2.12 ENERGY

2.12.1 INTRODUCTION

This chapter describes the effects that the Proposed Project may have on energy consumption. According to the *CEQR Technical Manual*, an energy analysis focuses on a project's consumption of energy and, where relevant, potential effects on the transmission of energy that may result from the project. The assessment is of the energy sources typically used in a project's operation (HVAC, lighting, etc.) and includes electricity, fossil fuels, nuclear power, hydroelectric power, and, occasionally, other fuels like wood, solid waste, or other combustible materials.

According to the *CEQR Technical Manual*, all new structures requiring heating and cooling are subject to the New York City Energy Conservation Code, which reflects state and City energy policy. Electricity used in New York City is delivered to most New York City users by Consolidated Edison (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 both 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. The incremental demand caused by most projects results in incremental supply, and consequently, an individual project's energy consumption often would not create a significant impact on the availability of energy supply. Consequently, a detailed assessment of energy impacts is typically limited to projects that may significantly affect the transmission or generation of energy. For energy intensive facilities that may significantly affect the transmission or generation of energy, consideration of clean on-site generation alternatives is recommended. Although significant adverse energy impacts are not anticipated for the great majority of projects analyzed under CEQR, it is recommended that the projected amount of energy consumption during long-term operation be disclosed in the environmental assessment.

2.12.1.1 The Energy System

Electricity within Staten Island is distributed by Con Edison. The electrical energy is derived from a variety of resources that originate within and outside New York City. These include nonrenewable resources, such as oil, natural gas, coal fuel, and uranium, and renewable resources, such as hydroelectricity and, to a much lesser extent, biomass fuels, solar power, and wind power. New York City's electrical demands are met primarily by electricity generating sources within New York City, and supplemented during periods of peak demand by generating sources across the Northeast, including sources as far away as Canada.

Con Edison provides the electrical power transmission system for the City through a network of cables and substations. The substations receive electricity from the transmission system and reduce the voltage to a level that can be delivered to the distribution system or "grid" in the streets. In the distribution system, the electricity's voltage is reduced further for delivery to customers. Each area substation serves one or more distinct geographic areas, called networks, which are isolated from the rest of the local distribution system. The purpose of creating distinct network areas is to contain the potential spread of power outages. If one substation goes out of service, the problem would be within the network area and would not spread. Substations are designed to have sufficient excess capacity to accommodate growth in demand for power within the network.

According to the New York Independent System Operator (NYISO) *2011 Load & Capacity Data* report, which is the most current update available, the peak electrical demand for New York City in summer 2012 was 11,500 Megawatts (MW), and the peak demand for summer 2013 is forecasted at 11,680 MW.[1] Typically, the electricity generated within the City is sufficient to satisfy the demand. However, during the peak demand periods, locally-generated electricity must be supplemented through the transmission grid

[1] New York Independent System Operator *2012 Load & Capacity Data*, released April 2012.

with power from across the Northeast. Con Edison's distribution grid has a finite capacity, and during heavy demand periods, the transmission grid is strained. There is an ongoing service and distribution improvement program for Con Edison's infrastructure, which upgrades localized areas that are continually high demand zones.

A number of power plants are located in the five boroughs, providing electric generation resources to New York City. According to NYISO's *Locational Minimum Installed Capacity Requirements Study* for the 2011-2012 capability year, New York City has an existing installed capacity of 11,514 MW.[2]

2.12.1.2 Energy Conservation Directives

In 2001, New York State began taking measures to address the increasing capacity needs of the Metropolitan New York City region. NYISO implemented the Emergency Demand Response and the "Day-Ahead Demand Bidding" programs to reduce utility electrical power demand during peak load periods. New York State Governor's Executive Order No. 111 (EO 111), introduced in June of 2001, directed state agencies, state authorities, and other affected entities to address energy efficiency, renewable energy, green building practices, and alternate fuel vehicles. EO 111 identified the New York State Energy Research and Development Authority (NYSERDA) as the organization responsible for coordinating and assisting agencies and other affected entities with their responsibilities. NYSERDA and other utilities have implemented programs to encourage businesses to reduce energy usage and increase energy efficiency.

The independent, non-profit New York State Reliability Council (NYSRC) has determined that a minimum of 80 percent of the City's peak load must be provided by generating sources within the City to maintain compliance with the criteria established by the regional and national reliability councils. Presently, there is sufficient capacity within the City to meet this 80 percent local energy generation requirement. As the energy demand increases over time, additional in-City generation would be needed to satisfy this requirement.

NYISO, which manages the safety and reliability of the state's electric transmission system, developed and implemented an annual review of New York State's energy reliability and needs in December 2005. According to NYISO's 2012 Reliability Needs Assessment, the forecasted baseline system meets applicable reliability criteria for the next 10 years, from 2013 through 2022, without any additional resource needs, assuming all modeled transmission and generation facilities remain in service.[3]

2.12.2 METHODOLOGY

This section has been prepared following the guidance of the *CEQR Technical Manual*, which recommends a detailed energy assessment for projects that may significantly affect the transmission or generation of energy. This chapter therefore estimates the annual energy of the properties that are anticipated to be affected by the Proposed Project under the Existing Scenario, the Future No-Action Scenario and the Future With-Action Scenario, as well as the net incremental change in energy consumption associated with the Future With-Action Scenario, when compared to the Future No-Action Scenario.

The measure of energy used in the analysis 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. This unit of measure may be used to compare consumption of energy from different sources (e.g., gasoline, hydroelectric power, etc.), taking into consideration how efficiently those sources are converted to energy. The use of BTU avoids the confusion inherent in comparing different measures of output (e.g.,

[2] NYISO *Locational Minimum Installed Capacity Requirements Study Covering the New York Control Area for the 2011-2012 Capability Year*, January 14, 2011.
[3] NYISO *2012 Reliability Needs Assessment*, released August, 2012.

horsepower, kilowatt hours, etc.) and consumption (e.g., tons per day, cubic feet per minute, etc.). In general 1 kilowatt (KW) is equivalent to 3,413 BTU per hour.

The *CEQR Technical Manual* identifies several different methods for calculating energy use of existing and proposed buildings. If feasible, based on knowledge of a project's site design and the applicant's control over the development site(s), energy consumption should be estimated by the project engineers or by using an energy modeling tool such as eQuest, Trace, HAP, or DOE-2. Such programs calculate a building's energy use by analyzing energy requirements of various building systems. For development sites not controlled by the applicant, or for sites that are not far enough along in the design stage to provide enough details for energy modeling, 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 for various land uses.

2.12.3 EXISTING CONDITIONS

As discussed in **Chapter 2.1**, "Land Use, Zoning and Public Policy," the entire Project Area is vacant, undeveloped and covered with vegetation. The degree of overgrowth varies across the Project Area, with the majority covered by trees and other vegetation. Open-field areas are located within the northern portion of the Project Area, parts of which were previously cleared between 2002 and 2004 for an earlier plan to create Fairview Park. The western portion of the site contains some vacant open areas, with trees along the east side of Arthur Kill Road. As a result, total energy consumption in the Project Area is estimated to be zero.

2.12.4 FUTURE NO-ACTION CONDITIONS

Under the Future No-Action Condition, if the Proposed Project is not approved, the Project Area is expected to remain in its existing vacant condition. No other projected or potential development is planned or considered likely to occur in the Project Area by the 2015 or 2020 analysis years of the proposed Charleston Mixed-Use Development. Therefore, total energy consumption in the Project Area under Future No-Action conditions is expected to remain at zero.

The NYISO *2012 Load & Capacity Data* report forecasts energy requirements through 2022 for summer months and 2023 for winter months (2022-2023). According to the report, the summer peak load for New York City is expected to be 11,985 MW in 2015 and 7,881 MW in the winter of 2015-2016. The 2015 annual energy requirements for New York City are forecasted at approximately 55,234 gigawatt hours (GWH). In 2020, the summer peak load for New York City is projected to be 12,725 MW, with 8,307 MW in the winter of 2020-2021. In 2020, the annual energy requirements for New York City are projected at approximately 58,086 GWH.[4] In addition to these energy projections, future planning initiatives will affect energy generation and usage in the future without the Proposed Project, as described below.

2.12.4.1 Future Energy Related Initiatives

The demand for electricity is expected to increase by approximately 1.5 percent a year in New York City. To meet that demand, a number of power plant construction projects are planned or currently under way. In addition, a number of electric transmission projects are proposed to bring electric power from outside New York City into the City. While not all of the projects will likely be constructed, sufficient additional generating capacity is expected to be built to meet New York City's projected future energy demands.

In June 2002, New York State Energy Planning Board released the New York State Energy Plan and Environmental Impact Statement, which was updated in March 2006. This plan and its updates establish

[4] New York Independent System Operator *2012 Load & Capacity Data*, released April 2012.

New York State energy policies and objectives. The plan's policy objectives are to support safe, secure, and reliable operation of the energy and transportation systems; to stimulate sustainable economic growth through competitive market development; to increase energy diversity; to promote a cleaner and healthier environment; and to ensure fairness, equity, and consumer protection. These objectives continue the policies developed in earlier energy plans. No large-scale changes in energy generation and consumption policies are foreseen at the present time. In the future, Con Edison and other energy providers are expected to continue to deliver energy throughout New York City.

2.12.5 FUTURE WITH-ACTION CONDITIONS

The Proposed Project would result in changes to the land uses within the Project Area, which as noted above is currently vacant and undeveloped. The Proposed Project would promote new development, construct a new public street, and map as parkland an existing conservation area located in Charleston, Staten Island. In addition, as the Proposed Project would occur on undeveloped land, new utility connection lines may be constructed to ensure energy delivery at the project site, as appropriate.

Developments of Proposed Project are expected to be completed over several years. Construction of Retail Site "A" and Fairview Park are expected to be completed by the year 2015. Construction of remainder of the Project Area is expected to be completed by the year 2020, including the developments of Retail Site "B", the school, the senior housing, and the Englewood Avenue and other road constructions.

2.12.5.1 Year 2015 Analysis

As part of the Proposed Project, by the year 2015, the City would develop a new 23-acre park, which is not expected to generate any additional notable demand for energy. Adjacent to the park, the 11-acre site of Retail Site "A" is expected to be developed by a private developer with up to approximately 195,000 square feet of commercial space for medium- and large-format retail stores. This site will also include an approximately 15,000-square-foot branch of the New York Public Library, which will share parking with the retail uses.

Table 2.12-1 provides a summary of the energy expected to be consumed by Retail Site "A" by 2015 in the Future No-Action Scenario and the Future With-Action Scenario, as well as the net incremental change in energy consumption associated with the Future With-Action Scenario, compared to the Future No-Action Scenario. As the Project Area is projected to remain vacant under the Future No-Action scenario, these figures represent the net incremental increase over Future No-Action conditions. As shown above in **Table 2.12-1**, the proposed development of Retail Site "A" by 2015 would create an incremental energy demand for approximately 45,939,000 thousand BTUs in annual energy use compared to Future No-Action conditions.

Table 2.12-1
Estimated Annual Energy Consumption on Development Sites in 2015

	NO-ACTION (2015)		WITH-ACTION (2015)			INCREMENTAL DIFFERENCE
Use	SF	Annual Energy Use (MBTU)[1]	SF	Rate (MBTUs/sf/year)	Annual Energy Use (MBTU)[1]	Annual Energy Use (MBTU)[1]
Commercial	0	0	195,000	216.3	42,178,500	42,178,500
Institutional	0	0	15,000	250.7	3,760,500	3,760,500
TOTAL		**0**			**45,939,000**	**45,939,000**

Notes: [1] Based on consumption rates from *CEQR Technical Manual* Table 15-1; MBTU = Thousand BTU.
Estimates and square feet are rounded to the nearest whole number.
Although the proposed parking and publicly-accessible open space would generate some energy demand for lighting, etc., this demand would be negligible

2.12.5.2 Year 2020 Analysis

By the year 2020, the remainder of the Project Area would be redeveloped with additional retail space, a public school and senior housing, along with the mapping and construction of Englewood Avenue. Along Arthur Kill Road, Retail Site "B" consists of approximately 7.3 acres that would also be privately developed in the future with an anticipated 90,000 square feet of neighborhood retail space. The City will offer an approximately 9.1-acre site for senior housing along Englewood Avenue for up to 162 units, consisting of 80 affordable multi-family rental units and 82 age-restricted for-sale detached units. To the east, the combined elementary/middle school on an approximately 5.9-acre site would be constructed with an approximately 750-seat capacity for kindergarten through 8th grade.

Table 2.12-2 provides a summary of the energy expected to be consumed by the proposed development by the year 2020. As indicated in **Table 2.12-2**, by the year 2020, the Proposed Project would create a total incremental energy demand for approximately 127,729,601 thousand BTUs in annual energy use. Compared with the approximately 333 trillion BTUs of energy consumed annually within Con Edison's New York City and Westchester County service area, this incremental increase would be considered a negligible increment. The proposed project would not be an energy intensive facility that would significantly affect the transmission or generation of energy, and would not result in significant adverse impacts to the transmission or generation of energy.

Table 2.12-2
Estimated Annual Energy Consumption on Development Sites in 2020

	NO-ACTION (2020)		WITH-ACTION (2020)			INCREMENTAL DIFFERENCE
Use	SF	Annual Energy Use (MBTU)[1]	SF	Rate (MBTUs/sf/year)	Annual Energy Use (MBTU)[1]	Annual Energy Use (MBTU)[1]
Commercial	0	0	285,000	216.3	61,645,500	61,645,500
Institutional	0	0	115,000	250.7	28,830,500	28,830,500
Large Residential (>4 Family)	0	0	294,030	126.7	37,253,601	37,253,601
TOTAL		**0**			**127,729,601**	**127,729,601**

Notes: [1] Based on consumption rates from *CEQR Technical Manual* Table 15-1; MBTU = Thousand BTU.
Estimates and square feet are rounded to the nearest whole number.
Although the proposed parking and publicly-accessible open space would generate some energy demand for lighting, etc., this demand would be negligible

The Proposed Project would comply with the New York State Energy Conservation Construction Code Act. This code governs performance requirements of heating, ventilation, and air conditioning systems, as well as the exterior building envelope. The code, promulgated on January 1, 1979, pursuant to Article 11 of the Energy Law of the State of New York, requires that new and recycled buildings (both public and private) be designed to ensure adequate thermal resistance to heat loss and infiltration. In addition, the code provides requirements for the design and selection of mechanical, electrical, and illumination systems. In compliance with the code, the building's basic designs would incorporate all required energy conservation measures, including meeting the code's requirements relating to energy efficiency and combined thermal transmittance.

The Proposed Project includes a number of commitments that would ensure that energy efficient buildings are constructed. If the Proposed Project requires city capital funding to construct the library, the approximately 15,000 square foot library building would comply with the requirements of Local Law 86 of 2005, as applicable. The proposed school would be built according to the New York City Green Schools Guide, which addresses the sustainable design, construction, and operation of new schools. The Green Schools Guide and Rating System include strategies that substantially reduce energy costs and water use as compared with buildings constructed to meet code, and require the use of recycled content, and regional materials, if feasible, in construction. The Contract of Sale for Retail Site "A" will require the developer to: (i) design and construct to achieve a 10% reduction in energy performance, calculated in accordance with LEED Core and Shell, Energy and Atmosphere, Prerequisite 2, Option 1, or design and construct in accordance with the Prescriptive Compliance Path set forth in LEED Core and Shell, Energy and Atmosphere Credit 1, Option 3; and (ii) employ low flow fixtures, fittings and appliances, which are described in LEED Core and Shell, Water Efficiency, Prerequisite 1. For Retail Site "B" and senior housing components of the development, through the request for proposals process the City would look favorably upon proposals that enhance the energy-efficiency of buildings. This may include designing and constructing to achieve LEED Silver certification, using fewer raw materials, making the best of natural light where appropriate, improving indoor air quality, and decreasing the total impact on the natural and human environment. These designs may also include features aimed at reducing energy consumption and greenhouse GHG emissions, such as:

- Energy efficient building envelopes to reduce cooling and heating;
- High-efficiency HVAC systems, incinerators and/or generators;
- Window glazing to optimize energy performance by allowing for day-lighting while managing both heat loss and solar heat gain; and
- Fuel from renewable sources or less GHG-intense fuels, such as natural gas, co-firing of biomass or use of biofuels or bioheat for heating fuel or in vehicles/equipment.

Based on all of the above factors, no potential for significant adverse energy impacts would result from the proposed project.