8.0 NEED FOR POWER

This chapter provides an assessment of the need for electric power in support of the Combined License Application (COLA) for the proposed Nine Mile Point Unit 3 Nuclear Power Plant (NMP3NPP). Also provided is a description of the existing regional electric power system, current and future demand for electricity, and present and planned power supplies.

The U.S. Nuclear Regulatory Commission (NRC) has indicated that the Environmental Report (ER) should include consideration of the benefits of the proposed action and that the ER must assess the need for power to characterize accurately the benefits associated with the proposed action (NRC, 2007). NMP3NPP would be a U.S. Evolutionary Power Reactor (EPR) with a rated and design net electrical output of approximately 1,600 megawatts electric (MWe). The NMP3NPP is proposed to serve as a baseload facility. NMP3NPP is projected to open for initial commercial operation in 2016. NMP3NPP would be a merchant facility providing energy to electric companies.

The owner of NMP3NPP is Nine Mile Point 3 Nuclear Project, LLC. The operator is UniStar Nuclear Operating Services. Nine Mile Point 3 Nuclear Project, LLC is a limited liability company and is an indirect subsidiary (through UniStar Nuclear Holdings, LLC and UniStar Project Holdings, LLC, which operate as holding companies) of UniStar Nuclear Energy, LLC (UniStar Nuclear Energy). UniStar Nuclear Energy is owned jointly by Constellation New Nuclear, LLC and by EDF Development, Inc. Constellation New Nuclear is an indirect subsidiary (through Constellation Energy Nuclear Group, LLC) of Constellation Energy Group, Inc (Constellation Energy Group). EDF Development is a indirect subsidiary of (through EDF International, SA) of Èlectricitè de France, SA.UniStar Nuclear Energy (UniStar) is a joint enterprise of Constellation Energy Generation Group (Constellation Energy) and EDF.

According to U.S. Nuclear Regulatory Commission Guidance (NUREG) 1555, Environmental Standard Review Plan (ESRP) 8.1, the geographic scope for the need for power might be defined in the application by a utility service area, but it also exists in a larger geographic context because power from the facility will flow outside a relevant utility service area boundary. This larger area is the relevant market area. The boundary of the relevant market area is primarily a function of the way the transmission system is planned and managed, but also has electrical and economic features (NRC, 2007).

The relevant market area for the purposes of this chapter is the region served by the New York Independent System Operator (NYISO), or in geographic terms, the entire state of New York (Figure 8.0-1). Electricity used by New York's consumers is bought and sold in the competitive wholesale electricity markets administered by the NYISO. The NYISO is the regional transmission organization that serves as the electricity broker for New York State and maintains the reliability of the bulk electricity grid for all suppliers of electricity, including those generators within the state. Electricity demand and the resources to meet that demand are satisfied first within the NYISO. The NYISO also coordinates reliability assessments with adjacent regional transmission organizations (RTOs). If available, surplus electricity would be made available to adjacent RTOs when demand requires it. Generators that sell electricity in the NYISO are contractually obligated to meet the reliability requirements as scheduled with the NYISO.

The Nine Mile Point Nuclear Station (NMPNS) units would generally fulfill contractual obligations within NYISO and its affiliated reliability region, Northeast Power Coordinating Council (NPCC). NYISO makes reliability reports to NPCC, which also includes Independent System Operator (ISO) New England and several Canadian provinces. Because transmission interties are limited and congested between NYISO and other markets, UniStar and Constellation Energy focused on the need for power in the NYISO and the reports prepared by that organization in order to identify the benefits associated with the proposed unit. The studies prepared by NYISO fulfill the required evaluation criteria found in NUREG-1555; they are (1) systematic, (2) comprehensive, (3) subject to confirmation and (4) responsive to forecasting uncertainty. Probable competitors within NYISO are discussed in Section 8.4.1.

Similar to other states across the nation, New York has undergone the deregulation of its utilities. The restructuring, which occurred in the mid-1990s, developed a framework for the wholesale electricity market and resulted in individual utilities selling most of their generating stations. The deregulation also resulted in the creation of an ISO to replace the existing New York Power Pool (NYPP). The NYISO is a not-for-profit organization responsible for administering wholesale energy markets in New York and operating the high-voltage electric transmission system in the state. These activities are conducted in accordance with the reliability standards adopted by the New York State Reliability Council (NYSRC). The Federal Energy Regulatory Commission (FERC) approved the proposed actions on December 1, 1999, at which time the NYISO officially began operations (NYISO, 2007).

Since the deregulation of electric utilities in New York, the NYISO evaluates and determines resource needs for the regional power supply. The area under the control of the NYISO is the New York Control Area (NYCA), and it includes the entire state of New York. With these goals in mind, the NYISO, in conjunction with stakeholders, developed and implemented its Comprehensive Reliability Planning Process (CRPP).

As noted in NUREG-1555, "Standard Review Plan for Environmental Reviews of Nuclear Power Plants" (ESRP) Section 8.1 (NRC, 2007):

> Affected States and/or regions are expected to prepare a need-for-power evaluation. Similarly, State or regional agencies may require the applicant to document a need for power or plan for future plant construction. The applicant may choose to rely on those documents rather than prepare a description of the power system of its own. If so, NRC staff should review these documents to determine if they are (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Of particular concern are third-party plans or reports restricted to boundaries smaller than relevant service and market areas. Another concern is plans and studies that do not extend far enough into the future to provide an adequate basis for comparison. If NRC staff conclude these other documents are acceptable, no additional independent review by NRC staff may be needed and that analysis can be the basis for ESRPs 8.2 through 8.4.

Additionally, the NRC recognizes that the "need for power" should be analyzed on an individualized basis (NRC, 2000):

> The guidance in (ESRP 8.0) is limited because changes in the regulatory structure are occurring as the guidance is being revised. Reviewers of issues related to the need for power should identify current NRC policy before beginning their review. Deregulation in the electricity market will have a significant impact on the analysis of the need for power. Applicants may be power generators rather than utilities; <u>therefore, analysis of the need for power must be sufficiently flexible to accommodate the applicant type</u> [emphasis added]. (NRC, 1999)

The following sections show that the licensing process and other regulatory reviews occurring in the Market in New York State. meet the characteristics of an acceptable analysis of the need for power that satisfies NUREG 1555.

Section 1.1 of the NRC Regulatory Guide 4.2, Rev. 2, *Preparation of Environmental Reports for Nuclear Power Stations* (NRC, 1976) states that the need for new capacity should be addressed in the following manner:

> *… the applicant should demonstrate the purpose of, and thus the benefits of, the proposed facility with respect to the power requirements to be satisfied, the system reliability to be achieved, or any other primary objectives of the facility and how these objectives would be affected by variations in the scheduled operation of the proposed station.*
>
> *…the term "applicant's system" includes all existing, committed, and planned generating units owned in whole or in part by the applicant and all large (greater than 100 MWe), existing, committed, and planned generating units not owned in whole or in part by the applicant that it plans to rely on for meeting demand and reliability requirements to which it is committed.*

This chapter provides a summary of the process used for analyzing the need for power, and demonstrates how this process satisfies the NRC criteria. The following sections describe the analysis of the need for power:

- Description of Power System (Section 8.1);
- Power Demand (Section 8.2);
- Power Supply (Section 8.3); and
- Assessment of Need for Power (Section 8.4).

The following four sections demonstrate that the NYISO CRPP meets the NRC criteria and is adequate for supporting the need-for-power evaluation in this chapter. Although UniStar is the license applicant, NYISO is the entity responsible for delivering electric power to its members (electric utilities) in the region servicing the public. These commitments to provide power to members require NYISO to prepare need-for-power evaluations including forecasting future demands and evaluating reliability. These commitments show that the licensing process and other regulatory reviews occurring in New York meet the characteristics of an acceptable analysis of the need for power that satisfies NUREG-1555.

8.0.1 REFERENCES

NRC, 1976. "Preparation of Environmental Reports for Nuclear Power Stations," Regulatory Guide 4.2, Revision 2, USNRC Regulatory Guide Series, July 1976.

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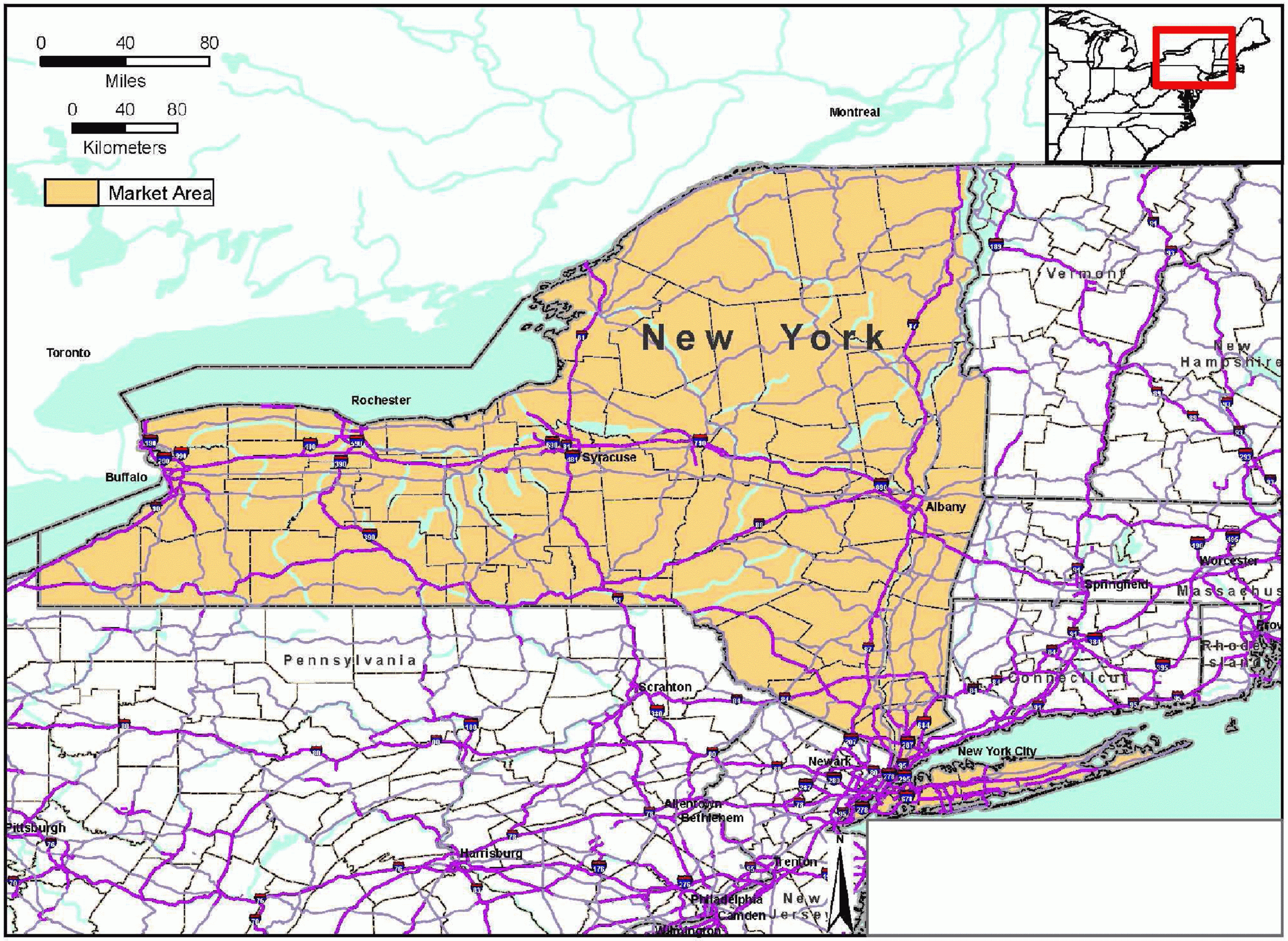
NYISO, 2007. "2008 Reliability Needs Assessment, Supporting Documents, and List of Appendices for the 2008 Comprehensive Reliability Planning Process," December 10, 2007.

Figure 8.0-1—Market Area



8.1 DESCRIPTION OF POWER SYSTEM

This section evaluates the following criteria described in NUREG-1555 (NRC, 1999):

> Affected States and/or regions are expected to prepare a need-for-power evaluation. Similarly, State or regional agencies may require the applicant to document a need for power or plan for future plant construction. The applicant may choose to rely on those documents rather than prepare a description of the power system of its own. If so, NRC staff should review these documents to determine if they are (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Of particular concern are third-party plans or reports restricted to boundaries smaller than relevant service and market areas. Another concern is plans and studies that do not extend far enough into the future to provide an adequate basis for comparison. If NRC staff conclude these other documents are acceptable, no additional independent review by NRC staff may be needed and that analysis can be the basis for ESRPs 8.2 through 8.4.
>
> If NRC staff determine these documents are not acceptable, it may request additional information from the applicant, or it may supplement the information provided with information from other sources, such as the Energy Information Administration, the Federal Energy Regulatory Commission (FERC), NERC and applicable member councils, and others to ensure adequate geographic coverage.(NRC, 2007)

Additionally, ESRP 8.1 provides the following information about the NRC's criteria for and analysis of regional transmission systems (NRC, 2007):

The determination of the need for new generation requires evaluation of both utility supplies compared to projected demand, and demand in the relevant service and market areas. The applicant may provide or NRC staff obtains information from sources that encompass different geographic areas. Therefore, NRC staff must be specific about what area they are referencing, such as utility service area, State, (regional transmission operators/independent system operators) RTO/ISO area or regional market, NERC region, or other area if appropriate.

This section also provides a description of the power system in New York and reviews the criteria described in NUREG 1555. The four criteria of the NRC for need for power evaluations are discussed in Sections 8.1.1 through 8.1.4. The following sections show that the NYISO CRPP meets these four criteria and is adequate for supporting the need-for-power evaluation.

Constellation Energy is an energy company that currently owns 78 electricity-generating facilities across the United States, with generating capacity of approximately 8,700 megawatts (MW). This group of generating facilities, all strategically located in or near competitive market areas where deregulation enables customers to choose their energy suppliers, is diversified by fuel, location and technology, and includes nuclear, coal, natural gas, oil, and renewable and alternative fuel (solar, geothermal, hydro, and biomass) facilities. The breakdown of fuel type diversity for Constellation Energy's generating facilities is approximately 61% nuclear, about 35% coal, approximately 4% renewables, and less than 1% oil and natural gas combined. Constellation Energy currently produces more than 60 million megawatt hours (MWh) annually. As a merchant energy business, Constellation Energy's wholesale customers include distribution utilities with no generation assets, such as Baltimore Gas and Electric Company (BGE), electric cooperatives, municipalities, and power marketers. (Constellation Energy, 2008).

The existing NMPNS has contracts with entities including Central Hudson Gas and Electric, New York State Electric and Gas, Niagara Mohawk Power Corporation, Rochester Gas and Electric Corporation, and the New York Independent System Operator. These contracts generally run between 8 and 10 years, with some terminating as soon as 2009 (Nine Mile Point Nuclear Station, LLC, 2008).

The merchant energy business of Constellation Energy operates and maintains fossil fuel and renewable generating facilities, and holds interests in qualifying facilities, fuel-processing facilities, and power projects in the United States. This includes a nuclear generation operation that provides energy products and services relating to load-serving obligations to wholesale and retail customers, including distribution utilities, cooperatives, and aggregators, as well as commercial, industrial, and governmental customers. In 2007, the merchant energy business provided approximately 32,700 MW of peak load in the aggregate to distribution utilities and municipalities, and to commercial, industrial, and governmental customers. It also managed approximately 8,730 MW of generation capacity.

Constellation Energy also owns 2,136 MW of nuclear generation capacity in the state of New York and has power purchase agreements for most of its output. Facilities with power purchase agreements include NMPNS and the R.E. Ginna Nuclear Plant. Both NMPNS and the R.E. Ginna Nuclear Plant are located within the NYISO region. As previously noted, Constellation Energy is also contractually obligated to meet electricity reliability needs with the NYISO. The market area for the NMP3NPP is consistent with the Constellation Energy market area in New York as shown in Figure 8.0-1.

The New York State Public Service Commission (NYSPSC) regulates electric, gas, steam, water, and telecommunications utilities and oversees the cable industry in the state. The New York Department of Public Service (NYDPS) is the staff arm of the NYSPSC. The NYSPSC is authorized by law to supervise the electric industry such that the residents of New York have access to reliable and reasonably priced utility services. The NYSPSC has the responsibility of setting rates and ensuring that state utilities provide adequate service. The NYSPSC also has jurisdiction over the siting of major gas and electric transmission facilities and ensures the safety of natural gas and liquid petroleum pipelines. (NYSPSC, 2008).

In New York, electric-generating project developers are required to obtain all appropriate local and state permits and approvals, and to undergo environmental review subject to the State Environmental Quality Review Act (SEQR) (Article 8 of the Environmental Conservation Law). If it is an electric corporation as defined in Section 2(13) of the PSL, a merchant project developer must also obtain a certificate of public convenience and necessity (CPCN) pursuant to Section 68 of the PSL. In order to obtain a CPCN, the developers must demonstrate that there is a public need for the project.

Article VII of the New York State PSL provides a review process for the consideration of any application to construct and operate new major utility transmission. The law requires that an applicant apply for a certificate of environmental compatibility and public need and meet the Article VII requirements before constructing any such facility. This law requires that the NYSPSC make a decision based on the complete information after the public and all interested parties have had an adequate opportunity to comment and participate in hearings.

The purpose of the New York State Energy Plan (NYSEP) is to provide broad statewide energy policy direction to guide state agencies, boards, commissions, and authorities in making decisions. The Energy Planning Board has adopted the following public policy objectives (New York State Energy Planning Board, 2002):

- Supporting the continued safe, secure, and reliable operation of the state energy and transportation systems infrastructures

- Stimulating sustainable economic growth, technological innovation, and job growth in the state energy and transportation sectors, through competitive market development and government support
- Increasing energy diversity in all sectors of the state economy through greater use of energy-efficiency technologies, and alternative energy resources, including renewable-based energy
- Promoting and achieving a cleaner and healthier environment
- Ensuring fairness, equity, and consumer protections in an increasingly competitive market economy

Additional details on the NYSEP are provided in Section 8.2.2.

The NYISO is a not-for-profit corporation that began operations in December 1999 and serves approximately 19.3 million customers in New York. The NYISO is responsible for managing the bulk electricity grid for the state, administering its wholesale electricity markets, and providing comprehensive planning for the electric power system for the state, including more than 335 power plants on approximately 10,775 miles of transmission lines (NYISO, 2008a). Figure 8.1-1 shows the bulk power system and key transmission interfaces for the NYCA. The main facilities are generally limited to those that are 230 kV and above, but do include certain 138 kV facilities and a very small number of 115 kV facilities. The balance of the facilities, 138 kV and lower, are considered non-bulk or subtransmission facilities (NYISO, 2008b). Expansions to the transmission system could occur from market driven solutions or from regulated backstop solutions identified by NYISO. While market driven solutions are mainly based on economic factors, regulated backstop solutions are required to meet the necessary reliability standards. The NYISO balances the supply and demand for electricity, on a minute-by-minute basis, consistent with reliability standards and market rules. The NYISO conducts and administers auctions where electric suppliers sell energy to companies serving retail customers. The NYISO also manages these markets for capacity, transmission congestion, reserves, and other services that are necessary for maintaining quality and reliability (NYISO, 2008c).

In addition to these priorities, the NYISO is responsible for important planning functions, including an assessment of the current system and determining future system needs. The NYISO CRPP focuses on reliability and was approved by FERC. The first phase of the process is the Reliability Needs Assessment (RNA), and the second phase is the CRPP. Additional details on the CRPP are discussed in Sections 8.2 and 8.3.

The NYISO does not have the authority to license or construct projects to respond to reliability needs. The ultimate approval of those projects lies with regulatory agencies such as FERC, NYSPSC, environmental permitting agencies, and local governments. The NYISO monitors the progress and continued viability of proposed market and regulated projects to satisfy identified needs, and reports its findings in annual plans (NYISO, 2007a).

The NYISO operates the state's bulk electricity grid in accordance with reliability standards and criteria set by the North American Electric Reliability Council (NERC) (which also serves as the Electric Reliability Organization (ERO)), the NPCC, and the NYSRC. Since passage of the Energy Policy Act of 2005 (EPACT) that made national reliability standards mandatory and led to the designation of NERC as the ERO in 2006, a greatly expanded set of mandatory reliability standards and criteria affecting almost every aspect of grid operations and planning are now in effect on a nationwide basis. These standards and criteria form the basis for the NYISO's secure operation of the bulk electricity grid, which means that at all times, the grid is able to withstand the loss of some resources and still meet the demand for electricity (NYISO, 2008c).

The NERC's mission is to improve the reliability and security of the bulk power system in North America. To achieve that, the NERC develops and enforces reliability standards; monitors the bulk power system; assesses future adequacy; audits owners, operators, and users for preparedness; and educates and trains industry personnel. The NERC develops and publishes annual long term reliability assessment reports to assess the adequacy of the bulk electric system in the United States and Canada over a 10 year period, including summer and winter assessments, as well as special regional, interregional, or interconnection assessments as needed. These reports project electricity supply and demand, evaluate transmission system adequacy, and discuss key issues and trends that could affect reliability (NERC, 2007).

The purpose of the regional entities under NERC is to ensure the adequacy, reliability, and security of the bulk electric supply systems of the region through coordinated operations and planning of their generation and transmission facilities. These processes provide a streamlined and systematic regulatory program to ensure that power plants are built to satisfy agency obligations to provide reliable, reasonably priced electricity without harming natural resources.

8.1.1 SYSTEMATIC PROCESS

The NYISO CRPP is systematic in that it consists of steps that can be independently replicated. The process is well documented, evolving, and completed on an annual basis. [Note that the NYISO has filed a request with FERC to conduct the CRPP on a biannual basis.] As an RTO, the NYISO is responsible for the safe and reliable operation of the transmission system in its region, as well as administration of competitive wholesale electricity markets. The NYISO CRPP not only includes an assessment of resource (power) adequacy, but also includes an assessment of transmission reliability. Assessments of the NYISO power system are conducted for 5 to 10 year planning horizons. These assessments determine the reliability of the bulk power system and aid in identifying solutions to reliability needs. The reliability of the system is evaluated in accordance with existing reliability criteria established by the NERC, NPCC, and NYSRC (NYISO, 2007a).

The philosophy behind the CRPP is market based, which indicates a preference for market solutions to satisfy the identified reliability needs. However, if the market does not respond with solutions in a timely manner, the NYISO has administrative remedies that include designating responsible transmission owners (TOs) or non TOs with a regulated backstop solution or alternative regulated backstop solution to maintain reliability.

A number of NYISO processes and planning factors are incorporated into determining the need for power. These processes are documented and published to ensure that the planning process is transparent. These criteria and a description of the nature of long-term planning for bulk power systems are described in detail in the CRPP manual from the NYISO (NYISO, 2007a). The NYISO monitors the viability of the market to meet identified reliability needs and reports its findings in annual plans. Figure 8.1-2 summarizes the NYISO reliability planning process.

It should be noted that the NYISO does not have the authority to license or construct projects to respond to reliability needs, and that the ultimate approval of the projects lies with regulatory agencies such as FERC, NYSPSC, environmental permitting agencies, and local governments.

8.1.2 COMPREHENSIVE PROCESS

The CRPP is comprehensive in that it considers input from stakeholders in the Transmission Planning Advisory Subcommittee (TPAS) and the Electric System Planning Working Group (ESPWG). Generally, the TPAS focuses on the reliability analyses, and the ESPWG is responsible for providing economic assumptions used in the reliability assessment scenarios and the reporting of congestion costs. The ESPWG includes market participants from all sectors, including the New York State Energy Research and Development Authority (NYSERDA) and NYDPS, that are stakeholders in the electric system needs for New York (NYISO, 2007b).

The first step in the CRPP is the Reliability Needs Assessment (RNA), which evaluates the adequacy and security of the bulk power system over a ten year study period. If the RNA identifies a reliability need in the 10-year study period, the NYISO will designate one or more responsible Transmission Owners (Responsible TOs) who are responsible for the development of a regulated backstop solution to address the identified need. In addition, the NYISO will solicit market-based and alternative regulated solutions to address the identified need. Solutions must satisfy reliability criteria, including resource adequacy. NYISO staff prepares a draft comprehensive reliability plan (CRP) following its evaluation of all proposed solutions (including alternative regulated solutions) and presents it to TPAS and ESPWG. The CRP identifies all proposed solutions that the NYISO has found to meet part or all of the identified reliability needs. The CRP will indicate if a viable, market-based project exists that meets the identified need in a timely manner. The CRP will also state if there is no viable market-based proposal and the NYISO will then determine if a regulated backstop solution needs to be implemented to maintain bulk power system reliability. If a regulated backstop project must proceed, the NYISO will request the NYSPSC to choose the responsible TO or TOs or non TO to proceed with regulatory approval and development of its regulated backstop or alternative regulated bacsktop solution.

Based on the results of the TPAS and ESPWG review, the NYISO staff undertakes additional analyses as necessary, revises the draft CRP, if necessary, and prepares a final draft CRP. The NYISO Operating Committee reviews and votes on the draft CRP document. A market participant cannot offer alternatives and discuss changes with NYISO staff during the CRPP through TPAS and ESPWG. However, a market participant can raise unresolved or new disputes for resolution by NYSPSC and/or FERC.

The Operating Committee determines whether the Management Committee should recommend that the Board of Directors approve the draft CRP. Thereafter, the final draft CRPP document is provided to the Management Committee for its review and vote. The NYISO will report minority opinions on the draft CRP from the Operating Committee to the Management Committee (NYISO, 2007b).

8.1.3 CONFIRMATION PROCESS

The CRPP is subject to confirmation. FERC approved the NYISO planning process in December 2004, and the NYISO Board of Directors approved the first CRPP in August 2006. In addition, NYISO submits capacity and demand forecasting reports to the NPCC. The NPCC is one of the eight approved regional entities in North America, under the NERC, and it gathers similar power-planning information from other RTOs in its region for use in its own system planning. The forecasting reports that are filed with the NPCC are also filed with FERC. Additional details on the relationship between the NYISO and NERC are provided in Section 8.1.4.

FERC issued the final rule, Order 890, in its Open Access Transmission Tariff (OATT) reform proceeding in February 2007. Order 890 directed improvements to the OATT of all transmission owners and operators, including ISO and RTOs. The purpose of the order is to eliminate opportunities for undue discrimination, provide greater specificity in the pro forma OATT, and increase transparency in the rules applicable to planning and use of the transmission system. These countermeasures would correct deficiencies in the OATT that have become apparent since the issuance of the order (NYISO, 2007b). The revised economic planning and greater transparency means that there are increased opportunities for comments, and a greater level of confirmation is added.

Another part of the confirmation process involves the State of New York. All electric-generating project developers are required to obtain all appropriate local and state permits and approvals, and to undergo environmental review subject to the SEQRA (Article 8 of the Environmental Conservation Law).

8.1.4 CONSIDERATION OF UNCERTAINTY

The process conducted by NYISO is responsive to forecasting uncertainty. The NYISO CRPP includes preparing long-range plans that evaluate and forecast future energy demand over a long period. The data used in the model are based on forecasts of future economic, societal, technological, and power market conditions, which inherently involve a great deal of uncertainty.

The evaluation of reliability in the market makes allowances for demand uncertainty, scheduled outages and deratings, forced outages and deratings, assistance over interconnections with neighboring control areas, capability of New York State Transmission System to transfer, and capacity and/or load relief from available operating procedures pursuant to the NYSRC regulations (NYISO, 2007b). UniStar and NYISO recognize that uncertainties in market trends, income, rapid increase in population and demand, and fuel supply diversity will remain significant uncertainties in forecast methodology.

8.1.5 REFERENCES

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NYISO, 2007b. Draft Comprehensive Reliability Planning Process (CRPP) Manual, Manual 26, September 2007.

NYISO, 2008a. Power Trends, 2008.

NYISO, 2008b. 2008 Comprehensive Reliability Plan, July 15, 2008.

NYISO, 2008c. 2008 Load & Capacity Data "Gold Book."

NYSPSC, 2008. Information about the Public Service Commission, available at the New York Department of Public Service website.

Figure 8.1-1—NYISO Transmission Map

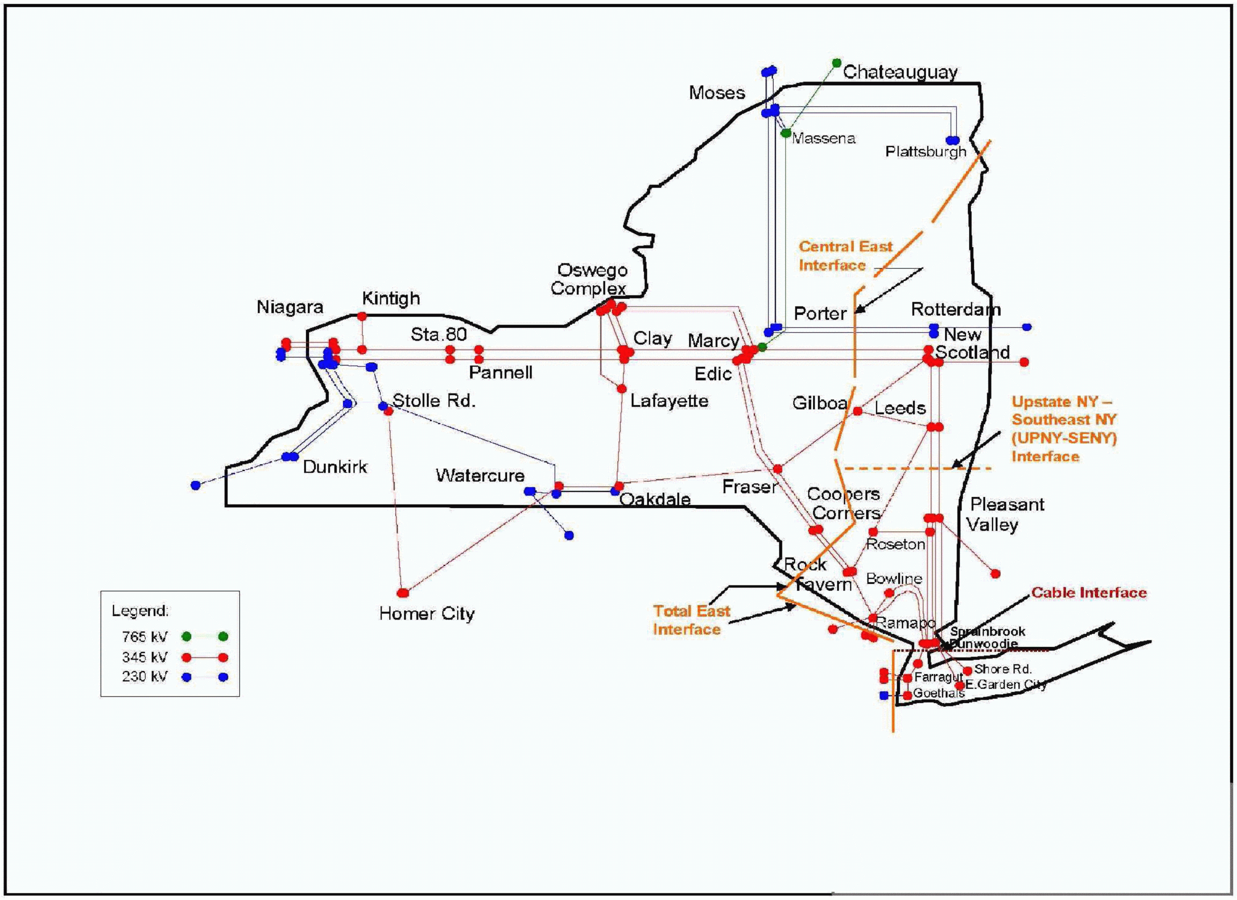
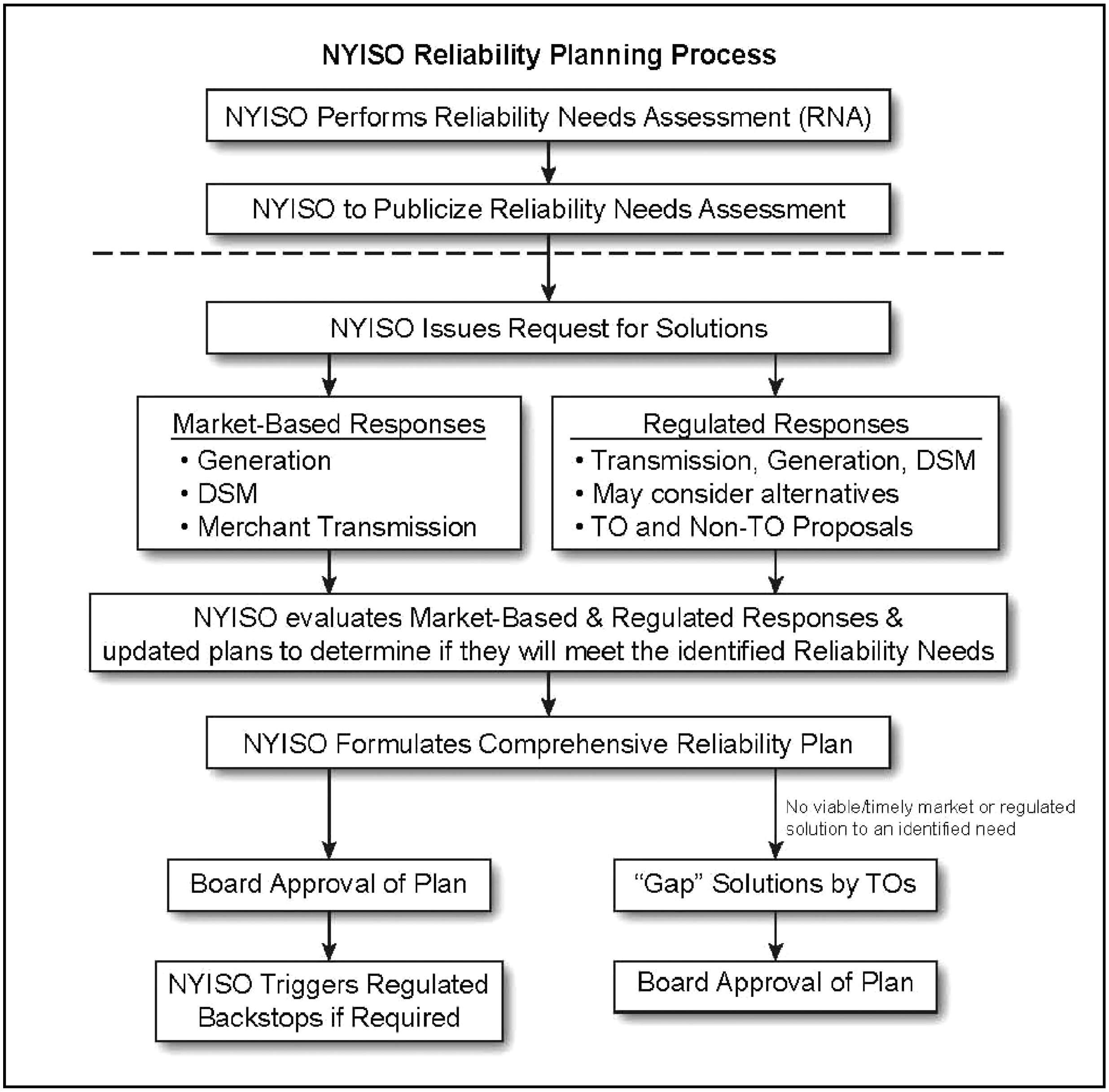


Figure 8.1-2—NYISO Reliability Planning Process



Source: NYISO, 2007a

8.2 POWER DEMAND

Guidance in NUREG-1555, ESRP 8.2, requires that a description of the demand for electricity be provided (NRC, 2007). This section contains information about the anticipated electrical demands, as well as the factors affecting power growth and demand in the market area. The need for power establishes a framework for evaluation of project benefits and for the geographic boundaries over which benefits and costs are distributed.

Load forecasts for the NYCA are presented in the NYISO 2008 Load and Capacity Data Gold Book (NYISO, 2008b)." The NYCA baseline peak demand forecast shows a compound growth rate of 0.94% for the 10-year period of 2008 through 2018. During this same period, the net energy forecast shows a compound growth rate of 1.18%. This is a modest decrease from the 2007 report where the compound growth rate for peak demand was 1.18% for the 10-year period of 2007 through 2017. In 2007, the compound growth rate for annual energy during this period was 1.34%. The 2008 forecast for Zone K (Long Island) is virtually unchanged; the forecast for Zone J (New York City (NYC)) is lower primarily because of new planned conservation activities. The changes in the remaining zones reflect new economic forecasts and updates of actual and weather-normalized energy usage trends. Table 8.2-1, shows the long-term forecasts for the NYCA.

NMP3NPP would be developed as a merchant facility, which is a facility that can sell electricity anywhere within the NYISO wholesale market area and the NPCC. As a merchant facility, the power generated could be distributed to NYISO members or it could be sold outside the relevant wholesale market area through its interties. Merchant facilities have the ability to sell energy to the wholesale market but they are limited by the capabilities of the transmission system.

NYISO actually imports electricity to meet its market needs but it is generally limited by the existing transmission capabilities within the Constellation Energy market area and within the NYISO market area. At times, the NYISO exports electricity through the five reliability coordinators of the NPCC but is often limited by the capabilities of the existing transmission system (NERC, 2007). Additional details on the power sales in the NYCA are contained in Section 8.3.2.

Typically, the market needs are met by baseload facilities. Baseload facilities produce larger amounts of energy, operate most of the time, and provide a constant source of power to the energy grid. Intermittent facilities generally are used to augment the need for baseload power when demand exceeds capacity. Peaking facilities have no reserves and little capacity, and are used in response to high levels of demand for energy. As stated in Section 8.0, the NMP3NPP is proposed as a baseload facility.

8.2.1 POWER AND ENERGY REQUIREMENTS

NUREG-1555 (NRC, 2007) provides the following guidance in ESRP 8.2.1:

> Affected States and/or regions, NERC reliability councils, and regional transmission organizations may prepare need-for-power evaluations for proposed generation and transmission facilities. The staff should review applicable evaluations and determine if each is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty…If the need for-power evaluation is found acceptable, no additional independent review by the NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4. (NRC, 2007)

As the RTO, one of the primary functions of the NYISO is planning reliability on a regional basis. Pursuant to a request from FERC, the NYISO initiated the ESPWG to administer a comprehensive planning process within the region. The ESPWG consists of market participants from all sectors, including NYSERDA and NYDPS, that are stakeholders of electric system needs in New York. In 2004, FERC approved the reliability planning process developed by the ESPWG. The reliability planning process is shown in Figure 8.1-2. As described in Sections 8.1.3, the NYISO CRPP is systematic and subject to confirmation.

Power demand can best be analyzed by evaluating its two major components: power and energy requirements, and factors affecting growth of demand. This section provides relevant information about electrical demand, demand growth in the region, and other factors affecting the need for new power.

The following information about the NRC criteria for, and analysis of, power demand evaluations is provided in NUREG 1555, ESRP 8.2.1 (NRC, 2007):

This environmental standard review plan (ESRP) directs the staff's analysis and evaluation of the historic and projected electricity consumption and peakload demands in the relevant service area or market. The scope of the review directed by this plan should include a detailed analysis and evaluation of the applicant's treatment of these projections and, where needed, an independent assessment of forecasts of growth in electricity consumption and peakload demand in the relevant utility service and market areas.

NMP3NPP would be developed as a merchant plant with the ability to provide electricity to Constellation Energy customers primarily in the NYISO wholesale market area, but also to provide electricity to customers outside the NYISO wholesale market. Historical and forecasted load information for the wholesale market area was taken from the NYISO Load Forecasting Model (LFM). As the RTO for the region, NYISO calculates long term forecasts of peaks, net energy, and load management for zones and regions in the RTO.

The NYISO has divided the state into 11 pricing or load zones that are labeled as letters A through K as shown in Figure 8.2-1. The development of these load zones was driven primarily by the topology or configuration of the transmission system and secondarily by the utility owned areas. The load areas were initially developed as part of the NYPP in the late 1960s. The load areas were used as part of the process to identify critical bulk power system transmission interfaces. Subsequently, these load zones were utilized to define pricing zones for the wholesale electricity market. (NYISO, 2007a)

The measures of reliability generally are divided between probabilistic measures (loss of load probability, frequency, and duration of outages) and non probabilistic measures (reserve margin and capacity margin). Capacity margin, the commonly used term, is the ratio of reserve capacity to actual capacity, while reserve margin is the supply capacity that a company maintains in excess of anticipated demand. This excess helps the company maintain reliable load regardless of unanticipated interruptions in supply (generation or transmission capacity) or increases in demand. Capacity margins and reserve margins are discussed further in Section 8.3.3.

The NYISO methodology for producing the long-term forecasts for the RNA consists of the following steps (NYISO, 2007b):

- Econometric forecasts were developed for zonal energy using quarterly data from 1993 through 2006. This differs from past years in which the NYISO used annual energy from

1975 to the current year. The benefits of this change are that more observations are available to fit data, and only the more recent data are included in the models. While these earlier data still provide useful information on how the state economy reacts to economic cycles, the data may no longer be appropriate in representing the future trends in the state's economy.

- For each zone, the NYISO estimated an ensemble of econometric models using population, households, economic output, employment, cooling-degree days, and heating-degree days. Each member of the ensemble was evaluated and compared to historical data. The zonal model chosen for the forecast was the one that best represented recent history and the regional growth for that zone. The NYISO also received and evaluated forecasts from Consolidated Edison of New York (Con Edison) and Long Island Power Authority (LIPA), which were used for Zones H, I, J, and K.

- The summer and winter non-coincident and coincident peak forecasts for Zones H, I, J, and K were derived from the forecasts submitted to the NYISO by Con Edison and LIPA. For the remaining zones, the summer and winter coincident peak demands were derived from the zonal energy forecasts by using average zonal weather-normalized load factors from 2001 through 2006. The 2007 summer peak forecast was matched to coincide with the 2007 installed capacity (ICAP) forecast.

Load forecasts are an important component of the NYISO reliability planning process. In addition, the examination of load levels also provides insight into market conditions. Figure 8.2-2 (Potomac Economics, 2008) shows the real-time load duration curves from 2005 through 2007. These load duration curves show the number of hours that the load is greater than indicated on the vertical axis. In most hours, the load grew modestly from 2006 to 2007; however, the curves show that there were considerably fewer peak load hours in 2007 because of milder summer peak temperatures.

The NYPP/NYISO LFM is used to forecast future loads and energy demands across the NYCA. The most important objective of the model is to forecast hourly loads for the day-ahead market. The 5- and 10-year horizons meet NERC standards and allow facilitation for the planning of future capacity needs.

The NYISO model uses historical data on energy usage in determining future electrical needs. Elements such as energy efficiency measures (that is, changes to building codes, technology improvements), energy substitution (that is, use of natural gas instead of electricity), the price of alternative fuels, and saturation levels of electricity using devices are generally reflected in this historical data. The recent historical data would reflect any changes in energy use or consumption due to these measures.

The model focuses on the next-day hourly load forecast, and the central data set consists of hourly loads for the NYCA. The model uses data from 1993/1994 through 1998 to provide estimates for the necessary input. Other key drivers for the model include weather, day-type, and economics. The system-level models use weather information gathered from 17 weather stations across New York. Day-type information is contained in a master daily calendar that includes information on the days of the week and holidays. Economic data at the state, metropolitan area, or county level are incorporated into the model (NYISO, 2005).

An important part of the NYISO 2008 CRPP is to assess the adequacy of the electricity infrastructure of New York for meeting reliability and market needs over the 10-year period from 2007 to 2017. Table 8.2-2 shows that the NYCA is a summer-peaking system and that the summer peak has grown faster than the annual energy and winter peak over the 1993 to 2006 period. As shown in Table 8.2-2 and Table 8.2-3, both summer and winter peaks vary considerably from year to year due to extreme weather conditions (NYISO, 2007b). NERC has indicated that the summer peak demands in the New York area are expected to grow at an average annual rate of 1.2% through 2016. The forecast developed by the NYISO is based on historical weather-normalized loads provided by the TOs of New York State (NERC, 2007).

8.2.2 FACTORS AFFECTING GROWTH AND DEMAND

This section reviews the factors that affect growth in power demand in the market area. As previously discussed, with the proposed construction of the NMP3NPP, UniStar plans to add approximately 1,600 MWe of generating capacity within the NYISO market area. As noted in Section 8.1, NYISO serves approximately 19.3 million people including Albany and NYC, which is a major load center in the United States.

Most power-generating facilities operate in a similar fashion in that they operate by using some form of energy to drive a generator to produce electricity. These energy sources can include nuclear fission, steam from coal, natural gas, oil, water, solar, and wind. Each of these technologies has different performance characteristics, entails different capital costs, and carries different operation and maintenance costs.

The power plants that are least expensive to run operate almost continuously to meet the minimum level of electricity that is demanded by a system (the baseload). Baseload facilities, which are typically coal-fired or nuclear facilities, are generally in continual operation and provide electricity to meet the base demand requirements on the system. Because the facilities operate continuously, it is desirable for baseload facilities to utilize the least expensive fuels. During periods when consumers demand more electricity, the power plants that can be quickly fired up to meet the peak load are put into operation. While expensive to operate because of fuel costs (typically oil or natural gas), these "peaking plants" are relatively inexpensive to construct.

Peak demand occurs when consumers in aggregate demand the greatest amount of electricity of the system over an hourly period. Over the course of a year, peak demand usually occurs on hot summer afternoons and cold winter evenings. In New York, peak demand is generally reached after a buildup of hot summer days when air conditioning is in full use. Electric generation is built to satisfy peak demand plus a safety margin reserve; demand-response programs help shave peak demand. The following sections discuss efforts identified to conserve and promote customer conservation of electrical energy.

The general purpose of the forecasting model is to provide information about future loads and energy demands across the NYCA. Certain variable factors have a greater influence on electricity demand and are estimated for modeling purposes. Economic and demographic trends are generally consistent in the short term but can vary greatly over time, having significant impacts on energy demand and supply.

Economic data used to forecast the electricity demand were collected in the fall of 2006. The data included detailed estimates of employment, output, income, and other factors for each of the 23 regions in the state. The annual employment growth rate in New York is projected to have modest economic growth (about 1.2%) through 2010, followed by slower growth thereafter. The highest levels of job growth are anticipated in the health, education and government sectors, with lower levels of growth anticipated in the business and retail sectors (NYISO, 2007b). The population forecast projects slower growth in every region of the state. In both 2005 and 2006, population decreases occurred in upstate regions. The upstate population is projected to remain flat through 2010, and then decline. In NYC and Long Island, population growth is expected to be small until 2015, when it is expected to decline. These population declines are generally attributed to the relocation of the retirement age population cohort to other states. By 2016, the population in the state as a whole is projected to decrease (NYISO, 2007b). Two of the key economic trends that are measured include real economic output (prosperity of business) and total income (prosperity of households). Real economic output is projected to grow annually by approximately 2% through 2010. After 2010, economic output is projected to grow at a rate of about 1.5%. Total income growth is projected to have a similar growth pattern. Both economic indicators are characterized by faster growth in the near term followed by slower growth in the long term (NYISO, 2007b). Summary information for the state of New York is provided in Table 8.2-4 and shows the average annual growth rates for certain economic indicators in 5-year increments. Table 8.2-5 shows minor changes in the market where there is a shift from manufacturing to other industries. These tables generally reflect that minor growth is expected in all of the areas.

Generally, trends in energy supply and demand are affected by a variety of factors that are difficult to predict. These include energy prices, national and worldwide economic growth, advances in technologies, and future public policy decisions both inside and outside of the United States. However, energy markets change in response to factors that are predictable, such as increasing energy prices, the growing influence of developing countries on worldwide energy requirements, new legislation and regulations, changing public perceptions on energy production (for example, air pollution, greenhouse gases (GHG), alternative fuels), and the economic viability of various energy technologies (Energy Information Administration (EIA), 2008).

According to the EIA branch of the U.S. Department of Energy (DOE), natural gas consumption in the electric power sector is highly responsive to market and price changes, because electricity producers can choose among different fuels on an ongoing basis. In contrast, consumption of natural gas in the residential, commercial, and industrial sectors is influenced not only by fuel prices but also by economic trends. In those sectors, natural gas consumption, which varies with natural gas prices and economic growth rates, is forecasted to increase steadily from 2006 through 2030.

High natural gas prices provide direct economic incentives for reducing natural gas consumption, whereas low prices encourage more consumption; however, the strength of the relationship depends on short- and long-term fuel substitution capabilities and equipment options within each consumption sector. Simply put, higher natural gas prices reduce demand, and higher economic growth rates increase demand. For the year 2019, about 3 years after the beginning of commercial operation at NMP3NPP, natural gas consumption is expected to range from a high of approximately 24 trillion cubic feet (ft^3) (679,604 trillion cubic meters (m^3)) to a low of about 22 trillion ft^3 (622,970 trillion m^3).

In the case of economic growth, consumption in the years 2019-2020 is expected to vary from about 24 trillion ft^3 (679,604 trillion m^3) in the high growth case to about 21 trillion ft^3 (594,654 trillion m^3) in the low growth case. With faster economic growth, disposable income increases more rapidly, and consumers increase their energy purchases either by buying products that consume additional energy (such as larger homes), being less energy-efficient in using products they already own (for example, by setting thermostats higher in the winter and lower in the summer), or both (EIA, 2008).

According to the EIA, conventional oil production in the United States is estimated to grow from 5.1 million barrels per day in 2006 to a peak of 6.3 million barrels per day in 2018, then decline to 5.6 million barrels per day around the year 2030. Dependence on crude oil imports in the United States is expected to decline to about 50% in 2019. There is considerable uncertainty surrounding the future of unconventional crude oil production in the United States. Environmental regulations could either preclude unconventional production or raise its cost significantly. If future U.S. laws limit and/or tax GHG emissions, the laws could lead to substantial increases in the costs of unconventional production, which emits significant volumes of carbon dioxide (CO2). Restrictions on access to water also could prove costly, especially in the arid West. In addition, environmental restrictions on land use could preclude unconventional oil production in some areas of the United States (EIA, 2008).

Additionally, based on 2006 data, approximately 58% of the energy used is from the commercial and industrial sector. The large majority of the remaining energy is used by the residential sector (39%) and a small portion is used for street lighting and other purposes (3%) (NYISO, 2008a). In 2005, the residential sector in New York consumed more natural gas than electricity. Natural gas comprised approximately 47% of the energy consumed while electricity was only 20%. The rest of the energy consumption came from sources such as coal, petroleum and wood (EIA, 2005a).

New York, New Jersey, and Pennsylvania are part of the Middle Atlantic Census Division, occupying the area between the middle Atlantic seaboard and lakes Ontario and Erie in the northeastern United States. The 15 million households in the Middle Atlantic Division account for about 14% of all U.S. households. Winters in this area are among the coldest nationwide, resulting in higher household space-heating requirements; however, summers in the area are milder than in most other parts of the country, and air-conditioning requirements tend to be lower. In 1997 (the most recent year for which data are available), households consumed approximately 1.7 quadrillion British thermal units (Btu) of energy. This was about 17% of the nationwide household energy consumption in 1997 of 10.2 quadrillion Btu. Approximately 21% of the household energy consumption was used to operate air-conditioners and appliances (including refrigerators). The nationwide average was 31% (EIA, 2005b).

As part of the planning process, NYISO also considers energy efficiency and substitution measures, such as demand side management (DSM), for considering methods to reduce customer demand for power (that is, a way of gaining extra kilowatt hours), which in turn can somewhat alleviate the demand on supply-side and transmission resources. Environmental concerns about emissions and the high cost of fuel prices have led to the creation of a variety of state, regional, and national initiatives that promote energy efficiency.

Energy efficiency and DSM programs result in estimated load drops that reduce the demand for energy. There has been a substantial increase in DSM programs in recent years. While beneficial, these programs cannot be reasonably expected to substitute entirely for necessary power upgrade projects. DSM measures are generally considered the cheapest possible compliance option and are often projected to provide a positive cash flow to the customer or utility implementing those measures. These measures can include such measures as rebates or other incentives for residential customers to update inefficient appliances with Energy Star® replacements. Customers could also receive credits on their bills for allowing a utility to control, or intermittently turn off, their central air conditioning or heat pumps when wholesale electricity prices are high.

The NYISO's DSM programs have grown ten-fold, from a total of 183 MW in May 2001 to 1,810 MW in May 2007 (NYISO, 2008a). The NYISO continues to work with regulators and other interested parties on a host of environmental initiatives aimed at encouraging the development of new cleaner generation and reducing emissions from existing generation.

Recent initiatives positions the state of New York as one of the leaders in energy efficiency and climate policy. The four programs with the potential to have the most impact on the power sector are (1) New York State Renewable Portfolio Standards (RPS), (2) NOX (nitrogen oxides) Emission Reduction of the Ozone Transport Commission, (3) New York State Consent Orders, and (4) Regional Greenhouse Gas Initiative (RGGI) (NYISO, 2008a). National concern for developing adequate supplies of electric power in an environmentally sound manner has led to state consideration of the RPS. The RPS typically consists of state policies that require electricity providers to obtain a minimum percentage of their power from renewable energy resources by a certain date. As of June 2007, 24 states, plus the District of Columbia, have RPS policies in place. Together, these states account for more than half of the electricity sales in the United States. Some of the energy efficiency and substitution programs applicable to the NYCA are described below.

National concern for developing adequate supplies of electric power in an environmentally sound manner has led to state consideration of the RPS. The RPS for New York were established by the NYSPSC in 2004. These standards require that by 2013, at least 25% of state electricity purchased by consumers is to be generated by renewable resources. Wind generation has proven to have the best potential for development in New York with almost 7,000 MW of projects currently proceeding through the grid interconnection process managed by the NYISO (NYISO, 2008b). Five commercial wind power projects totaling 391 MW were in operation by the end of 2007. In 2005, a study jointly sponsored by the NYSERDA and the NYISO concluded that the bulk-electricity grid for New York should be able to reliably integrate about 3,300 MW of wind-powered generation (NYISO, 2008a). Additional details on planned wind power projects are in Section 8.3.1.

On the energy efficiency side, New York has proposed an ambitious program called the Energy Efficiency Portfolio Standard (EEPS) or 15-x-15 Initiative. The NYSPSC issued an order on June 23, 2008, formalizing the EEPS (Case 07-M-0548) to achieve a reduction in statewide electricity usage by 15% by 2015 (NYSPSC, 2008). The initiative would require dramatic changes in all consumers of the electric system, including residential, commercial, industrial, and public sector users. This also requires the state's utilities to implement energy efficiency programs and tasks the NYSPSC with tracking progress toward that goal. This energy efficiency initiative, unlike energy conservation, which is based on changing behaviors and lifestyles, is technology-based. Some uncertainty exists in the ability of the state to achieve the 15-x-15 goal. Reducing electricity demand by approximately 27,000 gigawatt-hours (GWh) would require significant investments in demand-side programs. If these demand-side programs are not successful, additional supply-side (new power generation) resources would be needed (NYISO, 2008a).

As noted in Section 8.1, the NYSEP balances the need for new energy with the need to protect the natural resources of the state, and the health and safety of residents. Energy is an essential part of a healthy economy, and in 2000, New Yorkers spent an average of $38 billion on energy, including industrial processes, commerce, services, transportation, lighting, heating, and cooling (New York State Energy Planning Board, 2002). The NYSEP considers the major transformation occurring in the New York energy markets. Most importantly, the NYSEP is a 15 point plan that provides strategic direction and policy guidance for improving coordination in the state energy, environmental, transportation, and economic development activities (New York State Energy Planning Board, 2002).

The NYSEP shapes policies and objectives for state energy planning in New York. Policies relating to diversity in energy generation, using renewable energy resources, reducing GHG, and energy efficiency goals directly relate to the state's need for power. Increased investment in energy efficiency and energy reduction measures have the potential to reduce the amount of new power generation needed.

The average annual growth of electricity is one of the factors considered in determining the econometric forecasts as shown in Table 8.2-2. In 2006, the average retail price for electricity in New York was 15.27 cents per kilowatt-hour (¢/kWh), which ranked as the third highest in the United States (EIA, 2007). The average price of electricity in New York from 1990 to 2006 is shown in Figure 8.2-3. Information about the retail sales, revenue, and average retail price by sector, from 1990 through 2006 is found in Table 8.2-6.

8.2.3 REFERENCES

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Table 8.2-1—NYCA Long-Term Forecasts of Summer Peak Demand, Winter Peak Demand and Energy Requirements

Energy (GWh)				Summer Peak Demand (MW) [c]				Winter Peak Demand (MW) [c]			
Year	**Low**	**Base**	**High**	**Year**	**Low**	**Base**	**High**	**Year**	**Low**	**Base**	**High**
2007 [a]		165,309		2007 [a]		33,444		2007-08		25,490	
2008	158,028	166,767	175,505	2008 [b]	31,294	33,809	36,324	2008-09	23,760	25,293	26,825
2009	159,793	168,683	177,572	2009	31,612	34,167	36,723	2009-10	23,526	25,591	27,657
2010	161,621	170,649	179,676	2010	31,857	34,444	37,030	2010-11	23,794	25,891	27,989
2011	163,317	172,493	181,670	2011	32,143	34,768	37,393	2011-12	24,038	26,168	28,298
2012	165,197	174,535	183,873	2012	32,447	35,112	37,777	2012-13	24,309	26,472	28,635
2013	167,335	176,850	186,364	2013	32,765	35,475	38,186	2013-14	24,616	26,817	29,019
2014	169,524	179,220	188,916	2014	33,057	35,807	38,558	2014-15	24,922	27,163	29,404
2015	171,664	181,559	191,454	2015	33,340	36,133	38,926	2015-16	25,220	27,500	29,780
2016	173,879	183,960	194,041	2016	33,605	36,436	39,267	2016-17	25,511	27,829	30,147
2017	175,481	185,734	195,986	2017	33,888	36,762	39,637	2017-18	25,738	28,089	30,441
2018	177,152	187,562	197,972	2018	34,208	37,130	40,052	2018-19	25,959	28,343	30,726
Average Annual Growth (Percent)											
Period	**Low [d]**	**Base**	**High [d]**	**Period**	**Low [d]**	**Base**	**High [d]**	**Period**	**Low [d]**	**Base**	**High [d]**
2008-18	1.15%	1.18%	1.21%	2008-18	0.89%	0.94%	0.98%	2008-18	0.89%	1.15%	1.37%
2008-13	1.15%	1.18%	1.21%	2008-13	0.92%	0.97%	1.00%	2008-13	0.71%	1.18%	1.58%
2013-18	1.15%	1.18%	1.22%	2013-18	0.87%	0.92%	0.96%	2013-18	1.07%	1.11%	1.15%

Notes:

All results in the Section I tables include losses and exclude station power.

a) 2007 results are for weather-normalized energy and peak demand.
b) 2008 summer peak corresponds to the 2008 ICAP forecast.
c) Summer Capability period is from May 1 to October 31. Winter Capability period is from November 1 of the current year to April 30 of the next year.
d) The low and high forecasts are at the 5th and 95th percentiles, respectively.

Source: NYISO, 2008b

Table 8.2-2—Historical Peak and Energy Data and Growth Rates

Year	Annual GWh	Percent Growth	Summer Capability Period		Winter Capability Period		
			Summer (MW)	Percent Growth	Years	Winter (MW)	Percent Growth
1993	146,915		27,139		93-94	23,809	
1994	147,777	0.60%	27,065	-0.30%	94-95	23,345	-1.90%
1995	148,429	0.40%	27,206	0.50%	95-96	23,394	0.20%
1996	148,527	0.10%	25,585	-6.00%	96-97	22,728	-2.80%
1997	147,374	-0.80%	28,699	12.20%	97-98	22,445	-1.20%
1998	149,855	1.70%	28,161	-1.90%	98-99	23,878	6.40%
1999	154,841	3.30%	30,311	7.60%	99-00	24,041	0.70%
2000	155,140	0.20%	28,138	-7.20%	00-01	23,774	-1.10%
2001	155,240	0.10%	30,982	10.10%	01-02	22,798	-4.10%
2002	158,507	2.10%	30,664	-1.00%	02-03	24,454	7.30%
2003	158,013	-0.30%	30,333	-1.10%	03-04	25,262	3.30%
2004	160,211	1.40%	28,433	-6.30%	04-05	25,541	1.10%
2005	167,208	4.40%	32,075	12.80%	05-06	24,948	-2.30%
2006	162,237	-3.00%	33,939	5.80%	06-07	25,057	0.40%
Annual Average Growth		**0.80%**		**1.70%**			**0.40%**

Notes:

GWh – gigawatt-hour
MW – megawatts

Source: NYISO, 2007a

Table 8.2-3—Weather-Normalized Annual Energy and Seasonal Peak Loads

Year	Annual (GWh)	Percent Change	Summer (MW)	Percent Change	Winter (MW)	Percent Change
1993	144,883		26,204		23,685	
1994	145,674	0.50%	27,161	3.70%	23,654	-0.10%
1995	146,008	0.20%	27,167	0.00%	23,554	-0.40%
1996	148,071	1.40%	27,938	2.80%	22,788	-3.30%
1997	148,465	0.30%	28,488	2.00%	22,762	-0.10%
1998	150,030	1.10%	28,999	1.80%	24,031	5.60%
1999	153,572	2.40%	28,925	-0.30%	23,909	-0.50%
2000	156,779	2.10%	28,974	0.20%	24,218	1.30%
2001	155,166	-1.00%	29,767	2.70%	25,045	3.40%
2002	157,650	1.60%	30,028	0.90%	24,294	-3.00%
2003	158,673	0.60%	30,450	1.40%	24,849	2.30%
2004	161,363	1.70%	29,901	-1.80%	25,006	0.60%
2005	164,425	1.90%	31,821	6.40%	24,770	-0.90%
2006	162,853	-1.00%	32,992	3.70%	25,618	3.40%
Average Annual Growth		**0.90%**		**1.80%**		**0.60%**

Notes:

GWh – gigawatt-hour
MW – megawatts

Source: NYISO, 2007a

Table 8.2-4— Summary of Econometric Indicators

Economic Indicators	Average Annual Growth			
	1996-2001	2001-2006	2007-2012	2012-2017
Total Employment	1.6%	0.0%	0.7%	0.4%
Gross State Product	4.3%	2.5%	2.1%	1.5%
Population	0.5%	0.2%	0.1%	0.0%
Total Real Income	3.4%	1.4%	1.9%	1.2%
Average Real Electric Price	-1.8%	1.1%	0.9%	0.4%
Summer Peak (actual data through 2006)	1.4%	2.4%	1.2%	1.1%
Annual Energy (actual data through 2006)	1.0%	1.0%	1.3%	1.3%

Source: NYISO, 2007a

Table 8.2-5—Summary of Economic Trends

Employment Trends	Share of Total Employment			
	2001	2006	2012	2017
Business, Services, and Retail	53.3%	53.1%	53.3%	53.4%
Health, Education, Government, and Agriculture	33.5%	35.3%	36.0%	36.5%
Manufacturing	13.3%	11.5%	10.7%	10.2%

Source: NYISO, 2007a

Table 8.2-6—Retail, Revenue, and Average Retail Price by Sector, 1990 Through 2006

Sector	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Percentage Share 1990	Percentage Share 2006
Retail Sales (thousand megawatthours)																			
Residential	38,574	39,177	38,720	39,897	40,105	39,887	40,285	40,059	40,563	42,919	43,018	44,236	46,457	47,116	47,379	50,533	48,427	29.8	34.0
Commercial	46,921	46,982	46,591	47,728	48,828	52,751	52,915	54,231	55,745	57,894	59,764	60,806	62,271	72,495	74,378	76,822	76,029	36.3	53.5
Industrial	31,929	31,112	31,027	30,187	29,467	25,317	25,947	25,285	25,218	25,835	25,838	25,450	25,148	21,745	20,675	19,947	14,976	24.7	10.5
Other	11,900	12,140	12,132	12,357	12,777	12,515	12,380	12,369	12,669	12,729	13,407	13,689	13,565	-	-	-	-	9.2	-
Transportation	-	-	-	-	-	-	-	-	-	-	-	-	-	2,689	2,650	2,846	2,806	-	2.0
All Sectors	129,324	129,411	128,470	130,170	131,177	130,471	131,527	131,944	134,196	139,378	142,027	144,181	147,440	144,045	145,082	150,148	142,238	100.0	100.0
Retail Revenue (million dollars)																			
Residential	4,414	4,690	4,813	5,256	5,435	5,544	5,654	5,656	5,523	5,680	6,010	6,209	6,295	6,743	6,890	7,945	8,181	36.4	37.7
Commercial	4,911	5,099	5,204	5,564	5,700	6,290	6,390	6,577	6,376	5,852	7,562	7,827	7,681	9,372	9,654	11,031	11,793	40.5	54.3
Industrial	1,846	1,918	2,017	2,012	1,996	1,466	1,459	1,314	1,247	1,224	1,389	1,414	1,302	1,552	1,455	1,641	1,407	15.2	6.5
Other	947	958	1,057	1,129	1,189	1,135	1,130	1,134	1,121	1,113	1,206	1,201	1,177	-	-	-	-	7.8	-
Transportation	-	-	-	-	-	-	-	-	-	-	-	-	-	252	210	324	335	-	1.5
All Sectors	12,119	12,664	13,092	13,960	14,320	14,435	14,633	14,682	14,267	13,868	16,167	16,651	16,454	17,920	18,209	20,941	21,716	100.0	100.0
Average Retail Prices (cents/KWh)																			
Residential	11.44	11.97	12.43	13.17	13.55	13.90	14.04	14.12	13.66	13.23	13.97	14.04	13.55	14.31	14.54	15.72	16.89	-	-
Commercial	10.47	10.85	11.17	11.66	11.67	11.92	12.08	12.13	11.63	10.11	12.65	12.87	12.33	12.93	12.98	14.36	15.51	-	-
Industrial	5.78	6.16	6.50	6.66	6.77	5.79	5.62	5.20	4.95	4.74	5.37	5.56	5.18	7.14	7.04	8.23	9.39	-	-
Other	7.96	7.89	8.71	9.14	9.31	9.07	9.13	9.17	8.85	8.74	8.99	8.77	8.68	-	-	-	-	-	-
Transportation	-	-	-	-	-	-	-	-	-	-	-	-	-	9.38	7.92	11.39	11.94	-	-
All Sectors	9.37	9.79	10.19	10.72	10.92	11.06	11.13	11.13	10.71	9.95	11.38	11.55	11.16	12.44	12.55	13.95	15.27	-	-
Retail Revenue (2006 million dollars)																			
Residential	6,278	6,445	6,465	6,901	6,987	6,984	6,991	6,879	6,644	6,734	6,974	7,036	7,011	7,353	7,306	8,178	8,181	36.4	37.7
Commercial	6,985	7,007	6,991	7,305	7,328	7,924	7,901	7,999	7,669	6,938	8,776	8,869	8,555	10,221	10,238	11,354	11,793	40.5	54.3
Industrial	2,626	2,636	2,710	2,641	2,567	1,847	1,804	1,598	1,500	1,452	1,611	1,602	1,450	1,693	1,543	1,689	1,407	15.2	6.5
Other	1,347	1,316	1,420	1,482	1,529	1,430	1,397	1,380	1,349	1,319	1,399	1,361	1,311	-	-	-	-	7.8	-
Transportation	-	-	-	-	-	-	-	-	-	-	-	-	-	275	223	334	335	-	1.5
All Sectors	17,237	17,403	17,586	18,330	18,410	18,186	18,093	17,857	17,161	16,444	18,760	18,869	18,327	19,543	19,310	21,555	21,716	100.0	100.0
Average Retail Prices (2006 cents/KWh)																			
Residential	16.28	16.45	16.70	17.30	17.42	17.51	17.35	17.17	16.38	15.69	16.21	15.91	15.09	15.61	15.42	16.18	16.89	-	-
Commercial	14.89	14.91	15.00	15.31	15.01	15.02	14.93	14.75	13.76	11.98	14.68	14.59	13.74	14.10	13.76	14.78	15.51	-	-
Industrial	8.22	8.47	8.73	8.75	8.71	7.30	6.95	6.32	5.95	5.62	6.24	6.30	5.77	7.79	7.46	8.47	9.39	-	-
Other	11.32	10.84	11.71	12.00	11.96	11.43	11.29	11.15	10.64	10.36	10.44	9.94	9.67	-	-	-	-	-	-
Transportation	-	-	-	-	-	-	-	-	-	-	-	-	-	10.23	8.40	11.73	11.94	-	-
All Sectors	13.33	13.45	13.69	14.08	14.03	13.94	13.76	13.53	12.79	11.80	13.21	13.09	12.43	13.57	13.31	14.36	15.27	-	-

Source: EIA, 2007

Figure 8.2-1—New York Control Area Load Zones

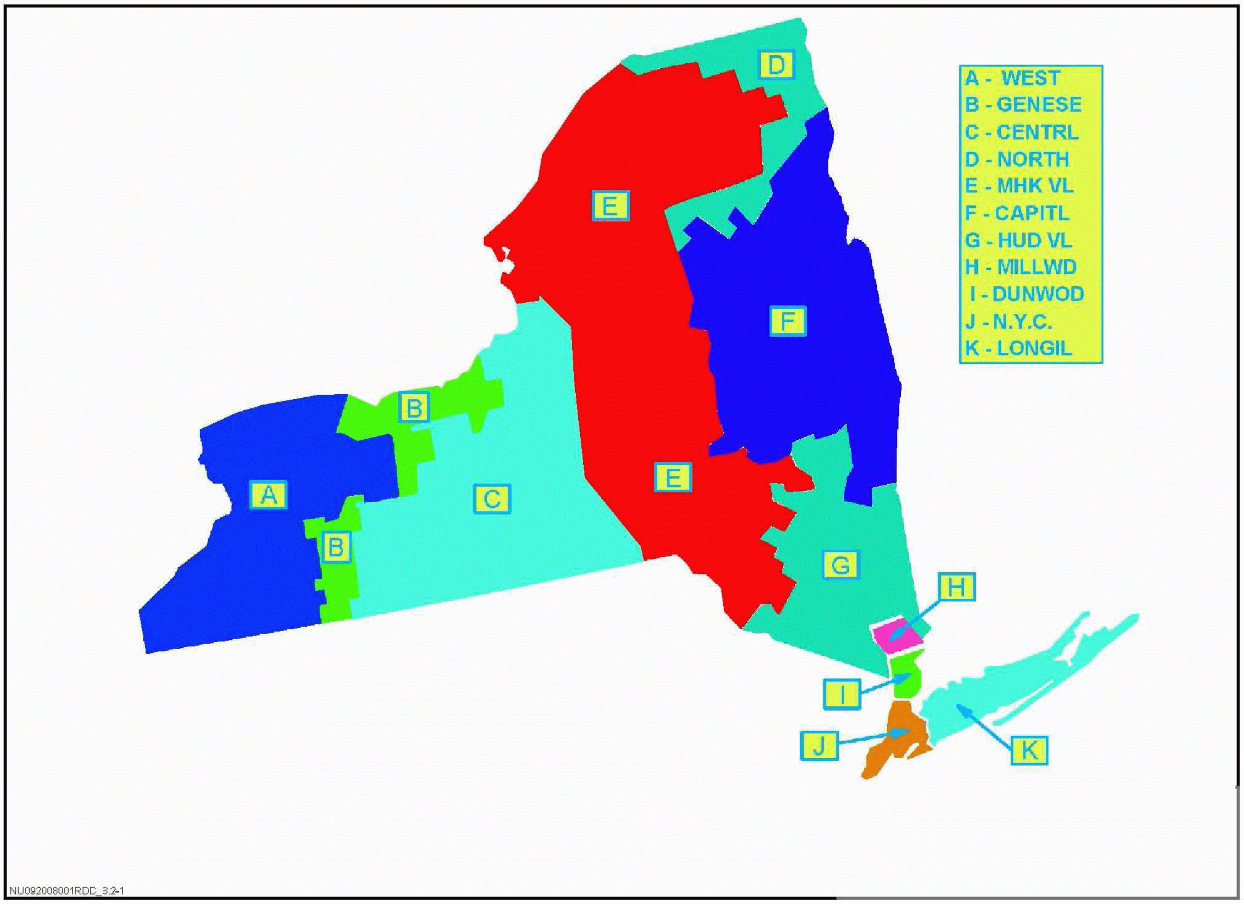


Figure 8.2-2—Real-time Load Duration Curves From 2005 Through 2007

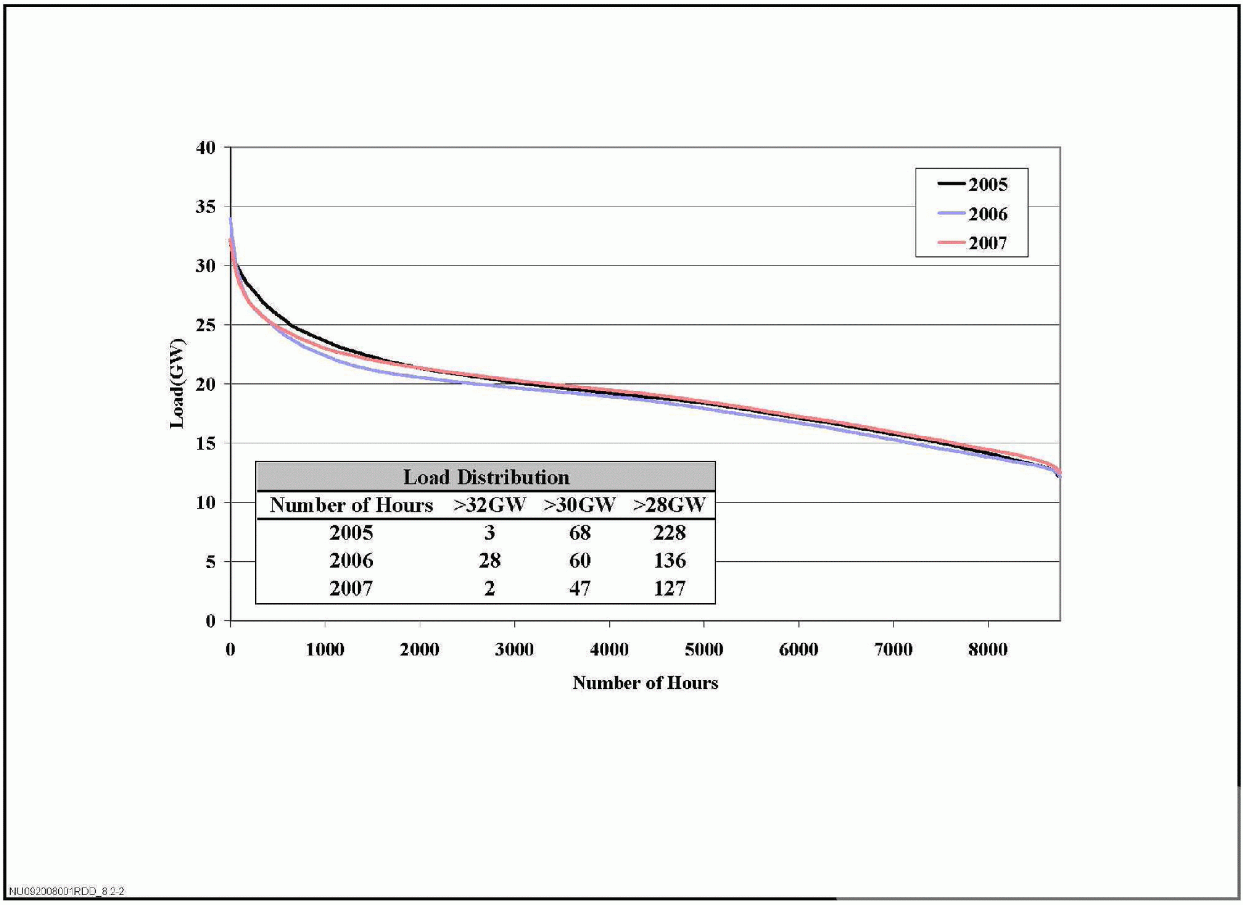
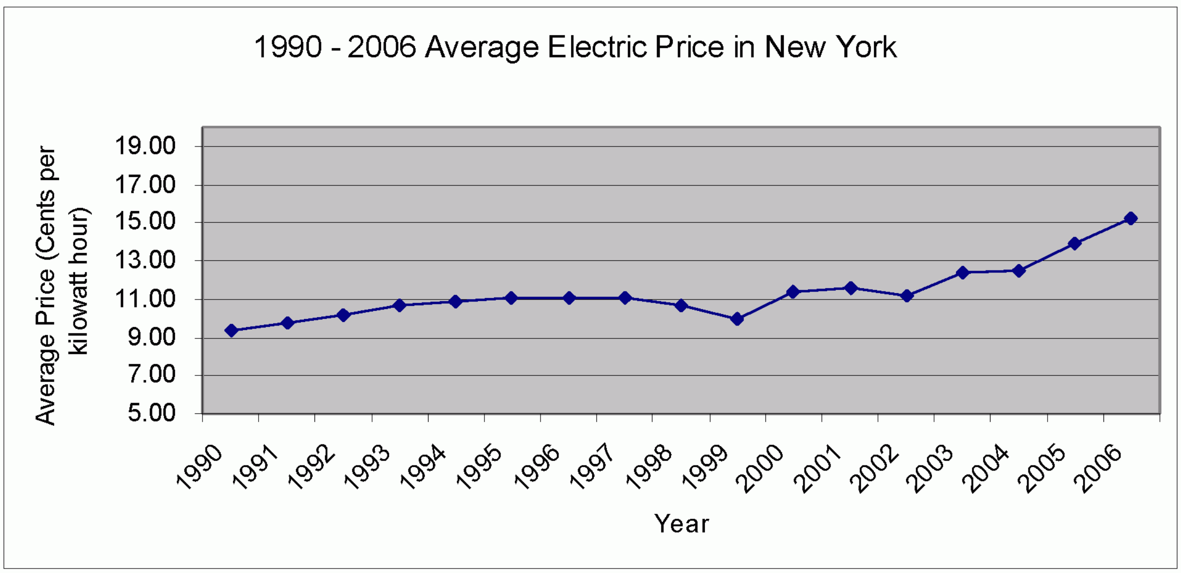


Figure 8.2-3— Average Price of Electricity in New York



Source: EIA, 2007

8.3 POWER SUPPLY

As specified in NUREG-1555, the purpose of this section is to identify and review the present and planned generating capability, as well as the present and planned purchases and sales of power and energy (NRC, 2007). The scope of this analysis considers the type and function of power-generation facilities, purchases and sales of power and energy, and changes in the power system including additions, retirements, and changes in ratings. This section also considers the variety of sources for energy supply including existing regulated power generating facilities, generator additions, generator ratings, and reserve margins.

As the RTO, the NYISO determines the adequacy of power supply and analyzes the need for power. The RNA and CRPP for the NYISO are designed to be aligned with the coordinated planning activities of the NERC, NPCC, and NYSRC. The study period analyzed in the 2008 RNA is 2008 to 2017. The load and capacity data shown in Table 8.3-1 and Table 8.3-2 include all capacity located within the NYCA.

Power-generating units are generally classified into three different categories that describe their functions. Baseload facilities typically produce larger amounts of energy, operate most of the time, and provide a constant source of power to the energy grid. Intermittent facilities are generally used to augment the need for baseload power when demand exceeds capacity. Peaking facilities have no reserves and little capacity, and are used in response to high levels of demand for energy. As previously noted, the NMP3NPP is proposed to be a baseload facility. While the tables include capacity traditionally identified as energy-only or black start units, these do not have entries for summer and winter capabilities. Black start generation units are called upon to restore power when the entire grid loses power. Black start units are capable of being restarted without an external power supply and have the automatic ability to remain operating at reduced levels when disconnected from the grid (EIA, 2008).

Wind generators are intermittent sources of power, and their expected capability for power generation during summer and winter is based on the NYSERDA Wind Study. The study concluded that the units would have an expected value of 10% capability for summer for upstate wind projects, 30% capability for offshore wind projects, and an expected 30% capability for winter wind projects (NYISO, 2008b). The wind study titled "The Effects of Integrating Wind Power on Transmission System Planning, Reliability, and Operations. Report on Phase 2: System Performance Evaluation" (General Electric (GE) Energy Consulting, 2005) can be found on NYSERDA's Web site.

Table 8.3-3 shows a summary of the NYCA capacity by fuel type. As shown, the summer 2008 capacity was determined to be 39,095 MW. The total power generation, by fuel type, in 2007 is shown in Table 8.3-4 (NYISO, 2008b). A complete listing of all the existing generating facilities including the name, location, type, and energy production capabilities is contained in the NYISO Gold Book, 2008 Load and Capacity Data report (NYISO, 2008b).

Table 8.3-5 shows the generator additions in the NYCA, generator retirements and the reasons for the retirements are shown in Table 8.3-6, and Table 8.3-7 shows the generator reratings from the NYISO 2008 Load and Capacity Data "Gold Book" (NYISO, 2008b).

NYISO's 2008 RNA notes that the New York ICAP market has historically had up to approximately 2,755 MW of energy available from sources outside the NYCA. Energy capacity available from sources outside the NYCA is classified as emergency assistance and is not included in the baseline resource need assessment.

Additionally, generators of electricity, such as Constellation Energy, are contractually obligated to meet and satisfy the electricity demand within the NYISO. Electricity used by New York's consumers is bought and sold in the competitive wholesale electricity markets administered by the NYISO. The NYISO is the RTO that serves as the electricity broker for New York State and maintains the reliability of the bulk electricity grid for all suppliers of electricity, including those generators within the state. Electricity demand and the resources to meet that demand are satisfied first within the NYISO. The NYISO also coordinates reliability assessments with adjacent RTOs. If available, surplus electricity would be made available to adjacent RTOs when demand requires it. Generators that sell electricity in the NYISO are contractually obligated to meet the reliability requirements as scheduled with the NYISO.

Table 8.3-8 shows the forecasted transactions from 2008 to 2018. This table shows that the NYCA is forecasted to purchase more power than it will sell over that period. Table 8.3-8 indicates that in 2010, more power will be sold than will be purchased. This is the only year where this is expected to occur (NYISO, 2008b).

The measures of reliability generally are divided between probabilistic measures (loss of load probability, frequency, and duration of outages) and non probabilistic measures (reserve margin and capacity margin). The commonly used "capacity margin" is the ratio of reserve capacity to actual capacity.

Reserve margin is the supply capacity that a company maintains in excess of anticipated demand. This excess helps the company maintain reliable load regardless of unanticipated interruptions in supply (generation or transmission capacity) or increases in demand. Reserve margins are typically established to maintain the risk of unscheduled interruptions to 1 day in 10 years.

The reserve margin, or reserve capacity, is a measure of available capacity over and above the capacity needed to meet normal peak demand levels. For a power generator, it refers to the amount of capacity they can generate above what is normally required. For a transmission company, it refers to the capacity of the transmission infrastructure to handle additional energy transport if demand levels rise beyond expected peak levels. Producers and transmission facilities are usually required to maintain a constant reserve margin of 10 to 20% of normal capacity by regulatory authorities. This provides an assurance against breakdowns in part of the system or sudden increases in energy demand (NYISO, 2005).

Reliability in the NYISO is determined by having adequate resources to support the power needs of the system. The power system is determined to be adequate by the NYISO when the probability of having sufficient transmission and generation to satisfy expected demand is equal to or less than the system standard, which is expressed as a loss of load expectation (LOLE). The LOLE is equal to an involuntary load disconnection that is not more frequent than once in every 10 years, or 0.1 day per year. In other words, the system is adequate and has reliability if the probability that electricity use will be interrupted due to insufficient transmission and/or generation is not greater than 1 occurrence in 10 years (NYISO, 2008a).

The LOLE standard forms the basis of the New York ICAP market requirement and is used to determine the amount of ICAP necessary. The ICAP is additional electrical capacity greater than what is required to satisfy the forecasted peak demand. The ICAP is required to maintain resource adequacy and reliability in the event of planned and unplanned outages (NYISO, 2008a).

The NYISO also conducts sensitivity analyses to test the robustness of the needs assessment studies and identify conditions under which reliability criteria may not be met. In general, an LOLE result above 0.1 day per year indicates that resources are required to maintain reliability, and therefore, there is a need for resources. These results indicate the first definitive year of need is 2012 for the RNA study case, thermal sensitivity case, and free flowing sensitivity case (NYISO, 2007).

Additionally, the free flowing transmission sensitivity (with an LOLE of 0.12 in 2012, 0.21 in 2013, and 0.71 in 2017) and the thermally limited transmission sensitivity (with an LOLE of 0.19 in 2012, 0.34 in 2013, and 0.90 in 2017) review indicates that the need in 2012 results from a statewide capacity deficiency as well as zonal deficiency resulting from transmission constraints. Therefore, the need could be resolved by adding capacity resources downstream of the constraints or by adding resources above constraints in conjunction with transmission reinforcement. (NYISO, 2007)

The installed reserve margin (IRM) is the amount of installed electric generation capacity above 100% of the forecasted peak electric consumption that is required to satisfy NYSRC resource adequacy criteria. The NYSRC annually determines the IRM and, in February 2007, reduced the statewide IRM from 18 to 16.5%. In December 2007, the NYSRC Executive Committee lowered the statewide IRM for the 2008/2009 summer/winter capability periods to 15%.

The 2008 IRM is 39,460 MW. As shown in Figure 8.3-1, the NYSRC indicates that the total ICAP available is expected to be 42,821 MW. This includes 38,577 MW of net in-state generation, 1,323 MW of Special Case Resources (a demand-response program), and 2,921 MW of import capability from neighboring regions.

The New York Energy $martSM Program supports research, development, and demonstration of distributed generation (DG) technology applications in New York. As of October 2005, the program was supporting 99 combined heat and power (CHP) demonstration projects with a potential peak capacity of 102 MW. To date, the program has invested over $50 million in these projects and leveraged another $220 million in co funder investment. In addition, the program is supporting another 50 DG/CHP product development projects (Energy Coordinating Working Group (ECWG), 2006). Section 9.2.2 further reviews restrictions on the use of energy sources available to the service area and the NYISO region.

8.3.1 REFERENCES

ECWG, 2006. State Energy Planning Board - 2005 Annual Report and Activities Update.

EIA, 2008. "Electricity Terms and Definitions," Official Energy Statistics from the U.S. Government, U.S. Department of Energy (DOE).

GE Energy Consulting, 2005. The Effects of Integrating Wind Power on Transmission System Planning, Reliability, and Operations. Report on Phase 2: System Performance Evaluation, Prepared for New York State Energy Research and Development Authority, March 4, 2005.

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NYISO, 2005. "Locational Installed Capacity Requirements Study", covering the New York Control Area for the 2005 - 2006 Capability Year. As approved by the Operating Committee, February 17, 2005, Revised March 23, 2005 (editorial).

NYISO, 2008a. Power Trends, 2008.

NYISO, 2008b. 2008 Load & Capacity Data "Gold Book."

Table 8.3-1—NYCA Load and Capacity Schedule – Summer

(Page 1 of 2)

	Megawatts											
Summer Capability	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Totals**
Fossil												
Steam Turbine (Oil)	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	1669.0	
Steam Turbine (Oil & Gas)	9009.4	9009.4	9009.4	8118.4	8118.4	8118.4	8118.4	8118.4	8118.4	8118.4	8118.4	
Steam Turbine (Gas)	1094.6	1094.6	1094.6	1094.6	1094.6	1094.6	1094.6	1094.6	1094.6	1094.6	1094.6	
Steam Turbine (Coal)	3105.3	2803.0	2803.0	2803.0	2803.0	2803.0	2803.0	2803.0	2803.0	2803.0	2803.0	
Combined Cycle	7793.1	8024.8	8024.8	8684.8	8684.8	8684.8	8684.8	8684.8	8684.8	8684.8	8684.8	
Jet Engine (Oil)	534.6	534.6	534.6	534.6	534.6	534.6	534.6	534.6	534.6	534.6	534.6	
Jet Engine (Gas & Oil)	166.2	166.2	166.2	166.2	166.2	166.2	166.2	166.2	166.2	166.2	166.2	
Combustion Turbine (Oil)	1089.4	1089.4	1089.4	1089.4	1089.4	1089.4	1089.4	1089.4	1089.4	1089.4	1089.4	
Combustion Turbine (Oil & Gas)	1653.8	1653.8	1653.8	1653.8	1653.8	1653.8	1653.8	1653.8	1653.8	1653.8	1653.8	
Combustion Turbine (Gas)	1235.3	1235.3	1235.3	1235.3	1235.3	1235.3	1235.3	1235.3	1235.3	1235.3	1235.3	
Internal Combustion	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	
Pumped Storage												
Pumped Storage Hydro	1314.8	1344.8	1374.8	1404.8	1404.8	1404.8	1404.8	1404.8	1404.8	1404.8	1404.8	
Nuclear												
Steam (PWR Nuclear)	2642.3	2642.3	2642.3	2642.3	2642.3	2642.3	2642.3	2642.3	2642.3	2642.3	2642.3	
Steam (BWR Nuclear)	2622.6	2622.6	2622.6	2622.6	2622.6	2622.6	2622.6	2622.6	2622.6	2622.6	2622.6	
Renewable [e]												
Conventional Hydro	4321.1	4321.1	4329.6	4329.6	4329.6	4329.6	4329.6	4329.6	4329.6	4329.6	4329.6	
Internal Combustion (Methane)	57.1	63.5	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	69.9	
Steam Turbine (Wood)	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1	38.1	
Steam Turbine (Refuse)	262.3	262.3	262.3	262.3	262.3	262.3	262.3	262.3	262.3	262.3	262.3	
Wind [f]	424.4	442.6	448.6	448.6	448.6	448.6	449.2	449.2	449.2	449.2	449.2	
Special Case Resources - SCR [c]	1287.2	1287.2	1287.2	1287.2	1287.2	1287.2	1287.2	1287.2	1287.2	1287.2	1287.2	
Changes												
Additions	328.2	0.0	660.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	988.2
Reratings	36.4	50.9	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	117.9
Retirements	-380.6	0.0	-891.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1271.6
NYCA Resource Capability	40365.7	40416.6	40215.6	40215.6	40215.6	40216.2	40216.2	40216.2	40216.2	40216.2	40216.2	
Contracts												
Net Purchases and Sales [a] [g]	76.8	76.8	-124.2	516.8	516.8	516.8	466.8	466.8	466.8	466.8	466.8	
Total Resource Capability	40442.5	40493.4	40091.4	40732.4	40732.4	40733.0	40683.0	40683.0	40683.0	40683.0	40683.0	
Base Forecast												

Table 8.3-1—NYCA Load and Capacity Schedule – Summer

(Page 2 of 2)

	Megawatts											
Summer Capability	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**Totals**
Peak Demand Forecast	33809.0	34167.0	34444.0	34768.0	35112.0	35475.0	35807.0	36133.0	36436.0	36762.0	37133.0	
Expected Reserve	6633.5	6326.4	5647.4	5964.4	5620.4	5258.0	4876.0	4550.0	4247.0	3921.0	3550.0	
Reserve Margin % [(d)]	19.6	18.5	16.4	17.2	16.0	14.8	13.6	12.6	11.7	10.7	9.6	
Proposed Resource Additions [(b)]	27.2	482.6	1444.9	1502.5	2602.5	2478.6	2478.6	2478.6	2478.6	2478.6	2478.6	
Adjusted Resource Capability	40469.7	40976.0	41536.3	42234.9	43334.9	43211.6	43161.6	43161.6	43161.6	43161.6	43161.6	
Adjusted Expected Reserve	6660.7	6809.0	7092.3	7466.9	8222.9	7736.6	7354.6	7028.6	6725.6	6399.6	6028.6	
Adjusted Reserve Margin % [(d)]	19.7	19.9	20.6	21.5	23.4	21.8	20.5	19.5	18.5	17.4	16.2	

Notes:

a) Purchases and Sales are with neighboring Control Areas. Negative Net Purchases and Sales represent higher total Sales out of NYCA than total Purchases into NYCA.
b) Proposed Resource Additions – Includes all generating projects that are not under construction but have met milestone requirements to qualify for inclusion in a class year. Only net capacity increases are included.
c) Special Case Resources (SCR) are loads capable of being interrupted upon demand and distributed generators that are not visible to the ISO's Market Information System and that are subject to special rules in order to participate as Installed Capacity suppliers.
d) The current Installed Reserve Margin for the 2008-2009 Capability Year is 15.0%.
e) The Renewable Category does not necessarily match the New York State Renewable Portfolio Standards (RPS) Definition.
f) Existing wind generators are listed at Full Nameplate rating.
g) Figures reflect the use of Unforced Capacity Delivery Right (UDRs) as currently known. For more information on the use of UDRs, please see section 4.14 of the ICAP Manual.

Source: NYISO, 2008b

Table 8.3-2—{NYCA Load and Capacity Schedule – Winter}

(Page 1 of 2)

	Megawatts											
Winter Capability	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**Totals**
Fossil												
Steam Turbine (Oil)	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	1670.9	
Steam Turbine (Oil & Gas)	8980.5	8980.5	8980.5	8093.8	8093.8	8093.8	8093.8	8093.8	8093.8	8093.8	8093.8	
Steam Turbine (Gas)	1109.6	1109.6	1109.6	1109.6	1109.6	1109.6	1109.6	1109.6	1109.6	1109.6	1109.6	
Steam Turbine (Coal)	3120.0	2806.1	2806.1	2806.1	2806.1	2806.1	2806.1	2806.1	2806.1	2806.1	2806.1	
Combined Cycle	8808.6	9031.5	9691.5	9691.5	9691.5	9691.5	9691.5	9691.5	9691.5	9691.5	9691.5	
Jet Engine (Oil)	653.9	653.9	653.9	653.9	653.9	653.9	653.9	653.9	653.9	653.9	653.9	
Jet Engine (Gas & Oil)	198.8	198.8	198.8	198.8	198.8	198.8	198.8	198.8	198.8	198.8	198.8	
Combustion Turbine (Oil)	1419.8	1419.8	1419.8	1419.8	1419.8	1419.8	1419.8	1419.8	1419.8	1419.8	1419.8	
Combustion Turbine (Oil & Gas)	2121.0	2121.0	2121.0	2121.0	2121.0	2121.0	2121.0	2121.0	2121.0	2121.0	2121.0	
Combustion Turbine (Gas)	1372.6	1372.6	1372.6	1372.6	1372.6	1372.6	1372.6	1372.6	1372.6	1372.6	1372.6	
Internal Combustion	61.3	61.3	61.3	61.3	61.3	61.3	61.3	61.3	61.3	61.3	61.3	
Pumped Storage												
Pumped Storage Hydro	1319.6	1349.6	1379.6	1409.6	1409.6	1409.6	1409.6	1409.6	1409.6	1409.6	1409.6	
Nuclear												
Steam (PWR Nuclear)	2648.9	2648.9	2648.9	2648.9	2648.9	2648.9	2648.9	2648.9	2648.9	2648.9	2648.9	
Steam (BWR Nuclear)	2639.9	2639.9	2639.9	2639.9	2639.9	2639.9	2639.9	2639.9	2639.9	2639.9	2639.9	
Renewable [e]												
Conventional Hydro	4555.3	4555.3	4563.8	4563.8	4563.8	4563.8	4563.8	4563.8	4563.8	4563.8	4563.8	
Internal Combustion (Methane)	52.7	59.1	65.5	65.5	65.5	65.5	65.5	65.5	65.5	65.5	65.5	
Steam Turbine (Wood)	37.6	37.6	37.6	37.6	37.6	37.6	37.6	37.6	37.6	37.6	37.6	
Steam Turbine (Refuse)	264.0	264.0	264.0	264.0	264.0	264.0	264.0	264.0	264.0	264.0	264.0	
Wind [f]	424.4	478.5	496.5	496.5	496.5	498.3	498.3	498.3	498.3	498.3	498.3	
Changes												
Additions	364.1	660.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1024.1
Reratings	36.4	62.9	30.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	131.1
Retirements	-401.0	0.0	-886.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1287.7
NYCA Resource Capability	41458.9	42181.8	41325.1	41325.1	41326.9	41326.9	41326.9	41326.9	41326.9	41326.9	41326.9	
Contracts												
Net Purchases and Sales [a] [g]	80.0	80.0	-121.0	520.0	520.0	520.0	470.0	470.0	470.0	470.0	470.0	
Total Resource Capability	41538.9	42261.8	41204.1	41845.1	41846.9	41846.9	41796.9	41796.9	41796.9	41796.9	41796.9	
Base Forecast												

Table 8.3-2—{NYCA Load and Capacity Schedule – Winter}

(Page 2 of 2)

	Megawatts											
Winter Capability	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**	**Totals**
Peak Demand Forecast	25293.0	25591.0	25891.0	26168.0	26472.0	26817.0	27163.0	27500.0	27829.0	28089.0	28343.0	
Expected Reserve	16245.9	16670.8	15313.1	15677.1	15374.9	15029.9	14633.9	14296.9	13967.9	13707.9	13453.9	
Reserve Margin % [d]	64.2	65.1	59.1	59.9	58.1	56.0	53.9	52.0	50.2	48.8	47.5	

Notes:

a) Purchases and Sales are with neighboring Control Areas. Negative Net Purchases and Sales represent higher total Sales out of NYCA than total Purchases into NYCA.

b) Proposed Resource Additions – Includes all generating projects that are not under construction but have met milestone requirements to qualify for inclusion in a class year. Only net capacity increases are included.

c) Special Case Resources (SCR) are loads capable of being interrupted upon demand and distributed generators that are not visible to the ISO's Market Information System and that are subject to special rules in order to participate as Installed Capacity suppliers.

d) The current Installed Reserve Margin for the 2008-2009 Capability Year is 15.0%.

e) The Renewable Category does not necessarily match the New York State Renewable Portfolio Standards (RPS) Definition.

f) Existing wind generators are listed at Full Nameplate rating.

g) Figures reflect the use of Unforced Capacity Delivery Right (UDRs) as currently known. UDRs are considered controllable transmission projects that provide a transmission interface into NYCA. For more information on the use of UDRs, please see section 4.14 of the ICAP Manual.

Source: NYISO, 2008b

Table 8.3-3—Capacity by Fuel Type (Summer 2008)

Fuel Type	MW	Percent of Capacity
Gas and Oil	14,514	37%
Gas	6,467	17%
Oil	3,325	9%
Hydro	5,636	14%
Nuclear	5,265	13%
Coal	3,105	8%
Wind	424	1%
Other*	357	1%
Total	39,093	100%

Notes:

* Includes methane, refuse, solar, and wood
MW - megawatt

Table 8.3-4—Generation by Fuel Type in 2007

Fuel Type	GMh	Percent of Capacity
Gas and Oil	37,688	25%
Gas	19,501	13%
Oil	484	<1%
Hydro	25,557	17%
Nuclear	42,451	28%
Coal	21,299	14%
Wind	873	<1%
Other*	2,555	2%

Notes:

* Includes methane, refuse, solar, and wood
GWh - gigawatt-hour

Table 8.3-5—Generator Additions
(Page 1 of 2)

Queue Pos.	Owner / Operator	Station Unit	Zone	Date	Rating (MW)	Summer [(a)]	Winter [(b)]	Unit Type	RNA
Proposed Resource Additions									
Completed Class Year Study									
172	Noble Environmental Power, LLC	Clinton Windfield	D	2008/03	79.5	8.0	23.9	Wind Turbines	
175	Noble Environmental Power, LLC	Ellenburg Windfield	D	2008/03	79.5	8.0	23.9	Wind Turbines	(b)
173	Noble Environmental Power, LLC	Bliss Windfield	A	2008/04	72.0	7.2	21.6	Wind Turbines	(b)
119	ECOGEN, LLC	Prattsburgh Wind Farm	C	2008/08	79.5	8.0	23.9	Wind Turbines	
107	Caithness Long Island, LLC	Caithness Long Island	K	2008/ Q2	310.0	310.0	310.0	Combined Cycle	(b)
174	Noble Environmental Power, LLC	Altona Windfield	D	2008/10	99.0	9.9	29.7	Wind Turbines	
186	Community Energy	Jordanville Wind	E	2008/12 - 2009/12	136.0	13.6	40.8	Wind Turbines	
19	NYC Energy LLC	NYC Energy LLC	J	2008/Q4	79.9	79.9	79.9		
113	Windfarm Prattsburgh, LLC	Prattsburgh Wind Park	C	2008/Q4	55.5	5.6	16.7	Wind Turbines	
135	UPC Wind Management, LLC	Canadaigua Wind Farm	C	2008/Q4	82.5	8.3	24.8	Wind Turbines	
161	Marble River, LLC	Marble River Wind Farm	D	2008/Q4	84.0	8.4	25.2	Wind Turbines	
171	Marble River, LLC	Marble River II Wind Farm	D	2008/Q4	134.0	13.4	40.2	Wind Turbines	
147	NY Windpower, LLC	West Hill Windfarm	E	2009/10	37.5	3.8	11.3	Wind Turbines	
156	PPM Energy/Atlantic Renewable	Fairfield Wind Project	E	2009/12	120.0	12.0	36.0	Wind Turbines	
69	Empire Generating Company, LLC	Empire State Newsprint	F	2009/Q4	660.0	660.0	660.0	Combined Cycle	(b)
31	SCS Energy, LLC	Astoria Energy (Phase 2)	J	2010/05	500.0	500.0	500.0	Combined Cycle	
96	Calpine Eastern Corporation	CPN 3rd Turbine, Inc. (JFK)	J	2011	45.0	45.0	45.0	Combustion Turbine(s)	
Class 2007 Projects									
211	Noble Environmental Power, LLC	Clinton II Windfield	D	2008/03	21.0	2.1	6.3	Wind Turbines	
213	Noble Environmental Power, LLC	Ellenburg II Windfield	D	2008/03	21.0	2.1	6.3	Wind Turbines	
212	Noble Environmental Power, LLC	Bliss II Windfield	A	2008/04	28.5	2.9	8.6	Wind Turbines	(b)
182	Everpower Global	Howard Wind	C	2008/11	62.5	6.3	18.8	Wind Turbines	
144	Invenergy Wind, LLC	High Sheldon Windfarm	C	2008/12	113.0	11.3	33.9	Wind Turbines	
177	Noble Environmental Power, LLC	Wethersfield Windfield 230kV	C	2008/12	126.0	12.6	37.8	Wind Turbines	
214	Noble Environmental Power, LLC	Chateau Gay Windpark	D	2008/12	106.5	10.7	32.0	Wind Turbines	
166	AES New York Wind, LLC	St. Lawrence Wind Farm	E	2008/12	130.0	13.0	39.0	Wind Turbines	
199	UPC Wind Management, LLC	Canadaigua II	C	2008/Q4	42.5	4.3	12.8	Wind Turbines	
168	Dairy Hills Wind Farm, LLC	Dairy Hills Wind Farm	C	2009/11	120.0	12.0	36.0	Wind Turbines	
189	PPM Energy, Inc.	Clayton Wind	E	2010/12	126.0	12.6	37.8	Wind Turbines	

Table 8.3-5—Generator Additions
(Page 2 of 2)

Queue Pos.	Owner / Operator	Station Unit	Zone	Date	Rating (MW)	Summer [a]	Winter [b]	Unit Type	RNA
Class 2008 Candidates									
20	KeySpan Energy, Inc.	Spagnoli Road CC Unit	K	2009/06	250.0	250.0	250.0	Combined Cycle	
220	AES Keystone Wind, LLC	Armenia Mountain I	C	2009/11	175.0	17.5	52.5	Wind Turbines	
231	AES Keystone Wind, LLC	Armenia Mountain II	C	2009/11	75.0	7.5	22.5	Wind Turbines	
152	Moresvill Energy, LLC	Moresvill Energy Center	E	2009/12	129.0	12.9	38.7	Wind Turbines	
178	Noble Cenerville Windpark, LLC	Allegany Windfield	A	2009/12	99.0	9.9	29.7	Wind Turbines	
197	PPM Energy, Inc.	Tug Hill	E	2009/12	78.0	7.8	23.4	Wind Turbines	
207	BP Alternative Energy NA, Inc.	Cape Vincent	E	2009/Q4	210.0	21.0	63.0	Wind Turbines	
239A	Innovative Energy Systems Inc.	Modern Innovative Plant	A	2009/Q4	6.4	6.4	6.4	Methane	
160	Jericho Rise Wind Farm, LLC	Jericho Rise Wind Farm	E	2009-2011	79.2	7.9	23.8	Wind Turbines	
169	Alabama Ledge Wind Farm, LLC	Alabama Ledge Wind Farm	A	2009-2011	79.2	7.9	23.8	Wind Turbines	
198	New Grange Wind Farm, LLC	New Grange Wind Farm	A	2009-2011	79.9	8.0	24.0	Wind Turbines	
90	Fortistar, LLC	Fortistar VP	J	2010/Q2	79.9	79.9	79.9	Combustion Turbine(s)	
91	Fortistar, LLC	Fortistar VAN	J	2010/Q2	79.9	79.9	79.9	Combustion Turbine(s)	
Small Generators									
209A	Casella Waste Systems	Hyland Landfill	C	2008/06	6.4	6.4	6.4	Methane	
164A	Casella Waste Systems	Clinton County Landfill	D	2008/07	6.4	6.4	6.4	Methane	
160A	Innovative Energy Systems Inc.	DANC	E	2008/08	6.4	6.4	6.4	Methane	
237A	Chautauqua County	Chautauqua Landfill	A	2008/12	6.4	6.4	6.4	Methane	
204A	Windhorse Power, LLC	Windhorse Beekmantown	D	2008/Q4	19.5	2.0	5.9	Wind Turbines	
					Total	3,407	3,999		

Notes:

a) The above capability values for wind generation projects reflect expected values of 10% of Name Plate for summer capability and 30% of Name Plate for winter capability.
b) Projects that have met the criteria for inclusion in the Base Case for the NYISO Reliability Needs Assessment.

Queue = considered a method for prioritizing projects used in assessing and developing larger transmission system planning activities.
MW = megawatts

Source: NYISO, 2008b

Table 8.3-6—Generator Retirements

Owner / Operator	Station Unit	Zone	Date	PTID	Capability (MW) Summer	Capability (MW) Winter	Reason for Retirement
Scheduled Retirements							
Mirant Corporation	Lovett 5	G	4/19/2008	23593	-182.9	-185.2	Environmental Restrictions
Rochester Gas and Electric Corporation	Russell Station 3	B	4/28/2008	23549	-41.7	-48.5	
Rochester Gas and Electric Corporation	Russell Station 4	B	4/28/2008	23556	-77.7	-80.2	
Onondaga Cogeneration, LP	Onondaga Cogen	C	4/30/2008	23986	-78.3	-87.1	
New York Power Authority	Poletti 1	J	2/1/2010	23519	-891.0	-886.7	Station Replacement
				Total	**-1,271.6**	**-1,287.7**	
Planned Retirements							
NRG Power, Inc.	Astoria GT 05	J	1/1/2013	24106	-14.0	-15.5	
NRG Power, Inc.	Astoria GT 07	J	1/1/2013	24107	-12.7	-16.4	
NRG Power, Inc.	Astoria GT 08	J	1/1/2013	24108	-12.3	-17.2	
NRG Power, Inc.	Astoria GT 10	J	1/1/2013	24110	-22.9	-29.9	
NRG Power, Inc.	Astoria GT 11	J	1/1/2013	24225	-21.5	-27.8	
NRG Power, Inc.	Astoria GT 12	J	1/1/2013	24226	-19.9	-28.8	
NRG Power, Inc.	Astoria GT 13	J	1/1/2013	24227	-20.6	-26.0	
				Total	**-123.9**	**-161.6**	
Units Retired since 4/1/2007							
Mirant Corporation	Lovett 3	G	5/8/2007	23632	-55.6	-55.6	Environmental Restrictions
Mirant Corporation	Lovett 4	G	5/9/2007	23642	-160.9	-168.2	Environmental Restrictions
AG Energy, LP	Ogdensburg	E	10/1/2007	24021	-76.7	-87.7	
Rochester Gas and Electric Corporation	Russell Station 1	B	1/31/2008	23602	-45.0	-47.2	Environmental Restrictions
Rochester Gas and Electric Corporation	Russell Station 2	B	2/15/2008	23532	-60.5	-62.5	Environmental Restrictions
NRG Power, Inc.	Huntley 85	A	6/2/2007	23559	-69.5	-72.0	Environmental Restrictions
NRG Power, Inc.	Huntley 66	A	6/2/2007	23560	-68.6	-69.0	Environmental Restrictions
				Total	**-536.8**	**-562.2**	

Notes:

PTID = Point Identification
MW = megawatts
Source: NYISO, 2008b

Table 8.3-7—Generator Reratings

Incremental Capability (MW)									Total Capability (MW) [b]
Queue Pos.	**Owner / Operator**	**Station Unit**	**Zone**	**Date**	**PTID**	**Rating (MW)**	**Summer [a]**	**Winter [b]**	**Rating (MW)**
224A	Bio-Energy Partners	High Acres Landfill	C	5/1/2008	23767	6.4	6.4	6.4	9.6
185	New York Power Authority	Blenheim-Gilboa Plant Unit 1	F	6/1/2008	23756	30.0	30.0	30.0	308.0
233	Erie Boulevard Hydro Power, LLC	Sherman Island Uprate	F	3/1/2009	24058	8.5	8.5	8.5	38.8
185	New York Power Authority	Blenheim-Gilboa Plant Unit 3	F	6/1/2009	23758	30.0	30.0	30.0	308.0
231	Seneca Energy II, LLC	Seneca Energy	C	7/1/2009	23797	6.4	6.4	6.4	24.0
234	Steel Winds, LLC	Steel Winds II	A	9/1/2009	323596	60.0	6.0	18.0	80.0
185	New York Power Authority	Blenheim-Gilboa Plant Unit 4	F	6/1/2010	23759	30.0	30.0	30.0	308.0
216	Nine Mile Point Nuclearn Station, LLC	Nine Mile Point Unit 2	C	7/1/2010	23744	168.0	168.0	168.0	1,427.3
127A	Airtricity Developments, LLC	Munnsville Wind Power	E	10/1/2012	323609	6.0	6.0	1.8	40.5
					Total	**345.3**	**285.9**	**299.1**	**2,544.6**

Notes:

a) The above capability values for wind generation projects reflect expected values of 10% of Name Plate for summer capability and 30% of Name Plate for winter capability.
b) Total capability values include current and incremental capability values.

Queue = Considered a method for prioritizing projects used in assessing and developing larger transmission system planning activities.
MW = megawatts

Source: NYISO, 2008b

Table 8.3-8—Summary of Transactions External to NYCA

Summer Net Purchases and Sales (MW) (a) (b)										
2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
76.8	76.8	-124.2	516.8	466.8	466.8	466.8	466.8	466.8	466.8	466.8
Winter Net Purchases and Sales (MW) (a) (b)										
2008/09	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19**
80.0	80.0	-121.0	520.0	520.0	520.0	470.0	470.0	470.0	470.0	470.0

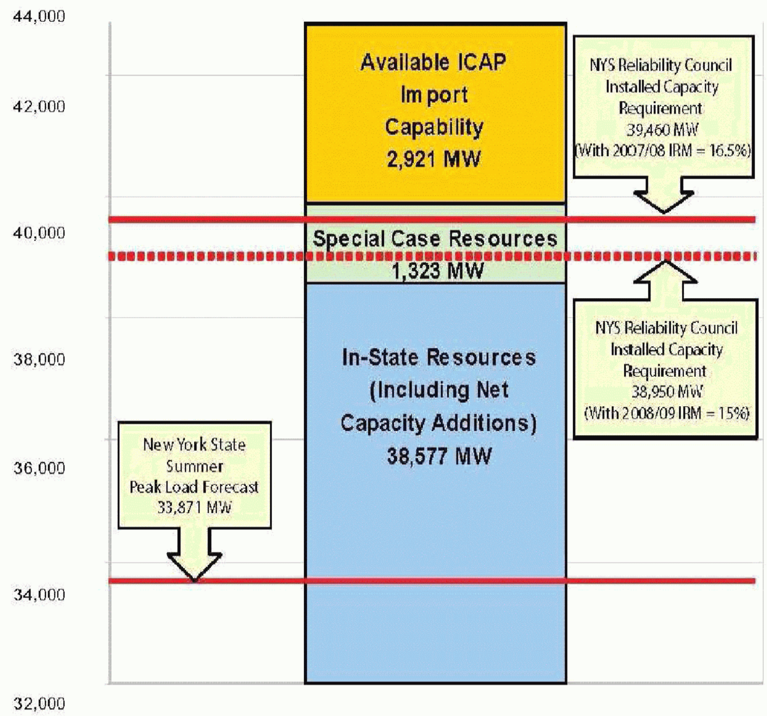
Notes:

a) Figures reflect the use of Unforced Capacity Deliverability Rights (UDRs) as currently known
b) Negative numbers for the Net Purchases and Sales values represent higher total Sales out of NYCA than total Purchases into NYCA.

MW = megawatts
NYCA = New York Control Area

Source: NYISO, 2008

Figure 8.3-1—Resource Availability for New York State - Summer 2008



Source: NYISO, 2008b

8.4 ASSESSMENT OF NEED FOR POWER

As introduced in Section 8.0, the NRC expects states and regions to prepare need for power assessments that can be used as the basis for NRC evaluation if they are (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty (NRC, 2007).

The NYISO process is used for comprehensive planning and the New York State government relies heavily on that process for the evaluation and planning of the electric system.

In assessing the costs and benefits of the project, NUREG 1555, ESRP 8.4, notes that if a need for power analysis is not available, staff should determine if the projected peak load responsibility plus the reserve requirement exceeds the total accredited generating capacity, and, absent special circumstances, these findings justify the conclusion that new capacity is warranted (NRC, 2007).

The NRC further notes the following (NRC, 2007):

> Although this criterion does not show a need for baseload capacity, it does demonstrate a need for new capacity that is independent of type. This criterion, coupled with an affirmative indication that there is a need for baseload capacity, justifies a baseload addition within the time span determined by the forecast analysis.

8.4.1 ASSESSMENT OF THE NEED FOR NEW CAPACITY

In December 2007, the Board of Directors of the NYISO approved the 2008 RNA. The RNA is the first part of the CRPP, which annually evaluates the state power generation adequacy and transmission reliability needs over a 10-year span. The RNA compares the anticipated energy supply to the forecasted demand and identifies the locations of energy needs. The CRPP develops and evaluates solutions to the energy needs (NYISO, 2007).

The 2008 RNA indicates that power generation and transmission resources in the state are expected to be adequate through 2011. Based on the current data, the RNA shows that a reliability need is expected beginning in 2012. As noted in Section 8.0, although the relevant market area corresponds exactly to the political boundary of the State of New York, the majority of power needs are largely located in the southeastern region of the state, near the load centers of NYC and Long Island. The need for resources (power generation and transmission improvements) is expected to become acute by 2017 if expected increases in electricity demand are not met with additional resources (NYISO, 2007). The problem in the NYC area is exacerbated by the fact that New York City and Long Island can only import limited quantities of power on constrained transmission lines. Additionally, the siting of new power plants in the NYC metropolitan area would be encumbered by expensive and little available land for new generation and community resistance in heavily residential and densely populated areas. Therefore, new generation in other portion of the state along with improvements to the existing transmission system would be the best way to meet this need.

According to the 2008 RNA, the equivalent of 500 MW in Zone J (NYC), or a total of 750 MW with 250 MW each in Zone F (Capital); Zones G, H, or I (Hudson Valley, Millwood, or Dunwoodie); and Zone J is required to meet anticipated power needs in 2012. The 2008 RNA also shows that by 2017, an additional 2,750 MW of resources are needed in the state's bulk electricity grid to accommodate the power demand needs. This need not only is based on growing demand but also considers the anticipated retirement of some facilities and achieving federally mandated reliability standards. The RNA concludes that about half of those MW should be located in the southeastern part of the state (NYISO, 2007).

Energy flows into the NYC area have created congestion in the north/south transmission of energy. Increasing demands on the transmission system, in conjunction with other system changes, consisting primarily of generating unit retirements, load growth, neighboring system changes and the lack of new capacity near NYC, have and will continue to result in energy transfer limits based on voltage constraints. The RNA further concludes that the power need in 2012 not only results from a statewide capacity deficiency, but also a zonal deficiency resulting from transmission constraints near NYC. Therefore, the need could be resolved by adding capacity resources downstream of the constraints or by adding resources above constraints in conjunction with transmission reinforcement (NYISO, 2007a). System upgrades as well as new transmission lines outside the NYCA have brought the transmission voltage transfer limit closer to the thermal limit in southeastern New York (NYISO, 2008a).

Congestion into the NYC area decreased in 2007, because of the following reasons. The Neptune Cable project began operation in July 2007 and dramatically reduced congestion into Long Island and, to a lesser extent, within NYC. Congestion was also reduced by increases in the value of congestion and by using detailed network models that better utilize the transmission system (Potomac Economics, 2008).

Electricity used by New York's consumers is bought and sold in the competitive wholesale electricity markets administered by the NYISO. The NYISO is the regional transmission organization that serves as the electricity broker for New York State and maintains the reliability of the bulk electricity grid for all suppliers of electricity, including those generators within the state. Electricity demand and the resources to meet that demand are satisfied first within the NYISO. The NYISO also coordinates reliability assessments with adjacent RTOs. If available, surplus electricity would be made available to adjacent RTOs when demand requires it. Generators that sell electricity in the NYISO are contractually obligated to meet the reliability requirements as scheduled with the NYISO.

For comparison, the 2007 RNA forecasted that additional resources would be required in 2011, not 2012. The 2007 RNA determined that sufficient statewide resources are available to meet NPCC LOLE criteria through the year 2010. The 2008 RNA indicated that in 2011, sufficient resources would exist if 250 MW were added to NYC or 500 MW were added in the Lower Hudson Valley, or if transfer limits into NYC were increased. Beyond 2011, additional resources of between 1,750 MW and 2,000 MW would be needed to meet the criteria through 2016. A majority of those resources would need to be in the NYC zone (NYISO, 2007).

The change in the 2008 RNA, providing additional resources through 2012 is a result of upgrades and additions made by power generation and TOs in response to the NYISO planning process, as well as the development of demand-response resources.

As part of the CRPP, the NYISO asks developers to submit market-based solutions to the reliability needs identified in the 2008 RNA, and requests the TOs and non TOs to submit proposed regulatory solutions that can be called upon if market-based projects are not available to satisfy the needs on a timely basis. These submissions are evaluated as part of the 2008 CRPP. The NYISO determined that the RNA-identified reliability needs can be satisfied through market-based solutions.

The 2008 RNA concludes that if the EEPS/15-x-15 Initiative is successfully implemented, then added generation or transmission capacity might not be necessary until the year 2017. As previously noted, the strategy calls for a 15% reduction of energy usage by 2015. While the need for added generation would be delayed under the 15-x-15 strategy, it would not be eliminated, and new generation sources would still be needed in the immediate future to replace older units that are being retired.

Realistically, the reliability needs of the state in 2012 are driven by load growth, generator retirements, and the physical limits of transmission systems serving the lower Hudson Valley, NYC, and Long Island. Load growth of more than 2% per year in Zones G through K has caused increased demands on the bulk system in those areas. The 2008 RNA forecasts that, by 2012, approximately two-thirds of the NYCA system load will be located in southeastern New York with 52% in NYC and on Long Island (NYISO, 2007).

As noted in Section 8.3.3, a reserve margin is the amount by which the capacity resources exceed the peak demand and is expressed as a percentage of the demand. Although the annual reserve margin defines only the relationship between capacity and demand for the peak hour of the year, it is derived from a probabilistic assessment method.

Reliability in the NYISO is determined by having adequate resources to support the power needs of the system. One of the key responsibilities of the NYSRC is the establishment of an annual statewide IRM. The IRM is intended to ensure that adequate levels of generation are available to serve load during normal and system emergency conditions. In establishing the IRM, the NYSRC considers various factors, including load characteristics, uncertainties in load forecasts, the transfer capability and configuration of the New York State transmission system, interconnections with other control areas, generation outages and deratings, and local reliability rules. Additionally, in accordance with NYSRC Reliability Rule A-R1, the NYSRC must establish the IRM for the NYCA, expressed as a percentage above forecasted peak loads, such that the probability or risk of disconnecting any firm load due to resource deficiencies could be, on average, not more than once in 10 years. Compliance with this criterion is evaluated probabilistically, such that the LOLE of disconnecting firm load due to resource deficiencies shall be, on average, no more than 0.1 day per year (NYSPSC, 2008).

Load-serving entities (LSEs) are required to procure resource capacity that is sufficient to meet the statewide IRM when cumulated, as well as any locational capacity requirements (LCRs). The NYISO determines each LSEs' LCR based on the IRM. LSEs comply with the LCRs and IRM by buying ICAP, which is a commitment by a generator to bid energy it can produce into the day-ahead energy market administered by the NYISO. LSEs may meet their ICAP requirements by either self-supplying (that is, bidding into the ICAP market either LSE-owned generation or ICAP obtained through a bilateral contract), or by purchasing ICAP through NYISO-administered ICAP auctions (NYSPSC, 2008).

Participation in the NYISO-administered ICAP auctions is generally voluntary, although the NYISO conducts a monthly spot auction in which LSEs are obligated to purchase any remaining ICAP requirements pursuant to the ICAP demand curve. The demand curve, which is administratively set, establishes the quantity and price of ICAP commitments that LSEs are required to procure in relation to the IRM. Under the demand curve, the price for ICAP gradually deceases as the amount of available ICAP goes above the IRM, while it increases as available ICAP decreases, in order to send an appropriate price signal when additional resources are needed (NYSPSC, 2008).

The NYSRC annually determines the IRM and, in February 2007, reduced the statewide IRM from 18 to 16.5%. On December 14, 2007, the Executive Committee of the NYSRC adopted an IRM for the NYCA of 15% for the upcoming capability year from May 2008 through April 2009. The NYSRC provides a satisfactory explanation for this reduction. Its reasons include:

- The continued improvement of NYCA generating unit availability,
- Updated NYCA transmission topology,
- Improved emergency assistance benefits from neighboring control areas, and
- Reduced cable outage rates. (NYSPSC, 2008)

While the need for installed capacity has been reduced, new generation sources would still be needed in the immediate future to replace older units that are being retired. In this regard, a number of companies, considered to be probable competitors, have announced their intentions to build new generating capacity in the NYISO region (Table 8.3-5).

8.4.2 OTHER BENEFITS OF NEW NUCLEAR CAPACITY

NUREG 1555 (NRC, 2007) allows for an applicant to assess the need for the proposed facility on other grounds. The following criteria suggest the continuing benefits of, and the need for, a new nuclear baseload generating facility in the state independent of the need for power:

- Energy prices are a major factor in New York's high cost of living and doing business.
- The potential to reduce the average cost of electricity to consumers and the potential increase in the availablity of new power to in state consumers are essential to ensure reliability and fair competition. The NYISO notes that the potential for new power generation to increase availability to in-state consumers is essential to ensure reliability and a robust competitive market. The addition of a new nuclear plant to New York's electricity supply would provide an additional source of baseload power that would help stabilize the cost of electricity for consumers.
- New York will need significantly more power to avoid blackouts early in the next decade. There is a need for the region to diversify sources of energy (for example, using a mix of nuclear fuel and coal for baseload generation). Although adding additional generation should be sufficient to meet established reliability criteria within the region, there is concern about the lack of fuel diversity exhibited by generation additions.
- There is a regional and nationwide need to reduce reliance on fossil fuels and imported petroleum in particular. The current national policy is to develop ways to reduce dependence on fossil fuels. The state recently placed severe limits on emissions from coal and natural-gas fired plants. The current national policy is to develop ways to reduce dependence on fossil fuels. New baseload nuclear generating capacity is required to enhance U.S. energy supply diversity and energy security, a key National Energy Policy (NEP) objective (White House, 2001). The national policy in support of new nuclear is also apparent in Nuclear Power 2010, which is a joint government/ industry cost-shared effort to identify sites for new nuclear plants, develop and bring to market advanced nuclear plant technologies, evaluate the business case for building new nuclear power plants, and demonstrate untested regulatory processes (DOE, 2001).

In addition, the EPACT of 2005 (Public Law, 2005) encourages needed investment in the national energy infrastructure that would help boost electric reliability, and promotes a diverse mix of fuels to generate electricity. EPACT includes a number of provisions that will affect the cost and availability of energy in New York and the overall structure of the electricity and natural gas industries.

- Authorizes construction cost-overrun support of up to $2 billion total for up to six new nuclear power plants
- Authorizes a production tax credit of up to $125 million total per year, estimated at 1.8 ¢/kWh during the first 8 years of operation for the first 6,000 MW of new nuclear capacity
- Authorizes a loan guarantee program to support advanced nuclear energy facilities

Although NUREG-1555 does not specifically identify GHG reduction as one of these benefits, more recent state and national policy statements assert the benefits of baseload capacity that reduces GHG. The increasing concern about GHG and consequent climate change has triggered a number of national policy trends:

- During the 109th Congress, both houses of the U.S. Congress introduced resolutions calling for a national program of carbon reduction. The Senate Committee on Energy and Natural Resources is reviewing "cap-and-trade" legislation to reduce GHG emissions during the early days of the 110th Congress (U.S. Senate, 2006).
- The 110th Congress continues its exploration of legislation that would limit carbon emissions in the United States. Known as "cap-and-trade" legislation, the legislation seeks to bring carbon emissions down through a series of industry caps and trading strategies (U.S. Senate, 2007a).
- The costs of climate change also have triggered concerns about the economic effects of continuing carbon emission growth. The following examples highlight the growing concern in the United States:
    - A British study reviewed by the U.S. Senate notes that unabated climate change will sharply affect economic systems globally, ultimately costing more than 20% annually of gross domestic product by the year 2050 (U.S. Senate, 2007b).
    - U.S. economic reviews of the British study support it with "high confidence" (Yohe, 2007).
    - President Bush agreed to carbon emissions reductions at the G-8 summit

The governor of New York initiated the RGGI in 2003. The RGGI is a cooperative effort by 10 northeastern states from Maryland to Maine to design a regional cap-and-trade program initially covering CO2 emissions from power plants in the region. In the future, the program might be expanded to include other GHGs. The program would limit total CO2 emissions from electric-generation sources in the member states to achieve the environmental goal of reducing total CO2 emissions (NYISO, 2008a).

States participating in the RGGI agree to allocations of emissions for established compliance periods. The initial allowance cap for New York is 64 million tons per year (tpy) for total CO2. Calculations conducted by the NYISO indicated approximately 52 million tpy are made available for current power-generating facilities. Notably, these calculations do not include nuclear power plants because these sources are non-carbon-emitting generation sources. The NYISO noted that any retirements or prolonged outages to these nuclear power facilities likely would require the expanded use of facilities that emit CO2 and potentially push the total CO2 emission levels to the cap of 64 million tpy, requiring the state to have, and to use, its full complement of initial allowances (NYISO, 2008a).

The Ozone Transport Commission (OTC) is an organization composed of Northeast and Mid-Atlantic States created under the Clean Air Act (CAA). The OTC is responsible for advising the U.S. Environmental Protection Agency (USEPA) on transport issues and for developing and implementing regional solutions to the ground-level ozone problems. Sources that generate emissions of nitrogen oxides (NOX) (for example, power plants and automobiles) create ground-level smog in the presence of sunlight and humidity.

As a member of the OTC, New York participates in a multi-state effort to achieve compliance with federal ambient air quality standards for ozone. In regard to power planning, the primary focus of OTC efforts is to reduce NOX emissions from power plants that operate infrequently but have few existing emission controls and, therefore, high emission rates.

The primary focus of the ozone compliance efforts is the load-following and peaking units that operate in southeastern New York on hot, hazy days when the electricity demand is highest and air quality is already poor. Evaluations conducted by the NYISO indicated that limiting the capacity of these generators, known as high electric demand day (HEDD) units, could have significant impacts on resource capacity in the short term. These considerations indicate the need for additional studies and multiple strategies over several years to successfully achieve USEPA air quality goals (NYISO, 2008b).

8.4.3 SUMMARY OF NEED FOR POWER

The NYISO 2008 RNA finds that a reliability need will occur in 2012, primarily in the southeastern region of the state. By 2017, the resource needs will become acute if the equivalent of approximately 2,750 MW is not installed. The solution to the reliability need is through the addition of new power sources. While energy efficiency measures, such as the EEP /15-x-15 Initiative might reduce energy demand, the current RNA identifies the need for additional power-generation resources and requests that developers submit market-based solutions to accommodate the reliability need. The reliability needs of the state in 2012 through 2017 are primarily driven by load growth, generator retirements, and the physical limits of transmission systems serving the lower Hudson Valley, NYC, and Long Island.

The purpose of NMP3NPP is to satisfy the need for power identified by NYISO. The result of no action, or not constructing the new facility, would mean that the need for power has not been satisfied, and other electric-generating sources would be needed to satisfy the forecasted electricity demands.

In summary, the need for power is demonstrated by the following:

- The 2008 RNA concludes there will be a reliability need in 2012.
- The NYISO asks developers to submit market-based solutions to the reliability needs identified in the 2008 RNA.
- The need for new electric supply both for economic development purposes as well as to provide the environmental and health benefits associated with new energy facility construction is unquestioned. In addition, it is also widely recognized that the NYC

metropolitan area is one of the largest load centers in the northeast, but importing electricity is problematic because of transmission line congestion. Siting new power plants in the NYC metropolitan area, however, would not be easy; land is scarce and expensive. The potential areas for locating new generation facilities are densely populated and heavily residential and would be affected by community resistance. Therefore, the best way to meet this need would be through a combination of generation plants (both new and repowered), transmission line and substation improvements, and various methods of energy efficiency and demand reduction.

- To satisfy the growing demand, NYISO has added capacity every year since 2000 at an average of 1,654 MW per year.
- If the supply of energy is not increased and existing demand trends continue, reserve margins will be reduced.
- NMP3NPP would be a fundamental piece of the energy solution.
- Given concerns in New York and throughout the northeastern United States about climate change and carbon emissions, NMP3NPP serves another important need by reducing carbon emissions in the state. NMP3NPP will displace significant amounts of carbon as soon as the plant becomes operational, as contrasted with a coal fired power-generating facility.

There is a growing demand for baseload power. Over the next 10 years, the average annual peak forecast is expected to grow between 1.2 and 1.5% per year. Long-term economic signals have indicated a shift in favor of baseload power, as opposed to, peaking facilities. While more costly to build, these facilities are less costly to run, produce more electricity and improve reliability by providing a constant secure source of power.

Section 9.2 discusses the viability of various baseload energy alternatives. Section 10.4 further reviews the costs and benefits of NMP3NPP.

8.4.4 REFERENCES

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