CHAPTER 13: ENERGY

A. INTRODUCTION

All new buildings and alterations requiring heating and cooling are subject to the New York City Energy Conservation Code (NYCECC), which reflects the 2010 Energy Conservation Construction Codes of New York State (ECCNYS) in addition to New York City energy policy. Electricity used in New York City is generated 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 Long Island Power Authority. Projected generation and transmission requirements are forecasted by the New York State Independent System Operator (NYISO) and Con Edison, ensuring that the City's power supply and transmission systems have the capacity to meet expected future demand.[1] Typically, actions resulting in new construction do not create significant energy impacts and do not require a detailed energy assessment. However, regardless of whether a detailed energy assessment is required by guidance set forth in the *CEQR Technical Manual*, it is recommended that the projected amount of energy consumption during long-term operation be disclosed in the environmental assessment.[2]

As described in Chapter 1, "Project Description," the development facilitated by the Proposed Actions would result in a net increase of approximately 2,553,585 square feet (sf) of residential use consisting of 2,557 dwelling units; 275,348 sf of commercial uses; and 46,799 sf of community facility use compared to the No-Action Condition.

This chapter discusses the estimated operational energy consumption on Projected Development Sites identified in the Reasonable Worst-Case Development Scenario (RWCDS) for the No-Action and With-Action conditions, as well as New York City's existing energy distribution system and recent energy conservation directives.

B. PRINCIPAL CONCLUSIONS

The Proposed Actions would not result in any significant adverse impacts to energy infrastructure serving the area. Development on the Projected Development Sites in the With-Action Condition would increase annual energy consumption by approximately 395.4 billion annual British thermal units (Btu) over the No-Action Condition. The increase in annual energy consumption on the Projected Development Sites in the With-Action Condition would represent approximately 0.22 percent of New York City's forecasted annual energy consumption of 177 trillion BTU for 2025.[3] Based on this information, it is not anticipated the incremental development in the With-Action Condition would adversely affect energy infrastructure serving the area. In addition, the development on the Projected Development Sites would be required to be built pursuant to the NYCECC, which governs performance requirements of heating, ventilation, and air conditioning systems, as well as the exterior building envelope of new buildings. The code aligns with the vision

[1] *CEQR Technical Manual, 2014.*
[2] Ibid.
[3] Load & Capacity Data, NYISO 2015.

and goals of Mayor Bill de Blasio's *One City Built to Last* initiative of the overarching *One New York: The Plan for a Strong and Just City (OneNYC)*, which calls for the City to develop and implement world-class green building and energy codes, including requirements relating to energy efficiency and combined thermal transmittance.[4]

C. METHODOLOGY

State Environmental Quality Review (SEQR) regulations 6 NYCRR 617.9(b)(5)(e), and consequently the City Environmental Quality Review (CEQR) process, require that Environmental Impact Statement (EIS) analyses include discussion of the effects of the proposed action on the use and conservation of energy, if applicable and significant. In most cases, a proposed project does not require a detailed energy assessment, but its projected operational energy consumption is generally estimated.[5] Operational energy consumption is the amount of energy that would be consumed annually as a result of the day-to-day operation of the buildings and uses on the Projected Development Sites identified in the Reasonable Worst Case Development Scenario (RWCDS).

To assess the incremental operational energy consumption of the Projected Development Sites identified in the RWCDS, this chapter (i) presents data on existing energy distribution system and estimated energy usage of existing conditions; (ii) determines future energy demands for the Projected Development Sites under the No-Action and With-Action conditions, using energy consumption rates for land uses provided in the *CEQR Technical Manual*; and (iii) assesses the effects of this incremental energy demand on the local energy distribution system and regional energy supplies. The net change in energy consumption between No-Action and With-Action conditions represents the Proposed Actions anticipated incremental energy use.

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, "Average Annual Whole-Building Energy Use in New York City" in Chapter 15 of the *CEQR Technical Manual.* This table was developed by the Mayor's Office of Long Term Planning and Sustainability and lists City-specific energy and carbon intensity values for various building types.[6]

D. EXISTING CONDITIONS

ENERGY SUPPLY AND TRANSMISSION

Con Edison provides electric service to approximately 3.4 million customers throughout New York City (except a section of Queens) and most of Westchester County in an approximately 660-square-mile service area with a population of more than 9.2 million. In addition, Con Edison delivers gas to approximately 1.1 million customers in Manhattan, the Bronx, parts of Queens, and most of Westchester County. It also operates the largest steam distribution system in the United States by

[4] New York City Energy Conservation Code, 2014.
[5] Ibid.
[6] *CEQR Technical Manual,* 2014.

producing and delivering an estimated 22,000 million pounds (MMlb) of steam annually to approximately 1,700 customers in parts of Manhattan.[7]

Con Edison owns 62 area distribution substations and various distribution facilities located throughout New York City and Westchester County. As of December 31, 2015, the company'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. The underground distribution lines represent the single longest underground electric delivery system in the United States. Con Edison's electric generating facilities consist of plants located in Manhattan with an aggregate capacity of 724 megawatts (MW).[8]

In 2015, annual electric energy delivered in Con Edison's franchise area was 57.015 billion kilowatt hours (KWH), or 194.5 trillion Btu. Con Edison also provided approximately 156.4 trillion Btu of natural gas,[9] and approximately 26.3 trillion Btu of steam in 2015.[10] Overall, approximately 377.2 trillion Btu of energy was consumed in 2015 within Con Edison's New York City and Westchester County service area.

According to the Con Edison 2015 Annual Report, the peak electrical demand for New York City in summer 2015 was 12,316 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 0.2 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

The 2015 New York State Energy Plan is a comprehensive roadmap to build a clean, resilient, and affordable energy system for all New Yorkers. It advances a major new energy initiative, the Reforming the Energy Vision (REV), which aims to create a stronger and healthier economy by stimulating a vibrant private sector market to provide clean energy solutions to communities and individual customers throughout New York State. REV, in conjunction with the New York State Energy Plan, seeks to drive the State's shift to a more market-driven clean energy future and allow for a reduction in ratepayer collections.[11]

In November 2015, Con Edison submitted an updated advanced metering infrastructure (AMI) plan for its electric and gas delivery businesses to the New York State Public Service Commission (NYSPSC) The plan, which is subject to NYSPSC review and approval, addresses AMI's financial, operations, and environmental benefits to customers, and how AMI supports the REV proceeding's

[7] *Con Edison, 2015 Annual Report*
[8] Ibid.
[9] Ibid.
[10] Con Edison, http://www.coned.com/steam/kc_faqs.asp
[11] *New York State Energy Plan,* "Overview" (2015)

objectives. AMI components include smart meters, a communication network, information technology systems, and business applications. The plan provides for full deployment of AMI to the company's customers to be implemented over a six-year period.[12]

OneNYC lays out strategies to reduce greenhouse gas (GHG) emissions by promoting "green" building practices and energy efficiency. *OneNYC* identifies opportunities to reduce GHG emissions from buildings' energy consumption by (i) improving the energy efficiency of building systems and operations, and investing in clean and renewable on-site power generation; (ii) reducing the energy consumption of a building's occupants, including commercial tenants, retailers, and residents; and (iii) reducing emissions from the City's power supply, which requires suppliers to switch to clean and renewable energy sources to power the City's electric grid and steam distribution system as well as fuel distributors to offer lower-carbon fuels.[13]

The City has also taken steps to enable private property owners to install renewable energy systems on their buildings. The City Planning Commission (CPC) 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.

EXISTING DEMAND

As shown in Table 13-1, current energy consumption on the Projected Development Sites is approximately 98.3 million Mbtu (86.1 billion Btu) of energy annually. This is equivalent to less than 0.03 percent of the total annual energy consumption in 2015 within Con Edison's New York City and Westchester County Service area.

Table 13-1: Existing Annual Energy Consumption for the Projected Development Sites

Use	Floor Area (square feet)	Average Annual Energy Use Rate (MBtu[1])/square foot)[2]	Existing Annual Energy Use (million MBtu)[4]
Commercial[3]	343,824	216.3	74.4
Factory/Industrial	35,900	554.3	19.9
Institutional	13,090	250.7	3.3
Large Residential (>4 Family)	0	126.7	0.0
Small Residential (1-4 Family)	7,096	94.0	0.7
		Total	**98.3 million MBtu**

Notes:
[1] MBtu = 1,000 Btu.
[2] CEQR Technical Manual, Chapter 15, Table 15-1.
[3] Includes retail supermarket, restaurant, office, hotel, auto-related, and storage/garage uses.
[4] 1 million MBtu = 1 billion Btu.

[12] *Con Edison, 2015 Annual Report.*
[13] *OneNYC* (2014).

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

ENERGY SUPPLY AND TRANSMISSION

On October 3, 2016, Con Edison published the *Long-Range Transmission Plan, 2016-2026*, which focuses on reliably serving forecasted loads over a 10-year planning horizon under certain conservative assumptions on the interconnection of new generating projects while adhering to Con Edison's Transmission Planning Criteria. The *Long-Range Transmission Plan* may change over time in order to adapt to changing future conditions.[14] The *Long-Range Transmission Plan, 2016-2026* reaffirms the need for system improvements in the Greenwood/Staten Island – 138 kV transmission load area. Solutions to address this deficiency, specifically the establishment of an additional breaker at Greenwood, are on track for completion.[15]

Con Edison estimates that under design weather conditions, 2016 service area peak demand will be 13,650 megawatts (MW), and the average annual growth in electric peak demand in its service area at design conditions over the next five years will be approximately 0.2 percent per year.[16]

NO-ACTION DEMAND

As shown in Table 13-2, energy consumption for the Projected Development Sites in the No-Action Condition is estimated to decrease to approximately 85.1 million Mbtu (85.1 billion Btu) of energy annually. This is an annual decrease of approximately 13.2 million MBtu (13.2 billion Btu) compared to existing conditions.

Table 13-2: No-Action Annual Energy Consumption for the Projected Development Sites

Use	Floor Area (square feet)	Average Annual Energy Use Rate (MBtu[1])/square foot)[2]	No-Action Annual Energy Use (million MBtu)[4]
Commercial[3]	343,235	216.3	74.2
Industrial	0	554.3	0.0
Institutional	37,879	250.7	9.5
Large Residential (>4 Family)	0	126.7	0.0
Small Residential (1-4 Family)	15,386	94.0	1.4
		Total	**85.1 million Mbtu**

***Notes**:*
[1] MBtu = 1,000 Btu.
[2] CEQR Technical Manual, Chapter 15, Table 15-1.
[3] Includes retail supermarket, restaurant, office, hotel, auto-related, and storage/garage uses.
[4] 1 million MBtu = 1 billion Btu.

By 2025, New York City's forecasted annual energy demand is anticipated to be 51,898 gigawatts (GWh), or roughly 177 trillion Btu per year.[17] The energy consumption of 85.2 million MBtu in the No-Action Condition accounts for less than 0.05 percent of New York City's anticipated annual energy demand of 177 trillion Btu by 2025.

[14] *The Long-Range Transmission Plan: 2016-2026, October 3, 2016.*
[15] Ibid.
[16] *Con Edison, 2015 Annual Report.*
[17] Load & Capacity Data, NYISO (2015).

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

ENERGY SUPPLY AND TRANSMISSION

Con Edison and the New York State Energy Research and Development Authority (NYSERDA) regularly publish reports addressing the City's anticipated energy demand and will continue to do so in the future. Con Edison produces an annual report in which anticipated peak energy demand for the following year is calculated, and a comprehensive review of its generation, distribution, and transmission facilities are discussed. The Projected Development Sites are anticipated to be developed individually, and should any site require a specific change to Con Edison infrastructure, it is anticipated appropriate time and notice would be given to Con Edison prior to the construction of such a development. Furthermore, NYSERDA produces a *New York State Energy Plan*, which also provides a comprehensive discussion of energy usage and future energy practices in New York State. Based on this information, the development under the With-Action Condition is not anticipated to cause significant adverse impacts on the supply and transmission infrastructure serving the area.

WITH-ACTION DEMAND

As discussed in Chapter 1, "Project Description," the Proposed Actions would facilitate a net increase of approximately 2,553,585 sf of residential use (2,557 dwelling units); 275,348 sf of commercial use; and 46,799 sf of community facility use over the No-Action Condition. As shown in Table 13-3, the energy consumption for the Projected Development Sites in the With-Action Condition would demand approximately 480.5 million MBtu annually (480.5 billion Btu), which is an annual increase of approximately 395.4 million MBtu (395.4 billion Btu) compared to the No-Action Condition. The 395.4-million-Mbtu increase in annual energy demand on the Projected Development Sites in the With-Action Condition would represent approximately 0.22 percent of New York City's forecasted annual energy consumption of 177 trillion BTU for 2025.[18] Based on this information, the development in the With-Action Condition is not anticipated to cause significant adverse impacts on energy infrastructure serving the area.

Table 13-3: With-Action Annual Energy Consumption for the Projected Development Sites

Use	Floor Area (square feet)	Average Annual Energy Use Rate (MBtu[1]/square foot)[2]	With-Action Annual Energy Use (million MBtu)	Incremental Energy Use (million MBtu)[4]
Commercial[3]	618,583	216.3	133.8	59.6
Industrial	0	554.3	0	0
Institutional	84,678	250.7	21.2	11.7
Large Residential (>4 Family)	2,568,971	126.7	325.5	325.5
Small Residential (1-4 Family)	0	94.0	0.0	-1.4
		Total	480.5	395.4

Notes:
[1] MBtu = 1,000 Btu.
[2] CEQR Technical Manual, Chapter 15, Table 15-1.
[3] Includes retail supermarket, restaurant, office, hotel, auto-related, and storage/garage uses.
[4] 1 million MBtu = 1 billion Btu.

[18] Ibid.

Under the With-Action Condition, the Projected Development Sites would be required to be built pursuant to the NYCECC. The code aligns with the vision and goals of *OneNYC*, which calls for the City to develop and implement world-class green building and energy codes.[19]

CONCLUSION

The With-Action Condition would result in a net increase of approximately 2,553,585 sf of residential use consisting of 2,557 dwelling units; a net increase of approximately 46,799 sf of community facility use; and a net increase of approximately 275,348 sf of commercial use compared to the No-Action Condition.

The annual energy consumption on the Projected Development Sites in the With-Action Condition would be approximately 480.5 million MBtu (480.5 billion Btu), which is an annual increase of approximately 395.4 million MBtu (395.4 billion Btu) over the No-Action Condition. The increase in annual energy demand on the Projected Development Sites in the With-Action Condition would represent approximately 0.22 percent of New York City's forecasted annual energy consumption of 177 trillion Btu for 2025.[20] Therefore, the Proposed Actions are not anticipated to cause significant adverse impacts on energy infrastructure serving the area.

[19] New York City Energy Conservation Code, (2014).
[20] Ibid.