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 2020 Energy Conservation Construction Codes of New York State (ECCCNYS), in addition to a series of local laws. Therefore, according to the 2021 *City Environmental Quality Review (CEQR) Technical Manual*, the amount of energy that the Proposed Actions would consume annually as a result of the day-to-day operation of the projected development sites is estimated. Most projects resulting in new construction would not create significant energy impacts, and, as such, do not require a detailed energy assessment.[1] However, operational energy consumption should be estimated to ensure the City's existing energy infrastructure would not be significantly impacted.

PRINCIPAL CONCLUSIONS

The Proposed Actions would result in an annual energy consumption of up to 1,403,655~~1,289,440~~ million British thermal units per year (MMBtu/year) across all development sites. The portion of this energy consumption that would be provided by the regional electric grid would be between 293,978~~272,030~~ mega watt-hours (MWh) and ~~290,729~~351,032 MWh of electricity consumed per year—depending on whether buildings are designed to use fossil fuels or a fully electric system, respectively. In the 2035 analysis year, this is anticipated to be approximately 0.6~~5~~ percent of New York City's predicted future total annual baseline electricity energy demand. This represents an increase of approximately 1,040,288~~989,517~~ MMBTUs as compared with the No Action condition, and with 211,391~~202,143~~ to 253,947~~216,979~~ MWh of incremental electricity consumption. The Proposed Project 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) New York City and Westchester County service area. Therefore, the Proposed Actions would not result in a significant adverse impact related to energy.

B. METHODOLOGY

To assess the potential impact of the Proposed Actions on energy, this chapter calculates the annual energy consumption of the projected development sites under existing and

[1] A detailed assessment of energy impacts is usually limited to projects that may significantly affect the transmission or generation of energy, per the *CEQR Technical Manual*.

With Action conditions as well as the net change in energy consumption, which represents the anticipated energy use in the future with the Proposed Actions.

In order to estimate each building's annual energy consumption, whole-building energy simulations of preliminary/conceptual design of two representative building typologies in the Project Area were prepared using the Department of Energy's (DOE) eQuest building energy model. The eQUEST model runs on the DOE-2 engine and has been approved to demonstrate a building's energy consumption for sustainability and energy certifications. The model allows detailed analysis of varying building designs and technologies via building energy use simulations.

The two representative models simulate two mixed-use building typologies representative of the projected development sites–one 12-story residential building and one 10-story office building where for each, the first floor is a retail use type. The residential/retail building has 117,698 gross square feet (gsf) and the office/retail building has 158,734 gsf. The window to wall ratio is modeled as 27 percent. Due to the ambiguous nature of early planning stages, the model uses industry standard practices, DOE national default data, or ASHRAE 90.1 design requirements, consistent with the NYCECC.

The estimated annual energy consumption from buildings under the Proposed Action with life science or manufacturing as the primary use type is based on energy consumption rates for typical buildings using fossil fuel fired HVAC and hot water systems within the Northeast region reported in the latest energy consumption information collected by the US Energy Information Administration (EIA) for commercial[2] buildings.

For each ~~representative~~ building, the ~~model~~ analysis estimated energy consumption ~~conservatively~~ under two scenarios: ~~assumed~~ 1) assuming a development site would be developed early and would ~~the~~ use a ~~of~~ natural gas-fired heating and hot water systems; and 2) assuming a development site would be designed as a fully electrified building. ~~However, a~~As the City phases out fossil fuels for new buildings under Local Law 154 of 2021, development sites may submit applications of construction documents before 2028—the year when all buildings would be prohibited to use any substance that emits 25 kg CO2e/MMBtu. Based on the conceptual Reasonable Worst-Case Development Scenario (RWCDS) construction schedule, construction activities would be spread out over a period of approximately 10 years and approximately 13 projected development sites are anticipated to begin construction before 2028 while the remaining development sites would be prohibited from utilizing fossil fuel systems. However, the analysis considered the maximum energy consumption between the two operating scenarios.

Furthermore, the analysis conservatively estimates electricity consumption by not including electricity generated through on-site renewable sources that the design of an individual development site may include to demonstrate compliance with the solar/green roof requirements of Local Laws 92/94 of 20219.

[2] EIA. *2018 Commercial Building Energy Consumption Survey (CBECS) Data*. https://www.eia.gov/consumption/commercial/data/2018/

Consequently, energy consumption assuming a fully electric building system was prepared alongside the assumption of fossil fuel systems to assess the maximum demand the Proposed Actions would have on the existing electric grid.

C. EXISTING CONDITIONS

ENERGY GENERATION

Within New York City, electricity is generated and delivered to most users by Con Edison, although some of the electricity delivered by Con Edison is generated by independent power producers. 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 and natural gas) 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 from 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 system. 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. In 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. As of 2023, the total Con Edison New York City generation capacity was 9,593 megawatts (MW), and annual electricity usage in Zone J of Con Edison's service area (which includes New York City) totaled approximately 53,710 GigaWatt hours (GWh), or 183 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.

RECENT ENERGY CONSERVATION DIRECTIVES

In 2019, the New York City Council enacted the Climate Mobilization Act: a legislative package targeting increased energy efficiency, utilization of roof space for installation of

solar energy sources/green roofing, and reductions in greenhouse gas (GHG) emissions associated with building energy use in order to meet the City's climate change goals. The legislation aims to reduce buildings' greenhouse gas emissions, which currently account for approximately 70 percent of the citywide total, by 40 percent in 2030 and 80 percent by 2050 by compelling building owners to retrofit existing buildings and developers to design new buildings that are more energy efficient or be subject to prescribed financial penalties. The Climate Mobilization Act also established the Office of Building Energy and Emissions Performance at the New York City Department of Buildings (DOB), which oversees implementation of the law, the creation of a method to assess building energy use, and development of a set of rules for establishing emissions limits.

Furthermore, in 2020, the City brought the NYCECC up to date by adopting the 2020 ECCCNYS, which substantially increased the stringency of the building energy efficiency requirements and adopted the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) 90.1-2016 standard as a benchmark, and aligns with NYStretch Energy Code 2020 developed by New York State Energy Research and Development Authority (NYSERDA). The NYCECC governs performance requirements for HVAC systems, as well as the exterior building envelope of new buildings.

D. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO ACTION CONDITION)

In the No Action condition, it is anticipated that existing buildings would remain. **Table 13-1** presents the land uses anticipated in the No Action condition and their associated annual energy demands. As shown in **Table 13-1**, it is estimated that energy demand will be 363,366~~299,923~~ MMBtus/year in the No Action condition. Approximately 82,587~~69,887~~ MWh (281,798~~238,465~~ MMBtu) of the building energy would be provided by the regional electric grid.

E. THE FUTURE WITH THE PROPOSED ACTIONS (WITH ACTION CONDITION)

In the With Action condition, new mixed-use buildings would be constructed within the Project Area increasing the number of residential units from 2,311 to 17,010—an increment of 14,699 units. Electrical service to the new buildings would be delivered by Con Edison. **Table 13-2** presents the land uses anticipated in the With Action condition and their associated annual energy demands. As shown, it is estimated that energy demand from the development sites would be 1,403,655~~1,289,440~~ MMBTUs/year in the With Action condition. Approximately 293,978~~272,030~~ MWh (1,003,095~~928,206~~ MMBtu) of the building energy would be provided by the regional electric grid.

Table 13-1
No Action Annual Energy Consumption for the Development Sites

Building Typology	Size (gsf)	Energy Source	Average Annual Energy Rate (kBTUs/sf) (1)	Energy Consumption (MMBTUs/Year)
Projected Development Sites				
Mixed Residential Buildings	2,668,991 ~~2,860,688~~	Natural Gas	18.42	49,165 ~~52,697~~
		Electricity	40.32	107,610 ~~115,339~~
Mixed Commercial Buildings	2,944,524 ~~3,376,453~~	Natural Gas	2.59	7,641 ~~8,762~~
		Electricity	36.47	107,375 ~~123,126~~
Manufacturing Buildings	623,626	Natural Gas	39.71	24,762
		Electricity	107.14	66,813
			Total Energy Consumption	**363,366** ~~**299,923**~~

Notes:
sf = square feet; kBTU = Thousand BTU; MMBTU = Million BTU
Totals may not sum due to rounding.
(1) Annual Energy Rate developed using eQuest model of representative building typology and energy intensity factors from the 2018 Commercial Buildings Energy Consumption Survey.

Table 13-2
With Action Annual Energy Consumption for the Development Sites

Building Typology	Size (gsf)	Energy Source	Average Annual Energy Rate (kBTUs/sf) (1)	Energy Consumption (MMBTUs/Year)
Projected Development Sites				
Mixed Residential Buildings	18,980,565	Natural Gas	18.42	349,639
		Electricity	40.32	765,269
Mixed Commercial Buildings	3,408,508 ~~4,468,188~~	Natural Gas	2.59	8,845 ~~11,595~~
		Electricity	36.47	124,295 ~~162,937~~
Life Science or Manufacturing Buildings	1,059,680	Natural Gas	39.71	42,076
		Electricity	107.14	113,531
			Total Energy Consumption	**1,403,655** ~~**1,289,440**~~

Notes: sf = square feet; kBTU = Thousand BTU; MMBTU = Million BTU
Totals may not sum due to rounding.
(1) Annual Energy Rate developed using eQuest model of representative building typology and energy intensity factors from the 2018 Commercial Buildings Energy Consumption Survey.

While the Proposed Action's total energy consumption estimates conservatively assume that development sites may use fossil fuel-fired systems, the City's low carbon fuel requirements under Local Law 154 of 2021 may result in many of the development sites being designed to use fully electric systems. Consequently, total energy consumption would decrease using these systems as electric systems would greatly increase energy efficiency to provide space heating and hot water. However, this would increase the

demand on the regional electric grid. **Table 13-3** presents the associated annual energy demand assuming fully electrified development sites. As shown, it is estimated that energy demand would be 1,197,771~~992,008~~ MMBTUs/year in the With Action condition (351,032~~290,729~~ MWh).

Table 13-3
With Action Annual Energy Consumption for the Development Site
Fully Electric Buildings

Building Typology	Size (gsf)	Energy Source	Average Annual Energy Rate (kBTUs/sf) (1)	Energy Consumption (MMBTUs/Year)
Projected Development Sites				
Mixed Residential	18,980,565	Natural Gas	-	-
		Electricity	48.12~~43.37~~	913,375~~823,179~~
Mixed Commercial	3,408,508~~4,468,188~~	Natural Gas	-	-
		Electricity	37.78	128,789~~168,829~~
Life Science or Manufacturing	1,059,680	Natural Gas	-	
		Electricity	146.84	155,607
			Total Energy Consumption	**1,197,771~~992,008~~**

Notes: sf = square feet; kBTU = Thousand BTU; MMBTU = Million BTU
Totals may not sum due to rounding.
(1) Annual Energy Rate developed using eQuest model of representative building typology and energy intensity factors from the 2018 Commercial Buildings Energy Consumption Survey.

According to the New York Independent Systems Operator's (NYISO) 2024 *Load and Capacity Data* report,[3] annual energy requirements for the 2035 analysis year are forecast to be approximately 176,910 GWh (or 604 trillion BTU). Of this forecasted annual energy demand, 53,710 GWh (or 183 trillion BTU) is expected to come from Zone J, which includes New York City.

The anticipated 351~~291~~ GWh use in annual electrical energy consumption under the With Action condition represents approximately 0.6~~5~~ percent of ~~New York City's~~ the forecasted future total annual energy demand within the load zone where electricity demand is aggregated and monitored. Construction is currently underway to connect the Vernon area substation serving the Project Area and the Newtown area substation to support building electrification within the western Queens neighborhoods—the Reliable Clean City-Long Island City. Consequently, the potential increase is anticipated to be within the forecasted demand considered by Con Edison within its long-term transmission and distribution planning, and therefore, the Proposed Actions would not result in a significant adverse impact related to energy. ✶

[3] NYISO's 2024 Load and Capacity Data report forecasts annual energy requirements up to 2053.