Chapter 12: 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 2020 *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," the Applicant (a joint venture between Kaufman Astoria Studios, BedRock Real Estate Partners, and Silverstein Properties) is seeking a series of land use actions, including zoning map amendments, zoning text amendments, and special permits (the Proposed Actions), to facilitate the Applicant's intended development and programming. The area subject to the Proposed Actions is the five city blocks bounded by 35th Avenue to the north, 43rd Street/Northern Boulevard to the east, 36th Avenue to the south and 37th Street to the west (the "Project Area") in the Astoria neighborhood of Queens in Community District 1. The Project Area (Blocks 641, 668, 669, 670, and 671) contains 43 lots, of which 21 are controlled by the Applicant while the remaining lots are controlled by others. With the Proposed Actions, the Applicant-controlled lots would be controlled by a Large Scale General Development (LSGD) Special Permit and would contain the Proposed Development (referred to as the "Development Site"). The 22 lots outside of the Development Site that are not controlled by the Applicant would be rezoned with approval of the Proposed Actions (referred to as the "Additional Affected Area").

The Proposed Development (branded as the Innovation QNS project) would redevelop the Development Site with a series of mixed-use buildings and publicly accessible open spaces. Innovation QNS is intended to create a series of arts and cultural venues including a multi-purpose arts and culture center, a re-envisioned multiplex movie theater that would provide a state of the art cinematic experience, galleries, artists' workshops and tech and general office space. In addition to art and cultural venues, the project would include eating and drinking establishments, a grocery store and world market and other local retail, service and community facility uses to support the new residential population, the existing business and residential community and provide a strong anchor for the Steinway Street and 35th Avenue commercial corridors.

In addition to the Proposed Development with approximately 2.9 million gsf of space, the Proposed Actions would facilitate the redevelopment of several projected development sites in the Additional Affected Area that are not controlled by the Applicant. These additional developments would include approximately 800,000 gsf of residential and commercial space, similar to the Proposed Development. Therefore, the Proposed Actions would facilitate the development of a total of approximately 3.7 million gsf in the Project Area.

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.

PRINCIPAL CONCLUSIONS

A preliminary analysis was conducted based on the methodology set forth in the *CEQR Technical Manual* and determined that the Proposed Actions would not result in a significant adverse impact related to energy systems. Development assumed in the future with the Proposed Actions (the With Action condition), would result in demand of approximately 534,063,294 thousand British thermal units (MBTUs) of energy per year, which represents an increase of approximately 443,470,023 as compared with future conditions without the Proposed Actions (the No Action condition). The total With Action energy consumption represents an increase of approximately 0.29 percent of the projected service demand for New York City in the 2032 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 development must meet standards for energy conservation, which include requirements related 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, detailed below. Therefore, no significant adverse impacts related to energy are expected to occur.

B. 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 2032, 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 in the Project Area identified in the reasonable worst-case development scenario (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 Projected Development Sites (A through K) form the basis for this assessment of energy demand.

According to the *CEQR Technical Manual*, for projects that would rezone an area where projected development would occur on development sites not controlled by the applicant, 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 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.

C. 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 (including 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 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 nine 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 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 2018, Con Edison's distribution system had a transformer capacity of 32,872 mega volt ampere (MVA), with 34,399 miles of overhead distribution lines and 96,307 miles of underground distribution lines. The underground distribution lines represent the longest underground electric delivery system in the country. In 2018, the total Con Edison New York City generation capacity was 9,559 megawatts (MW),[2] and annual electricity usage in Zone J of Con Edison's service area (which includes New York City) totaled approximately 53,360 GigaWatt hours (GWh), or 182 trillion BTU. 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 as to achieve 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.

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

[2] New York Independent System Operator (NYISO) *Load and Capacity Data* Gold Book, 2019.

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 buildings of this size represent just 2 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.[3]

As discussed in the "Public Policy" section of 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 one of the most sustainable big cities in the world, 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 ambitious 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 12-1**, current annual energy use on the Projected Development Sites is estimated to be approximately 87,319,137 MBTU for all heating, cooling, and electric power. This is equivalent to approximately 0.05 percent of the total annual energy consumption as of 2018 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—Retail	104,761	216.3	22,659,804
Commercial—Cinema	98,810	216.3	21,372,603
Manufacturing/Warehouse/ Auto-Related[2]	196,859	216.3	42,580,602
Small Residential (1-4 Family)	7,512	94	706,128
Total			**87,319,137**

Notes:
[1] From Table 15-1 of the *CEQR Technical Manual.*
[2] Existing light manufacturing, auto-related, and warehouse uses assumed to consume energy at the rate of commercial space.
Source: 2020 *CEQR Technical Manual*.

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

D. 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 12-2**. As shown in the table, it is estimated that energy demand from the Projected Development Sites would total approximately 90,593,271 MBTU of energy annually. This represents an increase of approximately 3,274,134 MBTUs over the 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]	Anticipated Annual Energy Use (MBTU)
Commercial—Retail	136,042	216.3	29,425,885
Commercial—Cinema	98,810	216.3	21,372,603
Commercial—Supermarket	30,000	216.3	6,489,000
Manufacturing/Warehouse/ Auto-Related[2]	150,715	216.3	32,599,655
Small Residential (1-4 Family)	7,512	94	706,128
Total			**90,593,271**

Notes:
[1] From Table 15-1 of the *CEQR Technical Manual.*
[2] Existing/No Action light manufacturing, auto-related, and warehouse uses assumed to consume energy at the rate of commercial space.
Source: 2020 *CEQR Technical Manual*

According to the New York Independent Systems Operator's (NYISO) 2019 *Load and Capacity Data* report,[4] annual energy requirements for the 2032 Build Year are forecast to be approximately 157,486 GWh (or 537 trillion BTU). Of this forecast annual energy demand, 53,448 GWh (or 182 trillion BTU) is expected to come from Zone J, which includes New York City. The anticipated 90,593,271 MBTU use in annual energy consumption due to development on the Projected Development Sites under the No Action condition represents less than 0.05 percent of New York City's forecast future total annual energy demand.

E. THE FUTURE WITH THE PROPOSED ACTIONS

Table 12-3 presents the land uses as anticipated under With Action condition on the 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 Projected Development Sites would total 534,063,294 MBTUs of energy annually. This represents an increase of approximately 443,470,023 MBTUs over the No Action condition. The total With Action energy consumption represents an increase of approximately 0.29 percent of the City's forecasted annual energy requirement of 182 trillion BTU; therefore, the Proposed Actions are not expected to result in a significant adverse impact on energy systems.

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 development must meet standards for energy conservation, which include requirements relating

[4] NYISO's 2019 *Load and Capacity Data* report forecast annual energy requirements up until 2026, six years before the proposed Build Year (2032) of the Proposed Actions. The forecast energy requirements for 2026 were used as the basis of the No Action and With Action conditions.

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 12-3**.

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]	Anticipated Annual Energy Use (MBTU)
Commercial—Retail[2]	189,915	216.3	41,078,593
Commercial—Cinema	73,000	216.3	15,789,900
Commercial—Supermarket	30,000	216.3	6,489,000
Commercial—Office	250,070	216.3	54,090,141
Community Facility[3]	107,720	216.3	23,299,836
Large Residential (>4 Family)	3,104,308	126.7	393,315,824
Total			**534,063,294**

Notes:
[1] From Table 15-1 of the *CEQR Technical Manual.*
[2] Includes retail and Physical Culture Establishment (PCE) space.
[3] Community Facility space includes medical office, performing arts center, daycare, and community center space, which are assumed to consume energy at the rate of commercial space.
Source: 2020 *CEQR Technical Manual*

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