC, new developments must meet standards for energy conservation, including energy efficiency and combined thermal transmittance. If voluntary utilization of high performance standard design is

installed on projected development sites there would be an even greater reduction in energy consumption than what is indicated in Table 12-3.

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