

# 11. Energy

## 11.1 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 *CEQR Technical Manual*, 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 New York City Department of City Planning (DCP) is proposing to establish the East Midtown Subdistrict within the Midtown Special District. Under the reasonable worst-case development scenario (RWCDS), the Proposed Action would result in approximately 10,340,972 gross square feet (gsf) of office floor area, 648,990 gsf of retail floor area, 2,134,234 gsf of hotel floor area, 207,029 gsf of residential floor area, as well as 140,200 gsf of parking floor area.

For CEQR purposes, energy impact analysis focuses on a project's energy consumption. Therefore, this chapter provides an estimate of the additional energy consumption associated with the Proposed Action.

## 11.2 PRINCIPAL CONCLUSIONS

The Proposed Action would not result in a significant adverse impact on energy systems. The Proposed Action would create an increased demand on energy systems including electricity and gas. However, relative to the capacity of these systems and the current levels of service within New York City, this increased energy demand would be minor. Moreover, the incremental annual demand expected to result from the Proposed Action would represent a negligible portion of the City's forecasted annual energy requirements. Electrical and gas connections are readily available in the proposed rezoning area. Furthermore, by replacing aging structures, any new development under the Proposed Action would be required to comply with NYCECC. The Proposed Action would not substantially involve energy-intensive uses such as data centers or web hosting facilities. Nor would it remove a source of energy generation. For these reasons, the Proposed Action would not result in a significant adverse impact on energy systems.

### 11.3 METHODOLOGY

To assess the Proposed Action’s 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 Action for 2033, using energy consumption rates for typical land uses provided in the *CEQR Technical Manual*.
- 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 properties that are anticipated to be affected by the Proposed Action under existing, No-Action, and With-Action conditions, and the net change in energy consumption (which represents the Proposed Action’s anticipated energy use). As the calculation of energy demand is a density-based technical analysis, only the anticipated development on the projected development sites form the basis for this assessment. The type of buildings anticipated as a result of the Proposed Action (e.g., new Class A office buildings) commonly adhere to LEED or other high standards for environmental performance. In addition, the Proposed Action incorporates requirements that sites utilizing the District Improvement Bonus be designed to meet standards for reduced energy consumption that exceed code compliance. The analysis of this chapter conservatively does not take this into account.

According to the *CEQR Technical Manual*, if a project, such as the Proposed Action, 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 in 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 Action. The measure of energy use in this chapter is British thermal units (Btu) per square foot of building floor area per year.<sup>1</sup> The assumptions utilized in calculating energy consumption for the existing condition were also applied to the projected development sites under the No-Action and With-Action scenarios.

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<sup>1</sup> One Btu is the quantity of heat required to raise one pound of water by 1 degree Fahrenheit.

## 11.4 EXISTING CONDITIONS

### 11.4.1 Energy Providers

Con Edison delivers electricity to all of New York City (except the Rockaway area in Queens) and almost all of Westchester County. 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 also provides steam service in parts of Manhattan including the East Midtown area. High-pressure steam is generated in cogeneration plants and conventional plants, and is distributed through an interconnected piping network (with pipe sizes up to 30 inches in diameter) to approximately 1,800 customers in Manhattan for heating, hot water, and air conditioning (HVAC). Many buildings within East Midtown use steam for their HVAC needs. Gas mains ranging from 4 to 24 inches supply natural gas for heating and cooking uses within the proposed rezoning area. Typically, these gas lines are located between 2 and 4 feet below the street.

In 2011 (the latest year for which data are available), annual electricity usage in Con Edison's service area<sup>2</sup> totaled approximately 57.8 billion kilowatt hours (KWH), or 197.3 trillion British Thermal Units (BTU). In addition, Con Edison supplied approximately 129 trillion BTU of natural gas and approximately 22.3 billion pounds of steam, which is equivalent to approximately 26.8 trillion BTU. Overall, approximately 353 trillion BTU of energy were consumed in 2011 within Con Edison's New York City and Westchester County service area.<sup>3</sup>

### 11.4.2 Recent Energy Conservation Directives

In December 2009, the City Council passed four laws, collectively known as the Greener, Greater Buildings Plan (GGBP), that require 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 compose half the built area in the City. Through the enactment of one of those laws, beginning in 2011, privately owned buildings over 50,000

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<sup>2</sup> 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 96<sup>th</sup> Street, Manhattan.

<sup>3</sup> Source: Con Edison of New York, *Annual Report, 2009*.

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square feet 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.<sup>4</sup>

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

**11.4.3 Existing Demands**

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 shown in Table 11-1, below, current annual energy use on the 19 projected development sites is estimated to be approximately 1.94 trillion BTUs for all heating, cooling, and electric power. This is equivalent to approximately 0.5 percent of the total annual energy consumption in 2011 within Con Edison’s New York City and Westchester County service area.

**TABLE 11-1: EXISTING ESTIMATED ANNUAL ENERGY CONSUMPTION ON PROJECTED DEVELOPMENT SITES**

<b>Building Type / Use</b>	<b>Rate of Consumption (Thousand BTU (MBtu)/ sq. ft)<sup>1</sup></b>	<b>Floor Area (sq. ft)<sup>2</sup></b>	<b>Annual Energy Consumption (million Btu)</b>
<b>Non-Applicant Sites - RWCDs Projected Development Sites</b>			
Office	216.3	6,617,617	1,431,391
Retail	216.3	469,964	101,653
Hotel	216.3	1,750,258	378,581
Residential	126.7	10,725	1,359
Parking	216.3	113,940	24,645
<b>Total Energy Consumption</b>			<b>1,937,629</b>
<b>Notes:</b>			
1. Based on rates provided in the <i>CEQR Technical Manual</i> , Table 15-1.			
2. RWCDs Totals for all projected development sites (refer to Table 1-2 in Chapter 1, "Project Description"). Berkely College, an institutional use located on a portion of Site 5 in both the existing and No-Action conditions is considered an office use for conservative energy consumption analysis purposes.			
MBtu = Thousand BTU			

<sup>4</sup> Source: PlaNYC, adopted in 2007 and updated in April 2011; Energy Chapter, page 107.

## 11.5 THE FUTURE WITHOUT THE PROPOSED ACTION (NO-ACTION)

Energy consumption under the No-Action condition would increase compared to existing conditions. Annual energy consumption estimates for each use under the existing and No-Action conditions are provided in Table 11-2. As shown in Table 11-2, it is estimated that buildings developed under the No-Action scenario would use 2.06 trillion BTUs of energy annually. This represents an increase of approximately 126 million BTUs over existing conditions.

**TABLE 11-2: NO-ACTION CONDITION: ESTIMATED ANNUAL ENERGY CONSUMPTION ON PROJECTED DEVELOPMENT SITES**

Building Type (Use)	Rate of Consumption (Thousand Btu (MBtu)/ sq. ft) <sup>1</sup>	Existing Condition		No-Action Condition	
		Floor Area (sq. ft) <sup>2</sup>	Annual Energy Consumption (MBtu)	Floor Area (sq. ft) <sup>2</sup>	Annual Energy Consumption (MBtu)
Office	216.3	6,617,617	1,431,391	6,519,633	1,410,197
Retail	216.3	469,964	101,653	529,328	114,494
Hotel	216.3	1,750,258	378,581	2,010,947	434,968
Residential	126.7	10,725	1,359	772,705	97,902
Parking	216.3	113,940	24,645	29,400	6,359
<b>Total Energy Consumption</b>			<b>1,937,629</b>		<b>2,063,920</b>
<b>Notes:</b>					
1. Based on rates provided in the <i>CEQR Technical Manual</i> , Table 15-1.					
2. RWCDs Totals for all projected development sites (refer to Table 1-2 in Chapter 1, "Project Description")					
MBtu = Thousand Btu					

According to the New York Independent System Operator 2012 Load & Capacity Data report, annual energy requirements for 2022 are forecasted at approximately 173,569 gigawatt hours (GWh), or 592.2 trillion Btu. Of this forecasted annual energy demand, 59,118 GWh (or 201.7 trillion Btu) is expected to come from Zone J (New York City). The anticipated 126,291 million Btu increase in annual energy consumption due to development under the No-Action scenario therefore represents less than 0.06 percent of New York City's forecasted future total annual energy demand.

## 11.6 THE FUTURE WITH THE PROPOSED ACTION (WITH-ACTION)

Compared with the No-Action scenario, the Proposed Action would result in a net increase of 3,821,339 gsf of office floor area, 119,662 gsf of retail floor area, 123,286 gsf of hotel floor area, and 110,800 gsf of parking floor area, and a net decrease of 565,675 gsf of residential floor area.

Table 11-3 shows the estimated energy consumption due to the Proposed Action. Buildings developed under the Proposed Action would use approximately 2.90 trillion Btu of energy annually, which represents an increase of approximately 831,400 million Btu (244 GWh) when compared with the No-

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Action condition. This increase in annual demand would represent approximately 0.4 percent of the City’s forecasted annual energy requirement of 59,118 GWh for 2022, and therefore is not expected to result in a significant adverse impact on energy systems.

**TABLE 11-3: WITH-ACTION CONDITION: ESTIMATED ANNUAL ENERGY CONSUMPTION ON PROJECTED DEVELOPMENT SITES**

Building Type (Use)	Rate of Consumption (Thousand Btu (MBtu)/ sq. ft) <sup>1</sup>	No-Action Condition		With-Action Condition		Energy Use Increment (MBtu)
		Floor Area (sq. ft) <sup>2</sup>	Annual Energy Consumption (MBtu)	Floor Area (sq. ft) <sup>2</sup>	Annual Energy Consumption (MBtu)	
Office	216.3	6,519,633	1,410,197	10,340,972	2,236,752	826,555
Retail	216.3	529,328	114,494	648,990	140,377	25,883
Hotel	216.3	2,010,947	434,968	2,134,234	461,635	26,667
Residential	126.7	772,705	97,902	207,029	26,231	-71,671
Parking	216.3	29,400	6,359	140,200	30,325	23,966
<b>Total Energy Consumption</b>			<b>2,063,920</b>		<b>2,895,320</b>	<b>831,400</b>
<b>Notes:</b>						
1. Based on rates provided in the <i>CEQR Technical Manual</i> , Table 15-1.						
2. RWCDs Totals for all projected development sites (refer to Table 1-2 in Chapter 1, "Project Description")						
MBtu = Thousand Btu						

Additionally, any new development 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.<sup>5</sup> The Proposed Action would encourage the construction of new sustainable office buildings incorporating best practices for energy efficiency, meeting the City’s goals of improving environmental performance through green building construction in conjunction with realizing the goals of the Proposed Action. Should there be a voluntary utilization of higher performance standards designs on the projected development sites, then there would be a reduction in the energy load forecasted in Table 11-3.

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

<sup>5</sup> Developments resulting from the Proposed Action would be constructed pursuant to the NYCECC performance path, rather than the trade-off or prescriptive paths. The performance path uses energy modeling to demonstrate that the total annual energy cost of the proposed building design is less than or equal to the total annual energy cost of the budget building design.