The Comprehensive Reliability Plan 2007

A Long-Term Reliability Assessment
of
New York's Bulk Power System

Fifth Draft
For Discussion Purposes Only

August 14, 2007

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EXECUTIVE SUMMARY

The reliability of New York's bulk power system depends on a combination of adequate resources, provided both in response to market forces and by regulated electric utility companies, which are obligated to deliver safe and adequate electric service to retail customers. To maintain the system's long-term reliability, those resources must be readily available or in development to meet future needs.

With these goals in mind, the New York Independent System Operator (NYISO) and its stakeholders developed and implemented its Comprehensive Reliability Planning Process (CRPP). In December 2004, the Federal Energy Regulatory Commission (FERC) approved the CRPP, and it is contained in Attachment Y of the NYISO's Open Access Transmission Tariff (OATT). This document represents the second in a series of annual CRPP studies to address the long-term reliability of New York's bulk power system. This 2007 Comprehensive Reliability Plan (CRP)[1] reported the following, which is discussed in more detail in the body of the report in Sections III–VII.

A. The 2007 Reliability Plan[2]

The 2007 Reliability Needs Assessment (RNA) determined that additional resources would be needed over the 10-year Study Period in order for the New York Control Area (NYCA) to comply with applicable reliability criteria[3]. As a result, the NYISO requested market-based, regulated backstop, and alternative regulated solutions to the Reliability Needs. The preference is to provide an opportunity for market solutions to meet the future needs with regulated backstops and alternative regulated solutions available, if needed.

The NYISO designated the Transmission Owners (TOs) responsible for developing regulated backstop solutions to address the Reliability Needs identified in the RNA. The Responsible Transmission Owners submitted their updated TO plans, which had the effect of meeting needs in the First Five Year Period. They also submitted regulated backstop solutions, which were sufficient to meet the identified Reliability Needs over the second five-year period.

In addition, a broad range of solutions, including market proposals and alternative regulated responses were submitted. Based upon its evaluation of the Market Proposals, updated TO Plans, and continued operation of the Charles A. Poletti generating unit through January 2010, the NYISO has concluded that there are sufficient resource additions to the NYCA planned or under development to meet the Reliability Needs for

[1] The first CRP was entitled the 2005 CRP, while the second is entitled the 2007 CRP. This difference of two years is the result of a change in naming convention which adopts the first year of the Study Period, 2007, as the identifier for the CRPP study year as opposed to the year from which the study assumptions are derived. This year's CRPP used assumptions derived from the 2006 Load and Capacity Data Book and other sources, while last year's CRPP was based upon data and assumptions from 2005.

[2] All supporting databases and analysis utilized in developing this plan are available for inspection subject to confidentiality and critical energy infrastructure information requirements (CEII).

[3] Reliability Needs were identified with respect to approved reliability criteria, including through MARS LOLE studies. These studies reflect the realistic capability of the NYCA transmission system with appropriate limits in the presence of thermal, voltage or stability constraints.

the next 10 years. Accordingly, the NYISO has determined that no action needs to be taken at this time to implement any regulated backstop solution or an alternative regulated solution to address the Reliability Needs identified in the 2007 RNA.

The plan consists of the following actions:

1. Deferring retirement of the New York Power Authority's Charles A. Poletti generating unit in New York City from 2009 until 2010. It is particularly important that the existing Poletti unit stay in-service until 2010 because the Consolidated Edison Company of New York, Inc. (Con Edison) M29 transmission project will not be in-service until late 2009.
2. Implementing certain Responsible TO plans, which include transmission upgrades, such as the addition of capacitor banks at the Millwood Substation and a breaker replacement at the Gowanus Substation.
3. Developing upwards of 1,800 MW of market-based resources from the 3,007 MW of the merchant generation and transmission projects that have been proposed for New York. At least 1,000 MW of these resources should be located in New York City or have unforced capacity delivery rights (UDRs) into New York City; 500 MW of resources in the Lower Hudson Valley; and the remaining 300 MW of additional resources in New York State as a whole, including Upstate New York (UPNY). The NYISO has received market-based proposals for more than the minimum resources needed to meet resource adequacy criteria. The NYISO does not choose which of the market-based projects submitted to it will be built. Rather, it is up to the proponents to proceed with, and the relevant state siting and permitting agencies to approve, the specific resources that will be added in New York. The NYISO will continue to monitor the viability of these projects in accordance with established procedures and will report on its evaluation in the next CRP. As identified in section 5.3 of the 2007 RNA, there are other combinations of resources that would meet resource adequacy criteria on a statewide basis.
4. In summary, based upon the solutions submitted to the NYISO, the resource additions required for the next 10 years, by 2016, total approximately 1,800 MW.

B. Summary of Findings

The CRP reported two primary findings, which are summarized here and discussed in more detail in Section VII.

Finding Number One – Transmission Security and Adequacy

As in the first CRP approved by the NYISO Board of Directors in August 2006, transfer limits for the 10-year Study Period were reduced to maintain the security of the transmission system. The lower transfer limits were largely located in Southeastern New York (SENY), and reduced the ability of the transmission system to deliver capacity downstream of the constraints.[4] The result was an increase in the Loss of Load

[4] Transmission system performance is evaluated in accordance with thermal, voltage and stability criteria.

Expectation (LOLE), which translates into increased resource requirements downstream. The major factor driving the reduction in transfer limits was the voltage performance of the New York transmission system, which is being impacted by load growth and generator retirements. However, the necessary transfer limit reductions identified in the 2007 RNA were not as severe as in the first RNA because of system improvements incorporated into the baseline from the first CRP and updated Transmission Owner plans, designed to improve the voltage performance of the system.

Finding Number Two – Plan Risk Factors

Although the planned system meets reliability criteria based on the conditions studied, the NYISO has identified a number of risk factors that could adversely affect the plan. These factors will require ongoing review and assessment.

They are:

1. First and foremost, construction of planned resources and transmission upgrades should move forward on the schedules provided, so that the resources anticipated by the plan are in service in the locations identified and in the amounts needed. If solutions are not implemented on a timely basis, electric system reliability could be put at risk. Also, the absence of a "one-stop" siting process could impede the construction and operation of new generating facilities to meet Reliability Needs. New York State once had a streamlined siting process for large power plants, but that law (Article X of the Public Service Law) expired at the end of 2002. The NYISO should reflect the absence of an Article X process when evaluating the viability of project timelines. The New York State Legislature should reenact a comprehensive siting process for major electric generating facilities in Article X of the New York Public Service Law.

2. The planned generator additions in this plan will be natural gas fired units with Number 2 fuel oil or kerosene as the back up fuel. The fuel diversity of the power supply system and its overall impact on fuel availability, reliability and prices needs to be monitored on a continuous basis.

3. The plan depends increasingly on the availability of capacity resources in neighboring control areas delivered as UDRs for New York to maintain its compliance with reliability criteria.

4. The proponents of market-based generation and transmission solutions stated that their viability may depend upon entry into long-term contracts for the sale of their output in combination with spot market sales. The Independent Market Advisor will review whether market rule changes are necessary to identify and address failure in one or more of the NYISO competitive markets.

5. Greater than expected load growth or retirement of additional generating units beyond those already included in the plan for either economic and/or environmental factors, as well as continued degradation of the voltage performance of the New York bulk power system, would adversely affect reliability. Emphasis should be placed on thoroughly identifying and addressing environmental factors that may lead to additional generating unit retirements.

6. New York's initiative to reduce demand. New York's Governor Spitzer announced a goal to reduce New York's energy consumption by 15% of forecasted levels by 2015. The New York Public Service Commission (PSC) is examining alternatives to reduce energy usage. Implementation of this initiative would also affect the State's future capacity needs.

C. Analysis by NYISO Independent Market Advisor

The analysis of Dr. David Patton, the NYISO Independent Market Advisor, on the 2007 CRP is attached as Appendix B (pending).

D. Recommendation

This 2007 CRP has determined that under the conditions studied, the market-based solutions submitted and the Responsible TO updated plans, the proposed system upgrades will maintain the reliability of the New York bulk power system without the need for regulated backstop or alternative regulated solutions at this time. Therefore, the NYISO Staff recommends that the Operating Committee and the Management Committee recommend that the Board of Directors approve the 2007 CRP.

I. INTRODUCTION

A. Historical Context and Current Policy Setting

Prior to the NYISO's formation in 1999, the electric utilities operated their systems cooperatively for decades, in an effort to provide reliable, economic electric supplies for consumers in New York State. In the wake of the Northeast blackout of 1965, the integrated electric utilities, together with the New York Power Authority (NYPA), established a statewide wholesale power coordinating institution, the New York Power Pool (NYPP), which operated for several decades as the predecessor of the NYISO. The NYPP carried out many of the reliability functions of a control area operator and provided a forum for short-term trades among the electric utilities and for allocating the benefits of these trades based upon a "split-savings" price formula. The NYPP also assisted the integrated electric utilities with their planning efforts, including the utilities' integrated evaluation of their customers' electric supply and delivery needs.

The advent of competition in the electric industry in New York State, and in many parts of the Northeast separated the costs of utilities' services into distinct products and markets, and led to the unbundling of power generation and transmission development. In New York, the integrated utilities have divested nearly all of their generation assets to private entities who compete to sell capacity, energy and ancillary services in the NYISO's markets. At the same time, the FERC required transmission providers to provide open and non-discriminatory access to their transmission systems under its landmark Order 888. The NYISO was created, under a FERC-approved Open Access Transmission Tariff (OATT), as part of an overall restructuring of the electric industry in New York. Key elements of the industry were redesigned to rely more on market forces for greater efficiency in operations of, and investment in, the bulk power system. The NYISO formally took over from the NYPP the operational control of the bulk power transmission system and the dispatch of generation on December 1, 1999.

Bulk power markets for capacity, energy and ancillary services were formed at the same time as state and federal policy makers recognized that the discipline and efficiency of market forces in providing these commodities would promote the public good through cost savings. Under this market-based philosophy, bulk power system needs should be provided for through markets that send economically efficient price signals for investment in needed resources. Approximately 5,000 MW of new power plants have come into operation in New York since the formation of competitive wholesale markets—most of these have been located in the downstate region where both the price signals and Reliability Needs are the greatest. Electric system needs are increasingly provided in response to market forces. As a result, the State's electric utilities no longer conduct vertically-integrated planning through which generation and transmission plans were tightly coordinated.

During the pendency of the 2007 CRPP[5], several state and federal policy initiatives have begun to examine the manner in which long-term electric system planning is conducted,

[5] A more detailed review of the CRPP is provided in the report entitled: "Comprehensive Reliability Planning Process Supporting Document and Appendices for the 2007 Reliability Needs Assessment" dated March 16, 2007 and available on the NYISO web site home page.

and whether changes to the current procedures should be adopted. The New York PSC has initiated a proceeding to examine whether long-term contracts should be encouraged and how they could be utilized to provide for future resource and infrastructure needs of the bulk power system. The PSC is also examining whether a planning process overseen by the State is needed as a supplement to the CRPP in order to incorporate state energy policy goals into planning for New York's energy future. Further, the PSC has commenced a proceeding to determine whether revenue decoupling mechanisms (RDMs) should be employed in retail rates to encourage more demand side management (DSM) programs. Finally, the PSC has commenced a proceeding to examine whether an energy efficiency portfolio standard should be established to assist in reducing forecasted electric consumption levels by 15 percent by 2015.

Also during this time, the FERC issued a final rule in its OATT reform proceeding. Following on FERC's Orders 888 and 889, which first established transmission open access and competitive market mechanisms for the wholesale electric industry, Order 890 directed improvements to the Open Access Transmission Tariffs of all Transmission Owners and Operators, including the ISOs and RTOs. Among other things, Order 890 listed nine principles that all Transmission Providers should adhere to in conducting their planning processes. In accordance with this Order, the NYISO has posted a Straw Proposal on its website (www.nyiso.com) addressing how it plans to comply with these nine principles. The NYISO will make a compliance filing to modify the CRPP in October of this year. Among other things, Order 890 required the NYISO to expand its economic planning process to include additional studies of transmission system congestion at the request of transmission customers. This will require modifications to the NYISO's existing economic planning process. Presently, this process is informational only, and provides for the calculation and posting of historic congestion information on the New York transmission system. For example, historic congestion data is reported in the 2007 RNA to inform the marketplace in evaluating what proposals to make in response to identified Reliability Needs. In its Straw Proposal, the NYISO has proposed enhancements to its planning process that will enable it to respond to customer requests by conducting a series of economic planning studies that build upon the reliability planning process under the CRPP.

The NYISO looks forward to continuing to participate in both the PSC and the FERC planning proceedings to share its technical expertise and experience in conducting reliability planning and transmission system congestion analyses. The NYISO believes that this 2007 CRP will help inform these state and federal processes.

B. The Nature of Planning Under the CRPP

Electric system planning is a continuous process of evaluating, monitoring and updating, which makes the annual publication of the CRPP an invaluable resource. In addition to addressing reliability issues, the CRPP offers valuable information to the State's wholesale electricity marketplace.

As set forth in NYISO OATT, Attachment Y, the objectives of the CRPP are to:

1. Evaluate the Reliability Needs of the Bulk Power Transmission Facilities (BPTF);
2. Identify factors and issues that could adversely impact the reliability of the BPTF;
3. Provide a process whereby solutions to identified needs are proposed, evaluated, and enacted in a timely manner to maintain the reliability of the system;
4. Provide an opportunity for the development of market-based solutions, while maintaining the reliability of the BPTF through backstop regulated solutions or alternative regulated solutions as needed; and
5. Coordinate the NYISO's reliability assessments with Neighboring Control Areas.

The CRPP is an ongoing process that produces two annual reports. The first is the RNA, which evaluates generation adequacy and transmission reliability over a 10-year span, and identifies future needs for maintaining reliability. Identifying potential and existing reliability issues concerning New York's bulk power system is the first step necessary to maintain the system's integrity for today and the future. The 2007 RNA was issued in March 2007.

The second step is the development of the CRP, which identifies and evaluates proposed solutions to maintain power system reliability. Those solutions may include market-based, regulated backstop and/or alternative regulated solutions that may result in new generation additions, transmission upgrades and additions, and/or improved demand response programs. This process is one of exception, where only needs not otherwise met by the market or by TOs as part of their own local plans are triggered through the process. To date, no project has been triggered, indicating that solutions to needs are moving forward utilizing existing market or other mechanisms.

This is the second CRP study produced by the NYISO and its stakeholders. The primary objective of the CRP is to present the results of the planning process. A secondary, but vitally important objective is to identify issues and improvements based on the lessons learned by the NYISO and its Market Participants in implementing the CRPP.

This report begins with an overview of the CRPP followed by a summary of the RNA report. The balance of the document describes the request for solutions, assesses transmission system security and adequacy, and the NYISO's evaluation of the proposed solutions. The CRP concludes with a summary of the reliability plan. The plan includes the NYISO's findings, actions required, and an evaluation of competitive market issues by the NYISO's Independent Market Advisor (Appendix B). The CRP concludes with a recommendation that the NYISO's Governance Committees recommend approval of the CRP by the NYISO's Board of Directors.

II. The Comprehensive Reliability Planning Process

The following discussion presents an overview of the CRPP, the reliability policies and criteria that form the foundation of the CRPP, and the analytical methods used to evaluate the reliability solutions provided and whether they satisfy the Reliability Needs identified in the RNA.

A. Overview of the CRPP

The CRPP is a long-range assessment of both resource adequacy and transmission reliability of the New York bulk power system conducted over five-year and 10-year planning horizons. The reliability of the bulk power system is assessed and solutions to reliability need evaluated in accordance with existing reliability criteria of the North American Electric Reliability Corporation (NERC), the Northeast Power Coordinating Council, Inc. (NPCC), and the New York State Reliability Council (NYSRC) as they may change from time to time. This process is anchored in the market-based philosophy of the NYISO and its Market Participants, which posits that market solutions should be the first choice to meet identified Reliability Needs. In the event that market-based solutions do not materialize to meet a reliability need in a timely manner, the NYISO designates the Responsible TO or TOs[6] to proceed with a regulated backstop solution in order to maintain reliability. Market Participants can offer and promote alternative regulated solutions which, if determined by NYISO to help satisfy the identified Reliability Needs and by regulators to be more desirable, may displace some or all of the TO's regulated backstop solutions. Under the CRPP, the NYISO also has an affirmative obligation to report historic congestion on the transmission system and whether the marketplace is responding appropriately to the Reliability Needs of the bulk power system. If market failure is identified as the reason for the lack of market-based solutions, the NYISO will explore appropriate changes in its market rules with its stakeholders. The CRPP does not substitute for the planning that each TO conducts to maintain the reliability of its own bulk and non-bulk power systems.

As the first step in the CRPP, the NYISO conducts an RNA to determine whether there are any violations of existing reliability rules with respect to either resource adequacy or transmission system security. A base case model of the electric system is assembled with inputs from stakeholders to determine the Reliability Needs of the electric system for a 10-year Study Period. This base case model includes plans that transmission owners have made to address the Reliability Needs of their own bulk and non-bulk power systems. Transmission security assessments are conducted to determine whether the transmission system meets reliability criteria and develop inputs into the resource adequacy assessments. MARS LOLE studies are conducted to assess resource adequacy utilizing emergency transfer limits that are determined from the transmission assessments as inputs. The emergency transfer limits are based on a transmission system that realistically reflects its capabilities with appropriate derates for thermal, voltage and stability limitations.

[6] The term "Responsible TO" means the Transmission Owner or Transmission Owners designated by the NYISO, pursuant to the NYISO Planning Process, to prepare a proposal for a regulated solution to a Reliability Need or to proceed with a regulated solution to a Reliability Need. The Responsible TO will normally be the Transmission Owner in whose Transmission District the NYISO identifies a Reliability Need.

Following the review of the RNA by the NYISO committees and final approval by the NYISO Board, the NYISO requests solutions from the marketplace to the Reliability Needs identified in the RNA. The RNA also identifies the Responsible TO or TOs that are obligated to prepare regulated backstop solutions for each identified need. The regulated backstop solutions also will serve as the benchmark to establish the timeframes for a market-based solution to appear. Both market-based and regulated solutions are open to all types of resources: transmission, generation, and demand response. Non-transmission owner developers, as well as TOs that have not been designated as a Responsible TO, also have the ability to submit proposals for regulated solutions as an alternative to the regulated backstop solutions provided by the responsible transmission owners. The NYISO has the responsibility to evaluate all proposed solutions to determine whether they are viable and will meet the identified Reliability Needs in a timely manner. The NYISO does not conduct an economic evaluation of the proposed solutions.

Following evaluation of the proposed solutions (including alternative regulated solutions); the NYISO prepares its CRP. The CRP identifies all proposed solutions that the NYISO has found will meet part or all of the identified Reliability Needs. If there is a viable market-based project that will meet the identified need in a timely manner, the CRP will so state. If there is no viable market-based proposal and the NYISO determines that a regulated backstop solution must be implemented to maintain bulk power system reliability, the CRP will so state. If a regulated backstop project must proceed, the NYISO will request the Responsible TO or TOs to proceed with regulatory approval and development of its regulated backstop solution.

The tariff also contains a provision that will allow the NYISO Board to deal with the sudden appearance of a reliability need on an emergency basis, whether during or in-between the normal CRPP cycle. In the event that there is an immediate threat to reliability, the NYISO will request the appropriate Transmission Owner to develop a "gap solution" and to pursue its completion and alert the PSC. Such a gap solution shall be designed to be a temporary solution, and shall strive to be compatible with market-based proposals and regulated projects.

Developers of market solutions are expected to recover their costs from the NYISO's energy, capacity, and ancillary services markets. Market-based solutions may also obtain revenues from other private contracting arrangements. The costs of implementing regulated backstop transmission solutions, including gap solutions and alternative regulated solutions are recovered through the NYISO's tariffs, with the costs of such solutions ultimately filed with the FERC for approval. The costs of implementing regulated backstop solutions that are either generation or demand response are to be recovered in accordance with the New York Public Service Law. Transmission Owner updated plans (Updated Plans) do not constitute regulated backstop solutions or alternative regulated solutions, and their costs are not recoverable under the CRPP provisions of the NYISO tariff.

The NYISO does not itself possess the authority to license or to construct projects to respond to Reliability Needs, and the ultimate approval of those projects lies with regulatory agencies such as the FERC, PSC, environmental permitting agencies, and local governments. The NYISO monitors the progress and continued viability of proposed market and regulated projects to meet identified needs, and reports its findings in annual plans.

Figure 2.1 below summarizes the process.

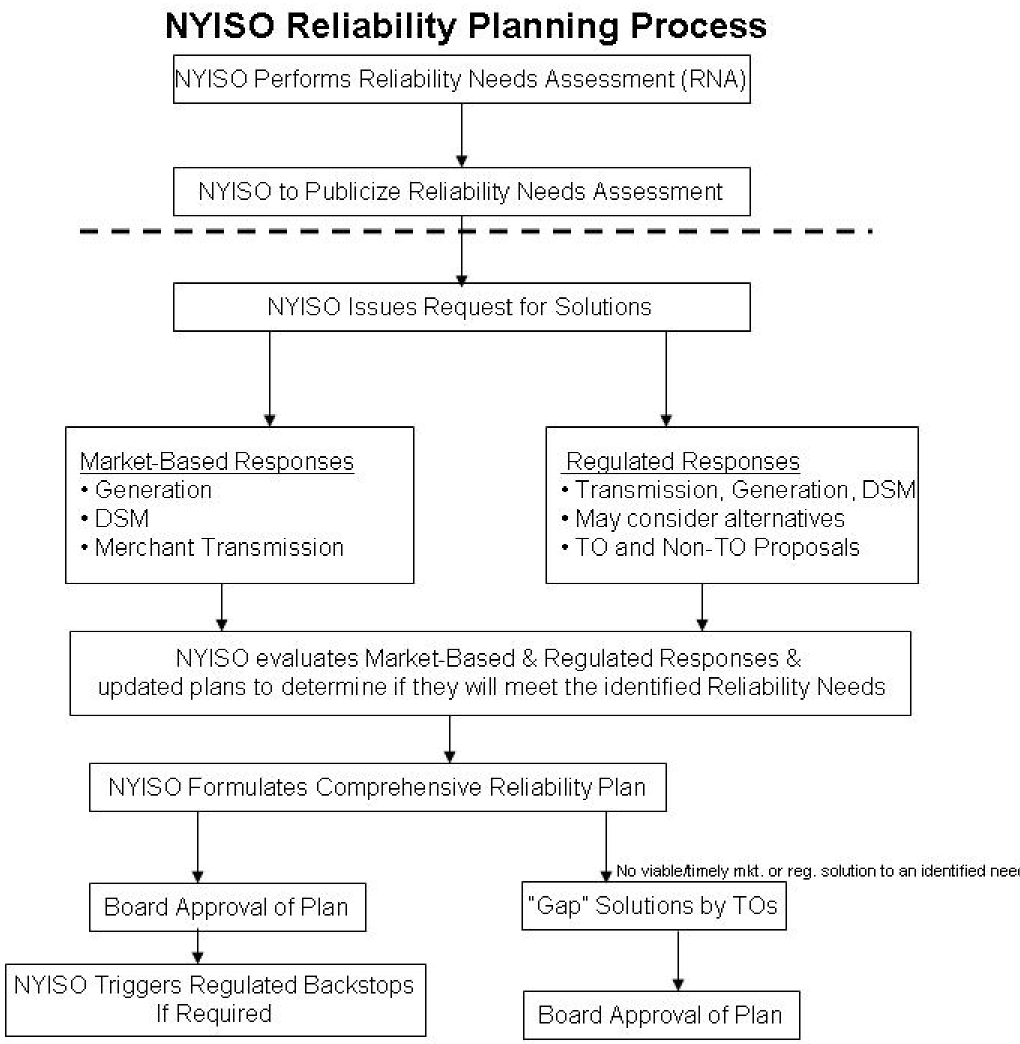

Figure 2.1: NYISO Reliability Planning Process

B. Overview of Reliability Policies and Criteria

The standard industry definition of bulk power system reliability is the degree to which the performance of the elements of that system (*i.e.*, generation and transmission) results in power being delivered to consumers within accepted standards and in the amount desired. It may be measured by the frequency, duration, and magnitude of adverse effects on consumer service.

Reliability consists of adequacy and security. Adequacy, which encompasses both generation and transmission adequacy, refers to the ability of the bulk power system to supply the aggregate requirements of consumers at all times, accounting for scheduled and unscheduled outages of system components. Security is the ability of the bulk power system to withstand disturbances such as electric short circuits or unanticipated loss of system components.

There are two different approaches to analyzing a bulk power system's security and adequacy. Adequacy is a planning concept that involves an analysis of the probability of future conditions and events. A system is adequate if the probability of having insufficient transmission and generation to meet expected demand is equal to or less than the system's standard, which is expressed as a LOLE. The New York bulk power system is planned to meet a LOLE[7] criteria that an involuntary load disconnection that is not more frequent than once in every 10 years, expressed mathematically as 0.1 days per year. This requirement forms the basis of New York's Installed Capacity Requirement to maintain resource adequacy.[8]

Security is an operating and deterministic concept. This means that possible events are identified as having significant adverse reliability consequences and the system is planned and operated so that the system can continue to serve load even if these events occur. Security requirements are sometimes referred to as N-1, N-1-1, or N-2, with N being the number of system components. In reality, it is the ability of the system to withstand the next credible contingency, which may include single or multiple elements. Credible contingencies are electrical system events (including disturbances and equipment failures) that are likely to happen. Each control area maintains a list of credible contingencies to which it plans and operates.

C. Overview of the CRPP Analysis Methodology

The CRPP is performed in three steps: an Input Step, an Analysis Step, and a Review Step. During the Input Step, information is gathered from various stakeholder groups, Neighboring Control Areas, existing reliability assessments, and existing NYISO publications and reports. The Analysis and Review Steps are conducted by performing a transmission screening analysis, which is followed by a resource adequacy assessment. These steps are conducted in a sequential and iterative process to maintain internal consistency between the two steps.

The primary tool to conduct the transmission screening is the Power System Simulator for Engineering (PSS/E) software used for electrical transmission planning in conjunction with the NYISO's voltage contingency analysis program (VCAP). PSS/E is a commercial software product offered by Siemens PTI and is currently in use in 123 Countries. Since its introduction in 1976, the PSS/E software has become one of the most comprehensive

[7] There are several reliability indices used in the industry to measure or evaluate resource adequacy such as Daily LOLE (days per year), Hourly LOLE (hours per year), LOEE (loss of energy), frequency (outages per year), duration (hours per outage), etc. NPCC and the NYSRC have adopted the daily loss of load expectation or LOLE as their criterion. LOLE is defined as the expected number of days in a year in which the daily peak load will exceed the available resources. The design standard or reliability criterion is an LOLE of 0.1 days per year.

[8] The NYSRC approved an Installed Reserve Margin ("IRM") of 16.5 percent for the 2007 capability year, which represents a decrease of 1.5 percent from the prior year's IRM of 18 percent. The FERC and the PSC each approved this change.

and widely used commercial programs of its type. The VCAP tool was originally developed by the NYPP.

The primary tool to conduct the resource adequacy assessment is GE Energy's Multi-Area Reliability Simulation program (MARS). MARS uses a Monte Carlo simulation to compute the reliability of a generation system comprised of any number of interconnected areas or zones.[9] MARS is able to reflect in its reliability calculations each of the factors listed in NYSRC Reliability Rule AR-1[10], including the impacts of the transfer capability of the transmission system.

The result of combining these tools in a sequential and iterative manner is a planning process that simultaneously addresses the "physics", or electrical properties of the grid, and how changes in power system transfer capability interacts with a probabilistic resource adequacy assessment. To the best of the NYISO's knowledge, this is the first electric system reliability planning process that attempts to do this in such a comprehensive and integrated way while giving preference for market-based solutions.

Figure 2.2 summarizes the CRP analysis process.

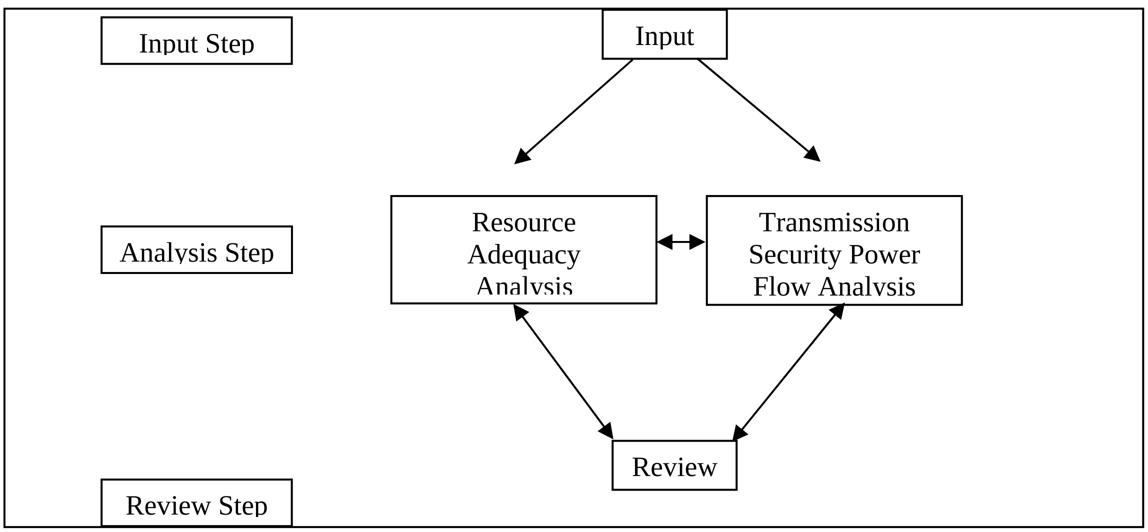

Figure 2.2: Flow Diagram for the CRP Analysis Process

[9] Eleven zones comprise the New York Control Area, and are lettered A through K. The zones run west to east and north to south. For example, Zone A includes Buffalo, Zone F includes Albany, Zone J is New York City, and Zone K is Long Island.

[10] NYSRC Reliability Rule AR-1 states that: "The NYSRC shall establish the IRM requirement for the NYCA such that the probability (or risk) of disconnecting any firm load due to resource deficiencies shall be, on average, not more than once in ten years. Compliance with this criterion shall be evaluated probabilistically, such that the loss of load expectation (LOLE) of disconnecting firm load due to resource deficiencies shall be, on average, no more than 0.1 days per year. This evaluation shall make due allowance for demand uncertainty, scheduled outages and deratings, forced outages and deratings, assistance over interconnections with neighboring control areas, NYS Transmission System transfer capability, and capacity and/or load relief from available operating procedures."

III. RELIABILITY NEEDS ASSESSMENT (RNA) - THE BASICS

The preparation of the RNA is the first step in the CRPP that leads to development of the CRP. Prepared annually, the RNA evaluates the reliability of the New York bulk power system for a 10-year Study Period. It identifies the needs of the baseline bulk power system to maintain reliability based on system adequacy and security criteria as described above. The Study Period for the 2007 RNA spanned 2007 to 2016. The baseline system is modeled in the RNA study case as the existing system together with changes that have a high probability of occurring over the 10-year Study Period. This study case is developed from inputs and criteria crafted in conjunction with stakeholders, including the plans the TOs already have to implement new resources, such as transmission upgrades and additions and demand response programs. Tables 3.1, 3.2, and 3.3 present the study case assumptions from the 2007 RNA.

Table 3.1 below presents the unit retirements, which were represented in the RNA study case:

Table 3.1: Unit Retirements

Unit\ Year	2007	2008	2009	
Huntley 65 & 66	165.0			
Lovett 5	176.2			
Lovett 4		167.9		
Lovett 3	46.8			
Russell 1 - 4		230.6		
Poletti			888.3	
Total	**388**	**398.5**	**888.3**	**1,674.8**

Table 3.2 below presents the unit additions, which were represented in the RNA study case:

Table 3.2: Unit Additions

Unit\Year	2007	2008	2009	CRP 2005 Status
SCS Astoria (Ph 1)[11]	479.9			baseline
Prattsburg Wind	79.0			Not Included
Flat Rock (Ph 2)	100.0			Not Included
Ginna Uprate	95.0			Not Included
Caithness			310.0	TO Solution
LI wind			140.0	TO Solution
Total	**753.9**		**450**	**1,233.9**

The unit retirements and additions, when combined with the existing generation as of April 1, 2006 in the "Gold Book" and other adjustments, resulted in the following 2007 RNA study case load and resource to load ratio margin table:

[11] SCS Astoria's commercial or in-service date was after April 1, 2006, and was not included in existing capacity in the "2006 Load and Capacity Data" report and is therefore shown here as an addition. It was not included in the 2005 RNA base case.

Table 3.3: NYCA Load and Resource Margins 2007 to 2016

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Peak Load										
NYCA	33,831	34,314	34,688	35,042	35,348	35,593	35,803	36,077	36,380	36,623
Zone J	11,800	11,970	12,140	12,290	12,440	12,570	12,705	12,815	12,925	13,003
Zone K	5,549	5,628	5,738	5,840	5,936	6,037	6,141	6,249	6,372	6,511
Resources										
NYCA										
"-Capacity"	38,911	38,513	38,057	38,057	38,057	38,057	38,057	38,057	38,057	38,057
"-SCR" (2)	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080
"-UDR" (3)	990	990	990	990	990	990	990	990	990	990
Total	40,981	40,583	40,127	40,127	40,127	40,127	40,127	40,127	40,127	40,127
Zone J										
"-Capacity"	9,996	9,996	9,108	9,108	9,108	9,108	9,108	9,108	9,108	9,108
"-SCR"	325	325	325	325	325	325	325	325	325	325
"-UDR"	0	0	0	0	0	0	0	0	0	0
Total	10,321	10,321	9,433	9,433	9,433	9,433	9,433	9,433	9,433	9,433
Zone K										
"-Capacity"	5,291	5,291	5,741	5,741	5,741	5,741	5,741	5,741	5,741	5,741
"-SCR"	150	150	150	150	150	150	150	150	150	150
"-UDR"	990	990	990	990	990	990	990	990	990	990
Total	6,431	6,431	6,881	6,881	6,881	6,881	6,881	6,881	6,881	6,881
NYCA Resource to Load Ratio	121.1%	118.3%	115.7%	114.5%	113.5%	112.7%	112.1%	111.2%	110.3%	109.6%
Resource Ratio w/o UDR	118.2%	115.4%	112.8%	111.7%	110.7%	110.0%	109.3%	108.5%	107.6%	106.9%
Zone J Res./Load Ratio	87.5%	86.2%	77.7%	76.8%	75.8%	75.0%	74.2%	73.6%	73.0%	72.5%
Zone K Res./Load Ratio	115.9%	114.3%	119.9%	117.8%	115.9%	114.0%	112.1%	110.1%	108.0%	105.7%

Note (1): NYCA Resource to load ratio margin only includes resources internal to New York (generation located in New York, generation radially connected to New York, UDRs, and SCRs) and does not include external resources of 2,755 MW that have historically participated in the NYCA installed capacity market. The LOLE includes support from neighboring control areas.

Note (2): SCRs are demand-side resources that are eligible to participate in the NYISO's capacity markets.

Note (3): UDRs are unforced capacity delivery rights and are supported by generation in neighboring control areas.

The tariff provides that the RNA is prepared by the NYISO Staff with assistance from its consultants and Market Participants. The Electric System Planning Working Group (ESPWG) and the Transmission Planning Advisory Subcommittee (TPAS) jointly review the draft RNA and recommend when the draft should be sent to the NYISO Committees for review. The tariff states that the Operating Committee reviews and votes on the draft RNA, and thereafter the draft is provided to the Management Committee for its review and vote. Minority views, if any, are presented with the RNA to the NYISO's Board of Directors. The Board then reviews and approves the RNA, either as presented, with its own changes, or after further revision by the NYISO's Committees. Final approval of the RNA triggers the next step in the CRPP, which is a request for solutions to the Reliability Needs identified in the RNA.

RNA 2007 – Summary of Findings

Addressing the first five-year period, the 2007 RNA[12] indicated that the forecasted system first exceeds the LOLE criterion in the year 2011, with 2010 just meeting that criterion. The need in 2011 is driven primarily by load growth exceeding two percent per year, generator retirements, and voltage-driven transmission constraints all of which are in the Lower Hudson Valley into the New York City Metropolitan Area. Accordingly, the RNA designated the TOs in those areas, namely Con Edison, Orange and Rockland Utilities, Inc. (Orange and Rockland) and Central Hudson Gas and Electric Corp. (Central Hudson), as the Responsible TOs required to identify a regulatory backstop solution to the reliability need in 2011, which may be called upon by the NYISO should no timely market-based solution be available.

Based upon continuing load growth throughout the New York Control Area from 2012 to 2016, the RNA determined that the LOLE criterion will be violated in these years as well. The RNA characterized the Reliability Needs for 2012-2016 as statewide resource adequacy needs. That is, total statewide generation and DSM resources were insufficient to meet resource adequacy requirements. Multiple combinations of generation, transmission, and demand-side resources could satisfy those needs during this period. Consequently, the RNA identified all of the TOs, except for the NYPA, as Responsible TOs to identify regulatory backstop solutions for the Reliability Needs in 2012 to 2016. NYPA was not identified as a Responsible TO because it serves its government, authority and private sector customers by contractual agreement rather than as the utility provider of last resort. Nevertheless, the RNA stated the NYISO's expectation that NYPA will work cooperatively with the Responsible TOs to identify regulated backstop solutions to the Reliability Needs identified in the RNA.

The RNA reported the results of two sensitivity analyses, with the following results:

- The reliability need in 2011 could be deferred to 2012 if the voltage constraints in the Lower Hudson Valley were resolved;

[12] All supporting databases and analysis utilized in developing this plan are available for inspection subject to requirements for the protection of confidential and critical energy infrastructure information (CEII).

- Assuming unlimited transmission system capability would also defer the first year of reliability need from 2011 to 2012.

The RNA also examined the Reliability Needs under a number of alternative scenarios, with the following results:

- If a high load case were to occur, the reliability need in 2011 would advance to 2009,
- If increasingly stringent environmental controls were to force the retirement of all of the coal-based generation in New York except for the two most modern units, which are owned and operated by AES [Sommerset and Cayuga], the Reliability Needs in some zones in New York would advance to 2009 or 2010,
- If the retirement of the older NYPA Charles A. Poletti generating unit were deferred until the end of 2009, both statewide and downstate reliability would improve,
- If non-utility generators that have power purchase agreements based upon the Public Utility Regulatory Policies Act (PURPA) and state law were to retire in the years when their contracts expire, the need date NYCA-wide would advance to 2009 and would increase dramatically in 2010,
- If NYPA proceeds with its plans to purchase 500 MW from New Jersey to serve its customers in New York City via a new direct current transmission tie, the first year of need would be 2013, and
- If NRG proceeds with a 680 MW clean coal facility in response to a NYPA Request for Proposals (RFP) for a clean coal facility, near Buffalo in 2013, there would still be Reliability Needs in the Lower Hudson Valley and the New York City Metropolitan Area in that year.

As part of the RNA, the NYISO conducted a short-circuit analysis and informed the market about historic congestion costs.

The statement of the NYISO’s Independent Market Advisor with respect to the RNA is attached to this CRP as Appendix A.

IV. REQUEST FOR SOLUTIONS

The CRP evaluates the market-based solutions offered by developers, the regulated backstop solutions offered by the Responsible TOs, and the alternative regulated solutions offered by other developers to satisfy the RNA's outlined Reliability Needs. Proposals can be large or small generation projects – including distributed generation – demand-side programs, transmission projects, market rule changes, operating procedure changes, and other actions to answer outstanding RNA issues. While market solutions are preferred, the Responsible TOs named in the RNA are required to submit regulated backstop solutions to meet the identified needs.

The needs outlined in the RNA for 2011 are located downstate, from the lower Hudson Valley through New York City. Three TOs – Central Hudson Gas and Electric Corporation, Consolidated Edison Company of New York, Inc., and Orange and Rockland Utilities, Inc. – have been identified as the Responsible TOs for addressing the reliability concerns in the RNA. From 2012 through 2016, the needs are statewide, resulting in the designation of all TOs, except for the New York Power Authority, as Responsible TOs.

On March 2, 2007, the NYISO Board of Directors approved the draft RNA submitted to it by the NYISO Management Committee. The Board's action became final on March 16, 2007. Because the tariff calls for the NYISO to encourage market-based solutions to Reliability Needs, the NYISO issued its initial request for those solutions on March 8, 2007. The NYISO requested that developers submit market-based solutions and that the Responsible TOs submit regulated backstop solutions to the identified Reliability Needs by May 1, 2007. If the market-based responses received by the NYISO will not, or based upon the amount of information provided at that time, may not, fulfill all of the RNA's identified Reliability Needs, the NYISO shall solicit alternative regulated responses. Developers and TOs (including those other than the Responsible TOs) may submit alternative regulated responses. Like market-based solutions and regulated backstop solutions, these proposals may consist of transmission, generation or DSM projects.

Given the information that had been received through May 14, the NYISO could not determine with certainty that sufficient market-based solutions would qualify to meet the Reliability Needs identified in the RNA. Therefore, in order to fulfill the requirements of CRPP and to provide an opportunity for all options for meeting the Reliability Needs to be identified and evaluated in time for the NYISO Board of Directors to consider and approve a Comprehensive Reliability Plan this summer, the NYISO issued a request for alternative regulated responses on May 15, 2007. The NYISO requested that alternative regulated solutions be submitted by June 8, 2007.

Market-based solutions primarily differ from regulated backstop and alternative regulated responses because their costs are not recoverable under Attachment Y of the NYISO's OATT. Market-based project developers obtain revenues through the NYISO's energy, capacity, and ancillary services markets, as well as through bilateral contracting arrangements. In contrast, all regulated solutions, once selected and triggered, recover their costs either though the NYISO tariff or in accordance with the provisions of the New York Public Service Law—depending upon the nature of the solution.

The following timeline represents the milestones in the NYISO's process for requesting solutions to the Reliability Needs:

March 2, 2007	RNA approved by the NYISO Board of Directors and issued by the NYISO.
March 8, 2007	NYISO issued formal request for regulated backstop solutions and market solutions to be submitted by May 1, 2007.
May 1, 2007	The TOs submitted regulated backstop solutions as well as updated plans. Eight market solutions were received. Five were generation projects and three were transmission projects.
May 15, 2007	Alternative regulated solutions requested by the NYISO to be submitted by June 8, 2007.
June 8, 2007	Three alternative regulated solutions were received: one transmission proposal, one generation proposal, and one demand-side management proposal.

The NYISO received market-based solutions totaling a potential of 3,007 MW of resources, and received 1,800 MW of resources as backstop regulatory solutions from the Responsible TOs. Three alternative regulatory solutions were received totaling approximately 600 MW of generation and demand response resources, as well as a 1,200 MW HVDC transmission proposal. The NYISO evaluated the various solutions it received according to the criteria approved by the Operating Committee for evaluating the viability of market based, regulated backstop, and alternative regulated backstop solutions.[13] The NYISO conducted an iterative process with the project proponents, and is reporting the results of its evaluation in this CRP.

A. Responsible Transmission Owner Solutions

First Five Year Base Case – 2007 to 2011

The 2007 RNA determined that the first year of need was 2011, and that needs increased throughout the rest of the Study Period through 2016[14]. The year 2011 need was the result of a binding transmission constraint and was not the result of a statewide resource deficiency. The Responsible Transmission Owners (TOs) identified for meeting this need for the First Five Year period of the 2007 RNA are:

- Central Hudson,
- Orange & Rockland, and
- Con Edison.

The RNA identified a statewide resource adequacy need for the period 2012 through 2016, and identified all TOs, except for NYPA, as the Responsible TOs for that period. The Responsible TOs for the First Five Year period originally submitted the following projects to be considered by the NYISO to solve the Reliability Needs identified by the 2007 RNA for the year 2011:

[13] The NYISO's determination that a solution is viable under the approved criteria does not predict the outcome of regulatory approval processes, or the application of governmental policies. The NYISO does not itself select specific projects to meet Reliability Needs, nor does it construct any projects.
[14] In the NYISO RNA study, load growth is modeled for each of the 10 years, but generally, most market-based solutions are not developed far enough to meet the criteria for inclusion in the RNA study case.

- Capacitor banks totaling 240 MVar at the Millwood substation in the Con Edison service territory to be in-service by the end of 2007. This project is offered as a TO Updated Plan, and consists of the capacitor portion of the Athens Special Protection System and Capacitor Banks (SPS/CAP) project, as approved by the NYISO Operating Committee, which Con Edison will own and operate when in-service.
- Replacement of Breaker 14 in the Gowanus 345 kV station in the Con Edison service territory. This project was initially offered as a Regulated Backstop solution with a scheduled in-service date of 2011 and a start date in 2010. This breaker replacement will allow Con Edison to by-pass the series reactors in the Farragut-Gowanus feeders. In an addendum submitted to the NYISO on June 7, 2007, Con Edison changed its designation of this item to a TO Updated Plan, since it now has firm plans to complete the replacement of this breaker by the end of 2007.

Second Five Years – 2012 to 2016

The Responsible Transmission Owners (TOs) identified for providing regulated backstops to meet the needs for the second five year period of the 2007 Reliability Needs Assessment (RNA) are:

- Central Hudson Gas and Electric Company (Central Hudson)
- Consolidated Edison Company of New York, Inc. (Con Edison)
- Long Island Power Authority (LIPA)
- New York State Electric & Gas Corporation (NYSEG)
- Niagara Mohawk Power Corporation d/b/a National Grid (National Grid)
- Orange & Rockland Utilities, Inc. (O&R), and
- Rochester Gas and Electric Corporation (RG&E)

The response includes detailed solutions developed to meet the needs identified in the 2012 – 2016 time period. The NYISO may trigger reliability backstop solutions if it determines that the market-based solutions are not likely to be available to meet the Reliability Needs in a timely manner. The proposed solutions are comprised of the following:

- 1,000 MW of new generation and DSM in Zone J, with 500 MW to be added by 2012 with a trigger date of 2008, an additional 250 MW to be added by 2014 with a trigger date of 2010, and an additional 250 MW to be added by 2015 with a trigger date of 2011. Implementation of each of these additions will take between 3 and 4 years.
- 300 MW of new generation in conjunction with DSM in Zone B in 2013. Implementation will take between 3 and 5 years.
- 500 MW of new generation and DSM in Zone G, with 100 MW added in 2015 and an additional 400 MW added in 2016. Implementation of each of these additions will take between 3 and 4 years. This project would need to be triggered by 2011.
- A 345 kV line between Zones F and G that would permit the location of generation and DSM in upstate zones, rather than Zone G as indicated above. Implementation

will take between 5 and 7 years.[15] The 345 kV transmission line between Zones F and G was developed by National Grid and consisted of two alternative proposals. The first proposal (A1) consisted of a new 44-mile 345 kV transmission line between Leeds and Pleasant Valley. The second proposal (A2) consisted of a 64 mile 345 kV transmission line between Schodack and Pleasant Valley. Schodack is near Alps and the intersection of the existing 115 kV line, which runs south towards Pleasant Valley and the existing 345 kV New Scotland line.

- In addition to the response provided by the Responsible Transmission Owners as a group for the second five years, Rochester Gas and Electric (RG&E) submitted separately supporting documentation for a specific 300 MW generation proposal in Zone B. Their submittal included conceptual design information, licensing, and a construction schedule for a 300 MW fluid bed combustor clean coal plant, or, alternatively a 300 MW natural gas combined cycle plant. RG&E stated that completion of this project would take 5 to 7 years.[16]

B. Market Solutions

The NYISO reviewed solutions that were submitted to the NYISO and concluded that the following are viable market solutions based upon the information received to date. Two of the solutions were included in the 2005 CRP and were re-submitted for the 2007 CRP. Six of the solutions are new. The market solutions include:

i. a 250 MW proposal in Zone K (Long Island) which was also a proposed solution included in the 2005 CRP,
ii. generation in Zone J (New York City) totaling 1,100 MW or approximately 975 MW net when accounting for associated retirements,
iii. 500 MW of existing generation in PJM to be delivered via a 660 MW back-to-back HVDC transmission project,
iv. two additional controllable transmission projects into Zone J totaling 850 MW**,** and
v. 300 to 330 MW of generation in Zone H.

In total, the NYISO received 3,007 MW of market-based solutions.

[15] Although the trigger date for this solution is 2007, the NYISO has determined that, based upon the 3,007 MW of market solutions it received in response to the 2007 RNA, it is likely that sufficient market solutions will be present to fulfill the needs identified in the 2007 RNA. Accordingly, the NYISO does not need to trigger a regulated backstop solution at this time.
[16] As stated previously, the NYISO does not need to trigger a regulated backstop solution at this time.

Table 4.1 below is a summary of the solutions that have been submitted. Figure 4.1 presents the cumulative MW by in-service dates for the market solutions versus the cumulative MW need by year of need:

Table 4.1: Summary of Proposed Market Solutions

Project Type	Size of Resource(MW)	Zone	In-service Date
Generation Proposals			
Combined Cycle Spagnoli Rd	222	K	6/2009
Gas Turbine **NRG Astoria Re-powering**	200 (Phase I) 300 (Phase II) (375 MW Net)	J J	6/2009 6/2011
Simple Cycle GT **Indian Point**	300	H	5/2011
Combined Cycle **NRG Arthur kill**	600	J	7/2012
Transmission Proposals			
Controllable AC Transmission –VFT Linden VFT	300 (No ICAP)	PJM-J	4th quarter 2009 PJM Queue G22
Back-to-Back HVDC, AC Line **HTS/FPL**	660 (500 MW ICAP)	PJM-J	Late 2010 PJM Queue O66
Back-to-Back HVDC, AC Line Harbor Cable	550 (550 MW ICAP)	PJM-J	6/2011

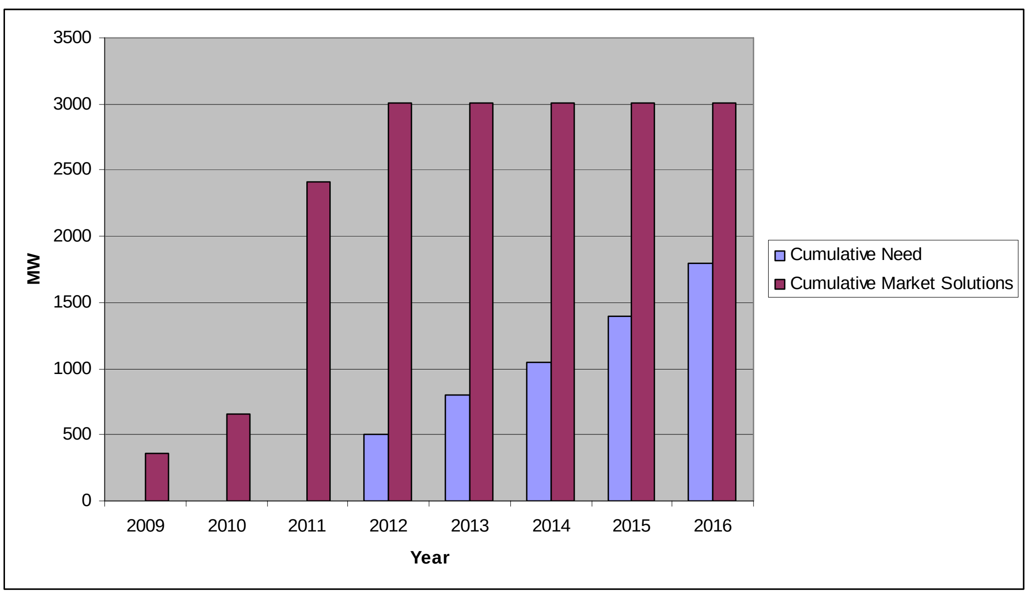

Figure 4.1: Cumulative Needs Compared to Market Solutions in MW

More specifically, the NYISO received the following projects:

The 250 MW Spagnoli Energy Center

This solution was initially submitted by KeySpan Ravenswood, LLC for Long Island in response to the 2005 RNA and is identified as the Spagnoli Road Energy Center. It is Project No. 20 in the NYISO Interconnection Queue, and is scheduled to be in-service and available for the summer of 2009. The project will be a nominal 250 MW combined cycle plant consisting of one GE Frame 7FA gas turbine generator, one steam turbine generator, a heat recovery steam generator (HRSG) with Selective Catalytic Reduction for control of nitrogen oxides (NOx), an oxidation catalyst for control of carbon monoxide (CO) and volatile organic compounds (VOC), and an exhaust stack. The steam from the HRSG will be used to run the steam turbine, with a closed loop air-cooled system acting as a direct heat sink for the condenser. The summer and winter (at 92ºF and 25ºF) net output ratings will be approximately 222 MW and 262 MW, respectively. An additional output of approximately 8 MW may be realized at 92ºF with air inlet evaporative cooling.

The 500 MW Astoria Repowering Project [375 MW Net]

This solution was submitted by NRG Power Marketing, Inc. and is identified as the Astoria repowering project. This project is scheduled to be phased in with 200 MW in-service in 2009 (project #201 in the NYISO Interconnection Queue) and the remaining 300 MW (project #224 in the NYISO Interconnection Queue) in-service by 2011. It was also included in the 2005 CRP. The project location is Zone J into the Astoria West 138kV substation and is Project No. 201 in the NYISO Interconnection Queue. The facility is designed to maximize use of existing infrastructure, including existing property and interconnections. It will utilize GE LMS 100 aero-derivative gas turbines. Moreover, the repowering project will result in the retirement of 126 MW of existing simple cycle combustion turbines (CTs) for a net increase in capacity of approximately 375 MW.

The 600 MW Arthur Kill Combined Cycle Unit

This solution was submitted by NRG Power Marketing, Inc. and is identified as the Arthur Kill combined cycle project. The facility is scheduled to be in-service by July of 2012. The project location is Zone J. The facility is designed to maximize use of existing infrastructure, including existing property and interconnections but has identified that additional transmission capability will be required to deliver the full output of the plant. This project has not yet submitted a request for interconnection to the NYISO.

The 660 MW Hudson Transmission Project (HTP)

This solution has been submitted by Hudson Transmission Partners (Hudson). The HTP is a HVDC project that will provide a new controllable transmission line into Zone J that is rated at 660 MW. This is Project No. 206 in the NYISO Interconnection Queue. The HTP consist of back-to-back HVDC system ("converter-circuit-converter") in a single building (the Converter Station) located in Ridgefield, New Jersey near PSE&G

Bergen substation, which is part of the PJM transmission system. A high-voltage 345kV alternating-current (AC) transmission line will connect the Converter Station to Con Edison's transmission system at the West 49th St. substation. The HTP is being developed in response to the Request for Proposals, "Long-Term Supply of In-City Unforced Capacity and Optional Energy" issued by NYPA dated March 11, 2005 (the "NYPA RFP"). The project was selected by NYPA's Board of Trustees for further negotiation and review. The project has a proposed in-service date of late 2010. The System Impact Study in the PJM interconnection process has been posted.

The 500 MW Red Oak, NJ Combined Cycle Generating Unit

This solution was submitted by FPL Energy. The Red Oak project is an existing 817 MW three on one (3x1) combined cycle, natural gas fired power generation project, located in Sayreville, New Jersey. Red Oak began commercial operation in 2002. Red Oak's major equipment includes three Westinghouse 501F CTs, one Toshiba Steam Turbine (ST), and three Foster Wheeler heat recovery steam generators (HRSGs), each with selective catalyst reduction. FPL Energy proposed the Red Oak project to NYPA as a supplement to Hudson's response to the NYPA RFP. The Red Oak project would provide reliable capacity to NYPA's New York City customers via the HTP. The project was selected by NYPA's Board of Trustees for further negotiation and review of a 500 MW capacity contract.

The 550 MW Harbor Cable Project (HCP) and Generating Portfolio

This solution was submitted by Brookfield Energy Marketing. The HCP will provide a 550 MW fully controllable electric transmission pathway from generation sources located in New Jersey to New York City (Zone J). The HCP will consist of a back-to-back HVDC converter station located in Linden, New Jersey with 200 MW going to the Goethals substation on Staten Island via a single circuit 345 kV AC transmission cable and 350 MW going to Manhattan near the new World Trade Center substation via double-circuit 138 kV AC transmission cables. This is Project No.195 in the NYISO Interconnection Queue. The developer proposes to bundle the transmission project with up to 550 MW of capacity and energy from existing and/or new capacity located in New Jersey to be available in June 2011. To date, the developer has not applied for interconnection in PJM.

The 300 MW Linden Variable Frequency Transformers (VFT)

This solution was submitted by GE Energy Financial Services. The Project is a 300 MW bi-directional controllable AC transmission tie between the PJM and NYISO systems. It will be physically located adjacent to Linden Cogen plant. Three (3) 100 MW Variable Frequency Transformer (VFT) "channels" will tie an existing PJM 230 kV transmission line to existing 345 kV cables connecting Linden Cogen into Con Edison's Goethals substation. This will result in a continuously variable 300 MW tie between the northern New Jersey PJM system and New York City (Zone J). This proposal does not contain any associated capacity but would rely on existing resources in PJM. This is Project No. 125 on the NYISO's Interconnection Queue and is scheduled to be in-service in late 2009. The developer has entered into an

Interconnection Services Agreement and a Construction Services Agreement in PJM, and is under construction.

The 300 MW Indian Point Peaking Facility

This solution was submitted by Entergy Nuclear Power Marketing. The Entergy Buchanan Generation Project will consist of 300 to 330 MWs of simple cycle gas turbine peaking capacity to be located on the site of the Indian Point Generating Facility in Zone H. The facility will be interconnected to Consolidated Edison Company's existing Buchanan substation at 138 kV. This project is scheduled to be in-service in mid-2011. This project has not yet submitted a request for interconnection to the NYISO.

C. Alternative Regulated Solutions

Three alternative regulated solutions were submitted. One consists of existing generation projects currently retired or scheduled to be retired, the second proposes a new transmission facility located wholly within New York, and the third constitutes a demand response proposal. Developers proposed the following alternative regulated responses:

Mirant Lovett

This alternative regulated solution was submitted by Mirant New York. Mirant is proposing to keep Lovett Unit #5 operational (either by firing on natural gas or firing on coal with acceptable control measures) and to restart operations of Unit #4 (firing on natural gas) for a transitional period of time beginning no later than May 1, 2008 and continuing as needed. The proposal would keep two of the three units on site in operation beyond the current May 1, 2008 retirement date for a total of 365 MW of capacity. The purpose of the transitional period for Unit #4 is to provide a bridge to allow for the installation of new generating capacity to replace Unit #4 at either the Mirant Bowline and/or the Lovett facility.

New York Regional Interconnect

This alternative regulated solution was previously submitted by the New York Regional Interconnect (NYRI) in response to the NYISO's 2005 RNA. The NYRI transmission proposal is to construct a new HVDC transmission line between the Edic Substation in the Town of Marcy, Oneida County, to the Rock Tavern Substation in the Town of New Windsor, Orange County. It is Project No. 96 in the NYISO Interconnection Queue. The HVDC transmission system would function as a bipolar, bi-directional facility operated at a rated power flow of 1,200 MW at a nominal voltage of ± 400 kV DC. The developer plans to place the project in commercial operation for the summer of 2011. The System Reliability Impact Study (SRIS) or Interconnection Study has been submitted to the NYISO and is under review.

EnerNOC Demand Response

This alternative regulated solution was submitted by EnerNOC, Inc. EnerNOC has offered 250 MW of demand response resources to the NYISO. The EnerNOC Demand Response Network^{SM} – is a long-term Special Case Resources (SCR) demand response product. EnerNOC will provide and maintain 250 MW of reliable unforced capacity on a schedule that allows NYISO to meet approximately half of its identified resource needs in the downstate region by 2012. The EnerNOC Demand Response Network^{SM} may either consist of:

- new capacity that is incremental to existing SCR capacity; or
- existing SCR capacity that would otherwise no longer participate in the SCR program in 2012. EnerNOC proposes to use a customer baseline methodology as per the current terms of the Emergency Demand Response Program (EDRP) for demand reduction verification.

V. TRANSMISSION SECURITY AND ADEQUACY

The figure below displays the bulk power transmission system for the NYCA, which is generally facilities 230 kV and above, but does include certain 138 kV facilities and very small number of 115 kV facilities. The balance of the facilities 138 kV and lower are considered non-bulk or sub-transmission facilities. The figure also displays key transmission interfaces for New York.

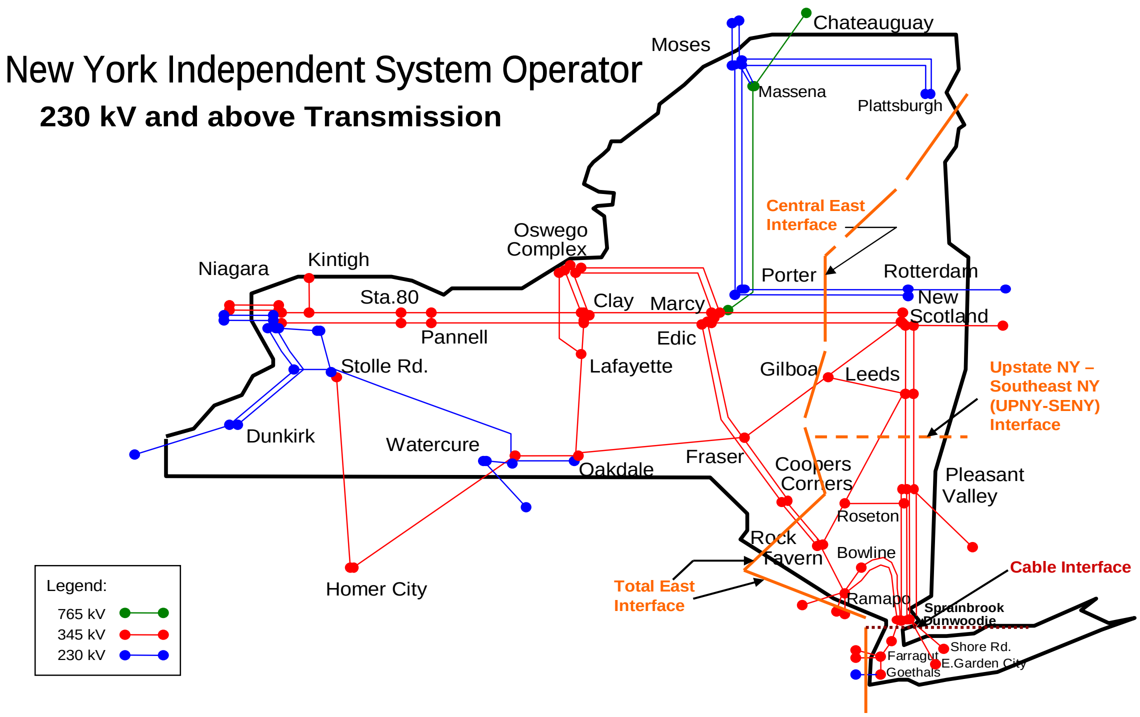

Figure 5.1: NYISO 230 kV and above Transmission Map

Transmission interfaces are groupings of transmission circuits that measure the transfer capability between regions. The lines connecting Leeds to Pleasant Valley and the lines into Coopers Corners are the critical components of the UPNY/SENY interface. By comparison, the lines running south from Pleasant Valley and those from Ramapo to the Buchanan river crossing are known as the UPNY/ConEd interface. The cables feeding into the New York City 345 kV and 138 kV systems from Sprainbrook and Dunwoodie are known as the I to J interface, which is a component of the Dunwoodie South and Cable Interface. The cables from Sprain Brook and Dunwoodie into Long Island are known as the I to K interface. These are the key transmission interfaces that experience limitations to power transfers into and through the Hudson Valley.

Based upon the assumption that sufficient resources exist, transmission adequacy can be defined as the ability of the transmission system to deliver the aggregate of the generation to the aggregate load such that LOLE criteria are maintained. A loss-of-load event can occur because sufficient resources are not available or, even if available, sufficient resources cannot be delivered. The latter would be a transmission adequacy deficiency and the former a resource adequacy deficiency. Standard industry practice has been to address transmission adequacy (*i.e.*, load deliverability) and resource adequacy independent of each other. These assessments are conducted simultaneously through use of the GE MARS model, as was briefly described in

Section II of this report, and the iterative solution process evaluating both transfer capability and LOLE.

A key input into the MARS model is the emergency[17] transfer limit of key interfaces. The ability of the transmission system to deliver capacity and energy is a function of available generation and system security constraints. The inability of the system to deliver capacity is a reliability issue, while the inability to deliver energy is a congestion or economic concern. System security is evaluated through contingency analysis, which involves the assessment of the loss of one or more system elements to determine the performance of the system and specific elements of the system with respect to the reliability criteria. The performance of the system and its elements are evaluated with respect to the thermal, voltage and stability reliability criteria. The most limiting of the criteria establishes the transfer limit for a group of lines that make up an interface.

Historically, the transmission interfaces in the Hudson Valley have been limited by thermal criteria. However, as indicated by the study results, robust load growth, modest resource additions, planned retirements, changes in neighboring systems, and changes in the transmission system network (such as the addition of the series reactors in the New York City cable system) together will result in reduced transfer limits. Increases in power transfer limits through the Lower Hudson Valley are required to remain compliant with voltage reliability criteria. The study results show that voltage-based emergency transfer limits were more limiting than either limits based on thermal or stability criteria.

The use of stringent screening criteria for including future resources in the baseline resulted in generation additions only in New York City early in the Study Period, and none later in the period. Planned generation retirements occur during the Study Period. As a result of additional load and a projected net decrease in resources in the Hudson Valley, voltage criteria become binding for the transmission facilities in the Lower Hudson Valley. Transfer limits into New York City are 3,700 MW (thermally limited) in the beginning of the Study Period, declining to 3,648 MW by 2011, as a result of voltage constraints negating the improvements in thermal transfer limits[18]. Similar, but not as severe reductions were observed for the UPNY/SENY and UPNY/Con Ed interface limits. In recognizing that transfer limits into the Hudson Valley also limit transfers through the Hudson Valley and into New York City and Long Island (because of the reduced generating capacity and increased load) a new interface grouping was created to capture this phenomenon. This interface grouping consists of the two interfaces from the Lower Hudson Valley to New York City and Long Island. This allows for the sharing of the limited net resources downstream of UPNY/SENY between New York City and Long Island during the capacity shortages simulated under emergency transfer and operating conditions in the MARS model. Transfer limits into New York City increase greatly with reduced transfers onto Long Island, and as a result, the limit from Zones I to J was increased. Even after these adjustments and the implementation of solutions, transfer limits were reduced over time.

The continued presence of voltage-based transfer limits in the Hudson Valley serves to increase resource adequacy requirements because of the reduced capability of the transmission system to

[17] The LOLE study utilizes emergency transfers because a loss of load event is executed only after available emergency measures are invoked.

[18]The addition of the M29 Cable will increased the thermal transfer limit to 4,400 MW.

deliver capacity to the loads downstream of the constraints. Although not nearly as severe as observed in the past because of the system upgrades being implemented by the TO, these voltage constraints result in an approximate decrease of 700 MW in transfer limits into New York City as compared to the thermal limit. As will be seen later in Section,VI of this report, the ability of solutions to increase transfer limits is an important aspect of the effectiveness of these solutions. The NYISO also observed degradation in the underlying (non-bulk) power system voltage performance, and the overall load power factor. With the updated TO plans, the reduction in transfer limits was mitigated to 300 MW. The reduced transfer limit is necessary to secure the system from voltage collapse. In the RNA, the NYISO also observed degradation in the underlying (non-bulk) power system voltage performance, and the overall load power factor. After the planned retirement of the Lovett generating units and the Charles A. Poletti generating unit in Zone J, the subzone most affected by the updated TO plans was the Orange and Rockland's non-bulk system. The retirement of generating capacity not only results in the loss of MW capability between constraining interfaces, but also the loss of dynamic reactive capability to support voltages both pre- and post-contingency.

VI. EVALUATION OF SOLUTIONS

Evaluation of solutions is covered by Section 7 of Attachment Y of the OATT. Section 7.1 describes the process for the evaluation of the regulated backstop solutions submitted by the Responsible Transmission Owners. Section 7.2 states how market-based solutions are evaluated. Section 7.3 lays out the process for the evaluation of alternative regulated solutions.

A. Responsible Transmission Owners Updated Plans and Regulated Backstop Solutions

The solutions submitted by the Responsible Transmission Owners consisted of updated plans for the first Five Year Base Case and backstop solutions for the second five year period. One of these solutions consisted of a commitment to new resources to satisfy the needs, and a variation that reduced the amount of new resources required by adding new transmission. The updated TO plans were not included in the NYISO's Five-Year Base Case in the 2007 RNA because they did not become available by the cutoff date for inclusion. As noted above, the TOs subsequently informed the NYISO that they are undertaking these projects, to be in-service by the end of 2007.

The evaluation of the Responsible TO Solutions is divided into two separate five year periods.

First Five Year Base Case:

The first step in evaluating the effectiveness of the proposed solutions is determining their impact on the transfer capability of the transmission system. As identified in the 2007 RNA and discussed in Section V of this report, load growth in SENY, planned generator retirements, and changes to neighboring systems, and the resulting impacts on the voltage performance of the transmission system, resulted in a significant reduction in the transfer capability of the bulk power transmission system to reliably deliver power into and through the Lower Hudson Valley. This impact manifested itself as increased needs in Zones G through J.

The Responsible TOs' Updated Plans included the installation of 240 MVars of capacitor banks at the 345 kV Millwood Substation which, in addition to the other non-bulk power system capacitor banks already planned, will help to further improve the voltage performance of the transmission system. Another TO plan is the replacement of a circuit breaker that will allow a series reactor in the cables between the Gowanus and Farragut substations to be bypassed. This bypass allows for more reactive support to be available to the 345 kV system in Manhattan. The other major change was the deferred retirement for one year of the Charles A. Poletti generating unit from 2009 until 2010. Incorporating these changes and network upgrades in New York and neighboring control areas improved the transmission capability in the Lower Hudson Valley. Table 6.1 below presents the key transmission interface transfer limits based on thermal limits, 6.2 below presents the key transmission interface transfer limits based on voltage limits, and 6.3 presents the transfer limits employed in the MARS analysis.

Table 6.1: Transmission System Thermal Transfer Limits for Key Interfaces in MW

Interface	Year				
	2007	2008	2009	2010	2011
Central East	3800	3800	3800	3800	3800
F-G	3450	3450	3450	3450	3450
UPNY/SENY	5150	5150	5150	5150	5150
I-J	4400	4400	4400	4400	4400
I-K	1290	1290	1290	1290	1290

Table 6.2: Transmission System Voltage Transfer Limits for Key Interfaces in MW

Interface	Year				
	2007	2008	2009	2010	2011
Central East	3150	3150	3150	3150	3150
F-G	3625	3625	3625	3625	3625
UPNY/SENY	5400	5400	5400	5400	5400
I-J	3700	3864	3791	3741	4100
I-K	1350	1350	1350	1350	1350

Table 6.3: Transmission System Transfer Limits for Key Interfaces in MW

Interface	Year				
	2007	2008	2009	2010	2011
Central East	3150^{V}	3150^{V}	3150^{V}	3150^{V}	3150^{V}
F-G	3450^{T}	3450^{T}	3450^{T}	3450^{T}	3450^{T}
UPNY/SENY	5150^{T}	5150^{T}	5150^{T}	5150^{T}	5150^{T}
I-J	3700^{V}	3864^{V}	3791^{V}	3741^{V}	4100^{V}
I-K	1290^{T}	1290^{T}	1290^{T}	1290^{T}	1290^{T}

T = Thermal Limit V = Voltage Limit

The primary observation is that the voltage-based transfer limit has improved significantly from the baseline. As an example, the Zone I to Zone J transfer limit for the year 2011 has improved from 3,648 MW to 4,100 MW in the solution case.

These updated transfer limits were incorporated into the MARS model along with the proposed additions. The LOLE results are presented in the Table 6.4 entitled: "RNA Study Case Load and Resource Table with TO Updated Plans." The table shows that the TO Updated Plans meet resource adequacy requirement through 2011. Table 6.5 presents the LOLE results by zone and for the NYCA.

Table 6.4: RNA Study Case Load and Resource Table with TO Updated Plans (First Five Year Base Case)

Year	2007	2008	2009	2010	2011
Peak Load					
NYCA	33,831	34,314	34,688	35,042	35,348
Zone J	11,800	11,970	12,140	12,290	12,440
Zone K	5,549	5,628	5,738	5,840	5,936
Resources					
NYCA					
Capacity	38,911	38,513	38,938	38,057	38,057
SCR	1080	1080	1080	1080	1080
UDR	990	990	990	990	990
Total	40,981	40,583	41,008	40,127	40,127
Zone J					
Capacity	9,996	9,996	9,996	9,108	9,108
SCR	325	325	325	325	325
UDR	0	0	0	0	0
Total	10,321	10,321	10,321	9,433	9,433
Zone K					
Capacity	5,291	5,291	5,741	5,741	5,741
SCR	150	150	150	150	150
UDR	990	990	990	990	990
Total	6,431	6,431	6,881	6,881	6,881
NYCA Resource to Load Ratio[19]	121.1%	118.3%	118.2%	114.5%	113.5%
Zone J Resource to Load Ratio[20]	87.5%	86.2%	85.0%	76.8%	75.8%
Zone K Resource to Load Ratio	115.9%	114.3%	119.9%	117.8%	115.9%
NYCA LOLE (day/year)	0.00	0.01	0.06	0.10	0.09

Table 6.5: NYCA LOLE Table for the First Five-Year Base Case with TO Updated Plans LOLE (First Five Year Base Case)[21]

AREA	2007	2008	2009	2010	2011
Zone B (Upstate NY)	0.00	0.01	0.03	0.04	0.05
Zone E (Upstate NY)	0.00	0.00	0.01	0.02	0.02
Zone G (Hudson Valley or SENY)			0.00	0.00	0.00
Zone I (Hudson Valley or SENY)	0.00	0.01	0.04	0.06	0.07
Zone J (Hudson Valley or SENY)	0.00	0.01	0.05	0.10	0.09
Zone K (Long Island or SENY)		0.00	0.00	0.01	0.01
NYCA	0.00	0.01	0.06	0.10	0.09

[19] The statewide and local resource to load ratios result from the existing system under the conditions studied and should not be interpreted as the IRM or LCR that would be established for the NYCA capacity markets.
[20] A ratio less than the current location capacity requirement is the result of the "as found system" being at a point on the LCR/IRM curve that meets reliability criteria with LCRs different from current requirements.
[21] Probability of occurrences in days per year.

Second Five Years

As previously discussed in Section IV, the Responsible TOs offered backstop solutions for the second five years. They consisted of 1,800 MW of new resources by 2016. These include 300 MW of new generation or DSM in Zone B, a commitment to 1,000 MW of new resources consisting of generation and demand response in Zone J, as well as another 500 MW in Zone G. Also included was a proposal to add new transmission between Zones F and Zone G, which would increase the transfer capability of the UPNY/SENY interface. This proposal allowed for the resource commitment in Zone G to be reduced by 250 MW[22], resulting in a reduction of the total resources required to 1,550 MW. It can also allow for 250 MW of resources to be either in Zones G or F, depending on the level of additional reactive support needed in Zone G.

Table 6.6 presents the phase in of the regulated solutions by year and zone with the new transmission line in-service by 2013 for the 1,550 MW transmission alternative.

Table 6.6: Regulated Backstop Resource Additions by Year and Zone

MW level	1,800		1,550	
Year	**MW**	**Zone**	**MW**	**Zone**
2012	500	J	500	J
2013	300	B	300	B
2014	250	J		
2015	250 100	J G	500 100	J F
2016	400	G	150	G

Transfer limits were assumed to be constant from the end of the first Five Years Base Case and confirmed by analysis for the year 2016. The staging of the solutions throughout the second five year period would maintain this constant level. The impacts of the Leeds to Pleasant Valley alternatives were evaluated by power flow analysis to determine their impacts on thermal and voltage limits. Both alternatives result in approximately the same increase in the UPNY/SENY interface of approximately 875 MW. However, the New Scotland to Leeds circuit becomes more limiting for the third Leeds to Pleasant Valley circuit alternative. This impact can be mitigated when Athens and Gilboa are fully dispatched. In other words, the Schodak to Pleasant Valley alternative mitigates the New Scotland to Leeds limit regardless of dispatch, thus allowing more generation upstream to participate, subject to the Central East Interface limit. Voltage limit impacts in the Hudson Valley were approximately the same for both alternatives, but to achieve the same level increase as the thermal limit, additional reactive compensation in the Hudson Valley would be required, either through transmission enhancements (capacitor banks, static var compensators, etc.) or generation solutions similar to the 250 MW generator solution in Zone G. Table 6.7 summarizes the transfer limits used in the LOLE analysis for the transmission alternatives.

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[22] The 250 MW reduction was primarily the result of emergency assistance that was "bottled" upstream of the UPNY/SENY interface in the MARS modeling, and that would be made available to Southeastern New York.

Table 6.7: Transfer Limits for Transmission Alternatives

Interface	Existing System	Leeds-PV	Schodack-PV
F-G	3450	3450	4450
UPNY-SENY	5150	6025	6025

Table 6.8 below presents the total level of MW needed to maintain compliance with resource adequacy criteria for the all-resource approach. Table 6.9 presents the results with the transmission upgrades. The LOLE results by zone are presented in Tables 6.10 and 6.11 respectively. Resource additions would need to be located primarily in load Zones G through J in order to fulfill the Reliability Needs. Although these results indicate the level of the MW of solutions that would be required, these amounts could change depending on the specific solutions that are proposed.

Table 6.8: RNA Study Case Load and Resource Table
(TO Plans with 1,800 MW of Resources, Second Five Years)

Year	2012	2013	2014	2015	2016
Peak Load					
NYCA	35,593	35,803	36,077	36,380	36,623
Zone J	12,570	12,705	12,815	12,925	13,003
Zone K	6,037	6,141	6,249	6,372	6,511
Resources					
NYCA					
Capacity	38,557	38,857	39,107	39,457	39,857
SCR	1080	1080	1080	1080	1080
UDR	990	990	990	990	990
Total	40,627	40,927	41,177	41,527	41,927
Zone J					
Capacity	9,608	9,608	9,858	10,108	10,108
SCR	325	325	325	325	325
UDR	0	0	0	0	0
Total	9,933	9,933	10,183	10,433	10,433
Zone K					
Capacity	5,741	5,741	5,741	5,741	5,741
SCR	150	150	150	150	150
UDR	990	990	990	990	990
Total	6,881	6,881	6,881	6,881	6,881
NYCA Resource to Load Ratio	114.1%	114.3%	114.1%	114.1%	114.5%
Zone J Resource to Load Ratio	79.0%	78.2%	79.5%	80.7%	80.2%
Zone K Resource to Load Ratio	114.0%	112.1%	110.1%	108.0%	105.7%
NYCA LOLE (day/year)	0.08	0.09	0.10	0.10	0.10

Table 6.9: RNA Study Case Load and Resource Table
TO Plans with 1,550 MW of Resources and Transmission Upgrade Second Five Years

Year	2012	2013	2014	2015	2016
Peak Load					
NYCA	35,593	35,803	36,077	36,380	36,623
Zone J	12,570	12,705	12,815	12,925	13,003
Zone K	6,037	6,141	6,249	6,372	6,511
Resources					
NYCA					
Capacity	38,557	38,707	38,857	39,457	39,607
SCR	1080	1080	1080	1080	1080
UDR	990	990	990	990	990
Total	40,627	40,777	40,927	41,527	41,677
Zone J					
Capacity	9,608	9,608	9,858	10,108	10,108
SCR	325	325	325	325	325
UDR	0	0	0	0	0
Total	9,933	9,933	10,183	10,433	10,433
Zone K					
Capacity	5,741	5,741	5,741	5,741	5,741
SCR	150	150	150	150	150
UDR	990	990	990	990	990
Total	6,881	6,881	6,881	6,881	6,881
NYCA Resource to Load Ratio	114.1%	113.9%	113.4%	114.1%	113.8%
Zone J Resource to Load Ratio	79.0%	78.2%	79.5%	80.7%	80.2%
Zone K Resource to Load Ratio	114.0%	112.1%	110.1%	108.0%	105.7%
NYCA LOLE (day/year)	0.08	0.09	0.09	0.10	0.10

Table 6.10: NYCA LOLE Table for the Second Five Years with TO Regulated Backstops Totaling 1,800 MW of Resources

AREA	2012	2013	2014	2015	2016
Zone B (Upstate NY)	0.05	0.04	0.04	0.04	0.04
Zone E (Upstate NY)	0.02	0.02	0.02	0.02	0.01
Zone G (Hudson Valley or SENY)	0.00	0.01	0.01	0.01	0.00
Zone I (Hudson Valley or SENY)	0.07	0.08	0.09	0.08	0.07
Zone J (Hudson Valley or SENY)	0.08	0.08	0.09	0.08	0.07
Zone K (Long Island or SENY)	0.02	0.02	0.03	0.05	0.06
NYCA	0.08	0.09	0.10	0.10	0.10

Table 6.11: NYCA LOLE Table for the Second Five Years with TO Regulated Backstops Totaling 1,550 MW of Resources and Transmission Upgrades

AREA	2012	2013	2014	2015	2016
Zone B (Upstate NY)	0.05	0.07	0.07	0.07	0.06
Zone E (Upstate NY)	0.02	0.03	0.03	0.03	0.02
Zone G (Hudson Valley or SENY)	0.00	0.00	0.00	0.01	0.01
Zone I (Hudson Valley or SENY)	0.07	0.08	0.08	0.08	0.07
Zone J (Hudson Valley or SENY)	0.08	0.08	0.09	0.09	0.07
Zone K (Long Island or SENY)	0.02	0.03	0.03	0.05	0.06
NYCA	0.08	0.09	0.09	0.10	0.10

B. Assessment of Responsible TO Updated Plans and Regulated Backstop Solutions

The updated TO plans and proposed regulated backstop solutions will meet the needs through 2016. Figures 6.1 and 6.2 below present the resource mix that results from the TOs' updated plans, the deferred retirement of the Poletti Unit, and the regulated backstop solutions for both the all-resource proposal of 1,800 MW and the 1,550 MW resource proposal that includes the Leeds-PV transmission upgrade. The transmission upgrade reduces the NYCA resources that are needed to meet criteria because it allows for better utilization of resources within NYCA and neighboring control areas.

NYCA resources are presented as the percentage of the forecasted annual peak load. The sum of the resources stated as a percentage of the forecasted peak load equals the Installed Reserve Margin, which is a generally accepted measure of the level of resources needed to maintain reliability. Expressed as the percentage of annual peak load, the resources are divided into five categories:

- in-NYCA generating capacity,
- UDRs, which are supported by external capacity,
- special case resources/demand response,
- regulated backstop resources needed to maintain the 0.1 days per year criterion, and
- external capacity of 2,755 MW currently eligible to participate in the NYISO markets. While updated annually, the statewide Installed Capacity Requirement is currently 116.5 percent.

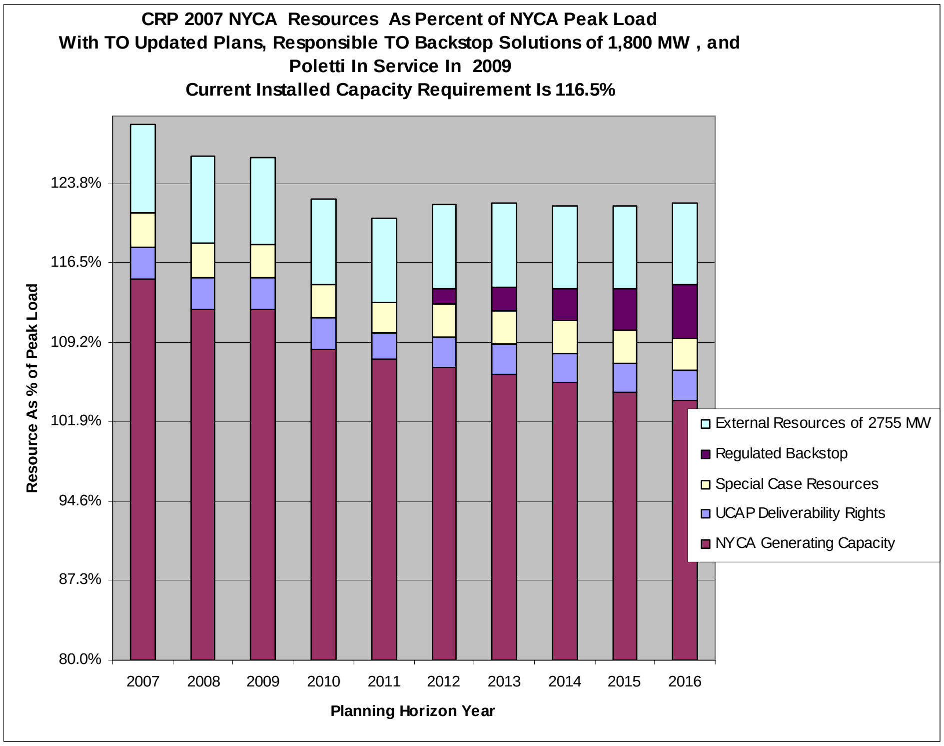

Figure 6.1: TO Regulated Backstop Solutions – 1,800 MW

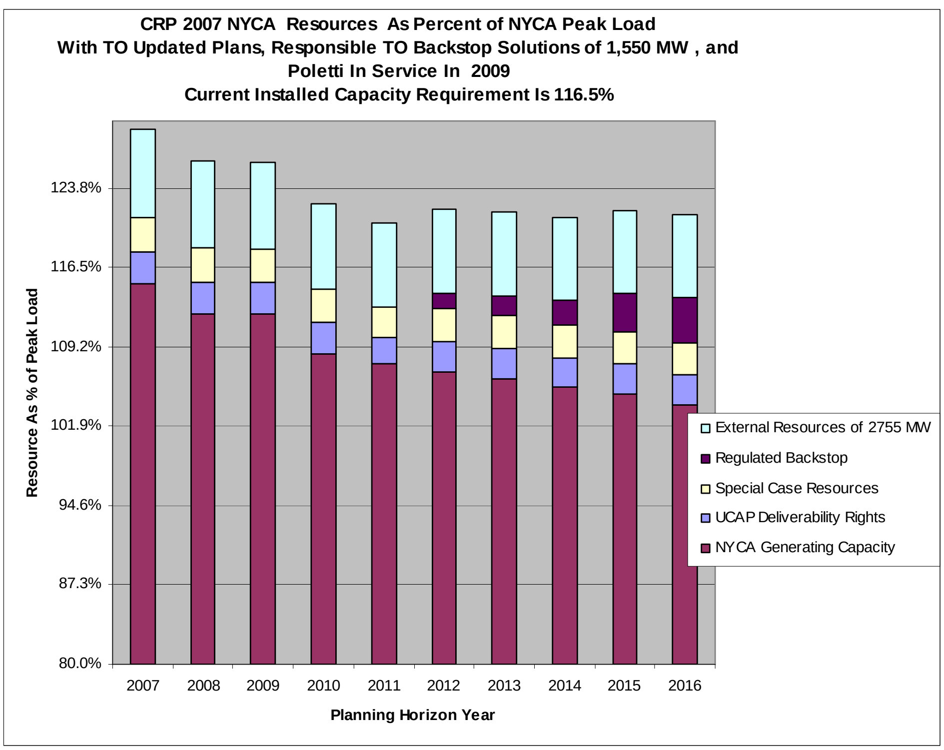

Figure 6.2: TO Regulated Backstop Solutions – 1,550 MW

C. Market-Based Solutions

As previously discussed, the NYISO received eight market-based proposals in response to its request for market solutions. The LOLE analysis only modeled seven of the proposals, because the capacity associated with the FPL Energy proposal was modeled together with the transmission proposal submitted by HTP.

Because the HVDC proposals provided evidence of the availability or potential availability of capacity and energy, the HVDC projects from PJM to Zone J were modeled as UDRs or equivalent to generators located in Zone J. The VFT was modeled as a tie line between NYCA and PJM and available to provide emergency assistance. The transfer limits utilized to evaluate the market proposals are the same as those used to evaluate the TO Updated Plans from the First Five Years. Since the proposed market solutions provide for generation additions in excess of the TO backstop solutions, as well as additional transmission capability, for the second five years, it was assumed that at least the same level of reactive support would be available as the assumed backstop solutions. Therefore, the transfer limits would be at least those used for the evaluation of the backstop solutions. Recognizing that many of the proposed market solutions were DC and AC ties from PJM, additional zones and interfaces were added to the transmission topology utilized for the MARS Resource Adequacy Analysis. This topology change was employed to capture potential internal PJM or Zone J constraints not otherwise specifically modeled when there is only one transmission interface modeled for the PJM to Zone J interface[23].

First Five Year Base Case

Table 6.12 below presents the Load and Resource table with the Five Year Base Case with the TO updated plans, the deferred retirement of the Charles A. Poletti generating unit, and the market proposals for the first Five Year Base Case. The market solutions improve the LOLE results for 2009 through 2010 when compared to the first Five Year Base Case. Table 6.13 presents the zonal and NYCA LOLE results with the market proposals in-service.

[23] Of the three proposed transmission solutions, one has not initiated the Interconnection Process with PJM, one has completed its impact study, and one has proceeded to construction with an Interconnection Service Agreement and Construction Service Agreement. Since these projects would have significant impacts on both the PJM and New York systems, their status will be closely monitored in Interconnection Processes, the CRPP and the Regional Planning Process through the Northeast Coordinated System Plan.

Table 6.12: Base Case Load and Resource Table With TO Updated Plans, Deferred Retirement of Poletti and Market Solutions

Year	2007	2008	2009	2010	2011
Peak Load					
NYCA	33,831	34,314	34,688	35,042	35,348
Zone J	11,800	11,970	12,140	12,290	12,440
Zone K	5,549	5,628	5,738	5,840	5,936
Resources					
NYCA					
Capacity	38,911	38,513	39,367	38,479	38,479
SCR	1080	1080	1080	1080	1080
UDR	990	990	990	990	2040
Total	40,981	40,583	41,437	40,549	41,599
Zone J					
Capacity	9,996	9,996	10,196	9,308	9,308
SCR	325	325	325	325	325
UDR	0	0	0	0	1050
Total	10,321	10,321	10,521	9,633	10,683
Zone K					
Capacity	5,291	5,291	5,963	5,963	5,963
SCR	150	150	150	150	150
UDR	990	990	990	990	990
Total	6,431	6,431	7,103	7,103	7,103
NYCA Resource to Load Ratio	121.1%	118.3%	119.5%	115.7%	117.7%
Zone J Resource to Load Ratio	87.5%	86.2%	86.7%	78.4%	85.9%
Zone K Resource to Load Ratio	115.9%	114.3%	123.8%	121.6%	119.7%
NYCA LOLE (day/year)	0.00	0.01	0.02	0.04	0.00

Table 6.13: NYCA LOLE Table for the First Five Year Base Case with TO Updated Plans and Market Solutions LOLE (probability of occurrences in days per year)

AREA	2007	2008	2009	2010	2011
Zone B (Upstate NY)	0.00	0.01	0.02	0.03	0.00
Zone E (Upstate NY)	0.00	0.00	0.01	0.01	0.00
Zone G (Hudson Valley or SENY)	0.00	0.00	0.00	0.00	0.00
Zone I (Hudson Valley or SENY)	0.00	0.01	0.02	0.03	0.00
Zone J (Hudson Valley or SENY)	0.00	0.01	0.02	0.04	0.00
Zone K (Long Island or SENY)	0.00	0.00	0.00	0.00	0.00
NYCA	0.00	0.01	0.02	0.04	0.00

Second Five Years

Table 6.14 presents the Load and Resource table incorporating the updated TO plans and market proposals for the second five years. Table 6.15 presents the zonal and LOLE results for the second five years with the market proposals in service.

Table 6.14: Base Case Load and Resource Table with TO Updated Plans and Market Solutions Second Five Years

Year	2012	2013	2014	2015	2016
Peak Load					
NYCA	35,593	35,803	36,077	36,380	36,623
Zone J	12,570	12,705	12,815	12,925	13,003
Zone K	6,037	6,141	6,249	6,372	6,511
Resources					
NYCA					
Capacity	38,953	39,553	39,553	39,553	39,553
SCR	1080	1080	1080	1080	1080
UDR	2040	2040	2040	2040	2040
Total	42,073	42,673	42,673	42,673	42,673
Zone J					
Capacity	9,482	10,082	10,082	10,082	10,082
SCR	325	325	325	325	325
UDR	1050	1050	1050	1050	1050
Total	10,857	11,457	11,457	11,457	11,457
Zone K					
Capacity	5,963	5,963	5,963	5,963	5,963
SCR	150	150	150	150	150
UDR	990	990	990	990	990
Total	7,103	7,103	7,103	7,103	7,103
NYCA Resource to Load Ratio	118.2%	119.2%	118.3%	117.3%	116.5%
Zone J Resource to Load Ratio	86.4%	90.2%	89.4%	88.6%	88.1%
Zone K Resource to Load Ratio	117.7%	115.7%	113.7%	111.5%	109.1%
NYCA LOLE (day/year)	0.01	0.01	0.01	0.02	0.03

Table 6.15: NYCA LOLE Table for the Second Five Years with TO Updated Plans and Market Solutions LOLE (probability of occurrences in days per year)

AREA	2012	2013	2014	2015	2016
Zone B (Upstate NY)	0.00	0.01	0.01	0.01	0.02
Zone E (Upstate NY)	0.00	0.00	0.00	0.00	0.01
Zone G (Hudson Valley or SENY)	0.00	0.00	0.00	0.00	0.00
Zone I (Hudson Valley or SENY)	0.00	0.01	0.01	0.01	0.02
Zone J (Hudson Valley or SENY)	0.00	0.01	0.01	0.01	0.02
Zone K (Long Island or SENY)	0.00	0.00	0.00	0.01	0.02
NYCA	0.01	0.01	0.01	0.02	0.03

Assessment of the Market Proposals

Given the updated TO plans and the current load forecast, the market proposals are not needed to meet criteria for the first Five Year Base Case. However, if they are constructed, the market proposals are sufficient to maintain the LOLE criteria for the second five year period. Because of planning uncertainties and the identified needs in the second five years, sufficient projects should proceed to meet resource adequacy requirements. At least 500 MW of resources should be added to New York City by 2012. Alternatively, 750 MW of resources should be added to the Lower Hudson Valley by 2012. A total of 1,800 MW of resources should be added statewide by 2016. Projects in quantities and locations noted above will need to maintain their schedules for permitting, construction, and entering into service. In evaluating the viability of the market proposals, the NYISO has identified a concern with respect to these projects going forward and their potential overall reliability benefits being realized. Although each of these developers have significant financial resources available to them, the proponents of market-based generation and transmission solutions stated that their viability may depend upon entry into long-term contracts for the sale of at least a portion of their output or use of their transmission facility. The developers indicated that the NYISO administered markets do not provide sufficient certainty with respect to revenue streams to fully support the significant investment these products will require. Accordingly, while the NYISO has determined that these projects are viable at this time to meet their projected in-service dates, there is at least some level of uncertainty as to whether these projects will proceed.

Figure 6.3 below presents the NYCA resource to load ratio that results from the TO Updated Plans for the first Five Year Base Case, the deferred retirement of the Charles A. Poletti generating unit, and the market proposals for the full 10-year Study Period. The resources are presented as a percentage of the annual peak load. The sum of the resources equal the NYCA IRM, which is a generally accepted measure of the level of resources needed to maintain reliability. While updated annually, the statewide IRM is currently 16.5 percent.

Expressed as a percentage of annual peak, the resources are divided into six categories: (1) in-NYCA existing generating capacity, (2) UDRs supported by external capacity, (3) special case resources/demand response, (4) market proposals that are additions to NYCA generating capacity, (5) market proposals that are additions to NYCA UDRs supported by external capacity, and (6) external capacity of 2,755 MW currently eligible to participate in the NYISO markets.

Figures 6.4 and 6.5 below present the resources for New York City and Long Island as a percentage of their respective peak loads. The sum of the resources is equal to the amount of installed locational resources expressed as a percentage of the forecasted zonal peak load. Because New York City and Long Island are defined as localities in the NYISO Tariff, they have minimum installed Locational Capacity Requirements. The current minimum Locational Capacity Requirements are 80 percent for New York City and 99 percent for Long Island, respectively.

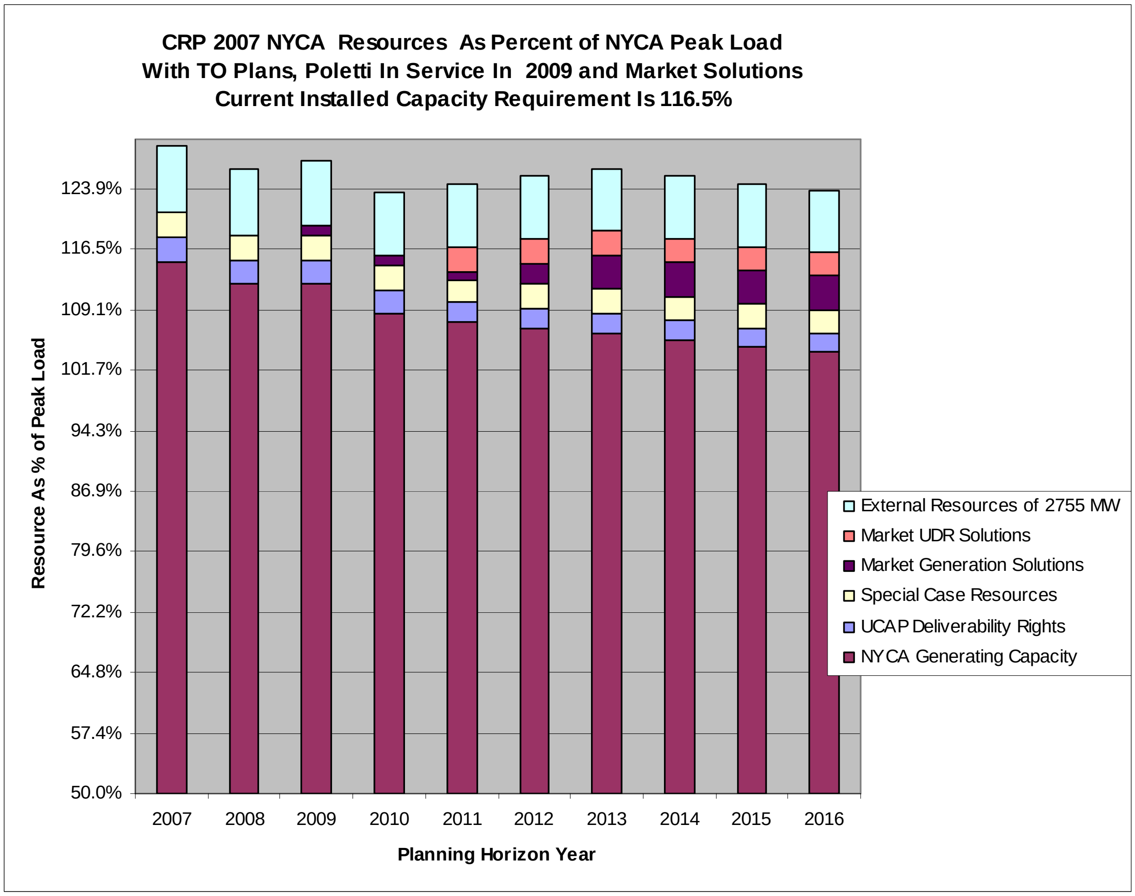

Figure 6.3: CRP 2007 NYCA Resources as Percent of NYCA Peak Load with TO Plans, Poletti In-Service in 2009 and Market Solutions

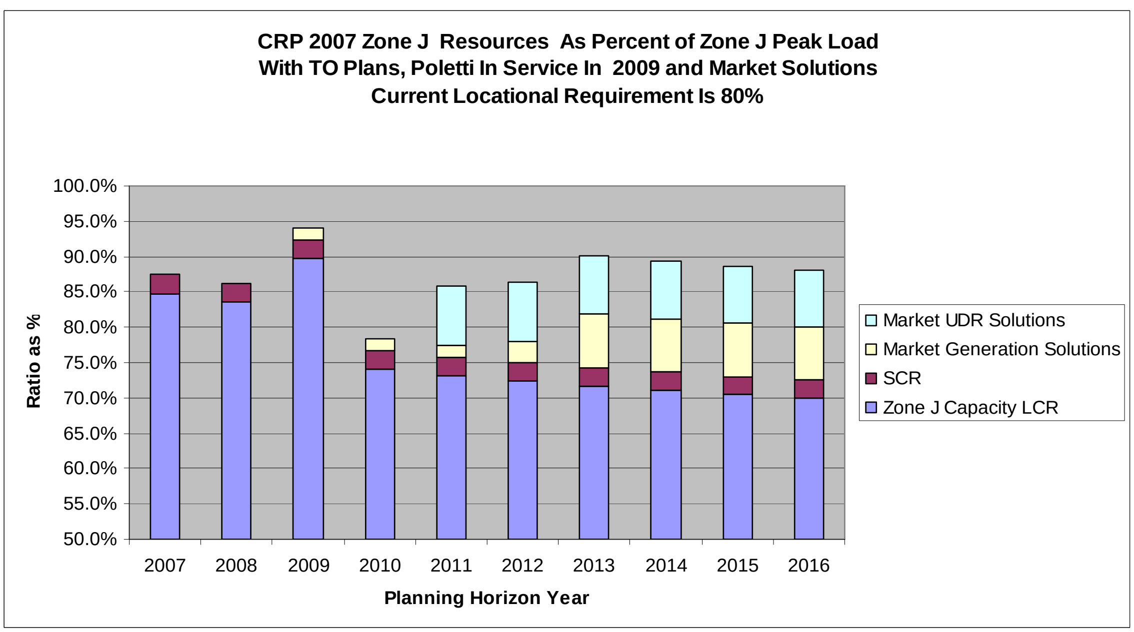

Figure 6.4: CRP 2007 Zone J Resources as Percent of Zone J Peak Load with TO Plans, Poletti In-Service In 2009 and Market Solutions

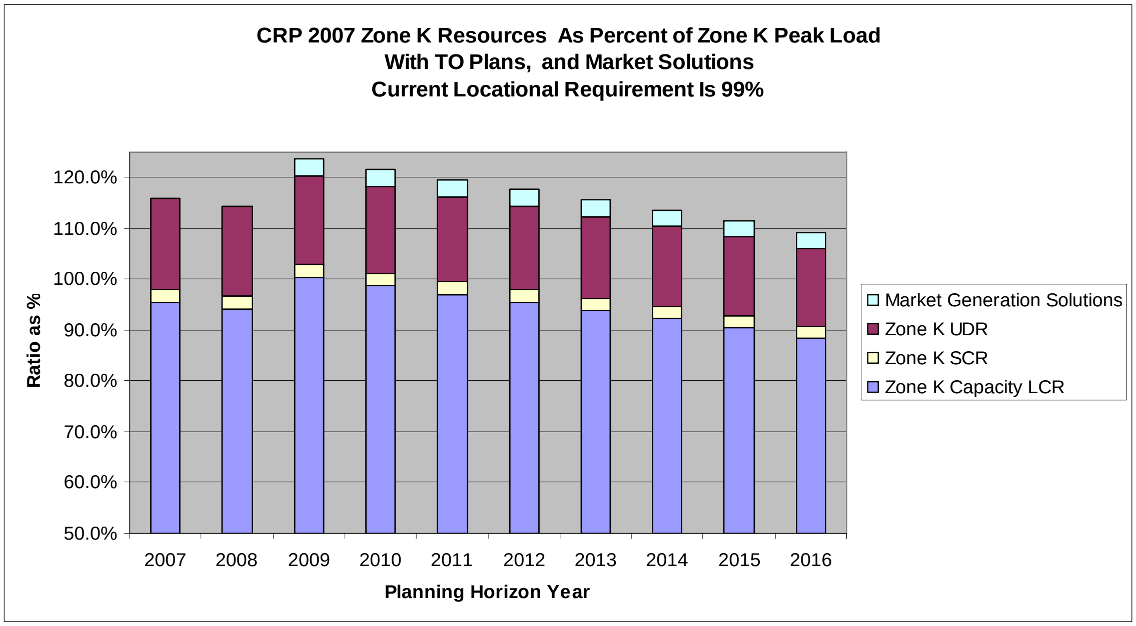

Figure 6.5: CRP 2007 Zone K Resources as Percent of Zone K Peak Load with TO Plans, and Market Solutions

D. Alternative Regulated Responses

The NYISO initiated a request for alternative regulated responses to meet the needs identified in the second five-year period. As discussed previously, three alternative regulated responses were submitted. The responses consisted of one generation proposal, one DSM proposal and one transmission proposal. An in-depth review of each of the proposals at this time was not undertaken at this time because, as noted above, the NYISO determined that none of these alternatives are required at this time.

Regulated Generation Alternative

This alternative regulated solution was submitted by Mirant New York. Mirant is proposing to keep Lovett Unit #5 operational (either by firing on natural gas or firing on coal with acceptable control measures) and to restart operations of Unit #4 (firing on natural gas) for a transitional period of time beginning no later than May 1, 2008 and continuing as needed. The proposal would keep two of the three units on site in operation beyond the current May 1, 2008 retirement date for a total of 365 MW of capacity. The impact of this proposal on LOLE is presented in Table 6.16.

Table 6.16: Impact Lovett Units 4&5 Remaining In-service on NYCA LOLE[24]

	2011	2012	2013	2014	2015	2016
Zone B (Upstate NY)	0.04	0.07	0.08	0.11	0.15	0.16
Zone E (Upstate NY)	0.01	0.03	0.03	0.04	0.06	0.08
Zone G (Hudson Valley or SENY)	0.00	0.00	0.00	0.00	0.01	0.01
Zone I (Hudson Valley or SENY)	0.05	0.10	0.13	0.19	0.29	0.37
Zone J (Hudson Valley or SENY)	0.06	0.11	0.16	0.22	0.33	0.45
Zone K (Long Island or SENY)	0.01	0.02	0.02	0.05	0.08	0.13
NYCA	0.07	0.12	0.17	0.24	0.35	0.47
NYCA Differences (W and W/O ARR)[25]	-0.03	-0.04	-0.06	-0.08	-0.11	-0.10

The generation alternative would increase capacity in Zone G or SENY below the Leeds Pleasant Valley congestion point, and provides additional dynamic reactive power capability. The additional reactive capability would increase the transfer limits across the UPNY/Con Ed and Zone I to Zone J transmission interfaces by approximately 200 MW and improves the voltage performance of the transmission system in the Lower Hudson Valley. In addition, the alternative would improve the LOLE and help maintain a more diverse fuel mix.

Alternative Transmission Response

The alternative regulated solution submitted by NYRI proposed to construct a new HVDC transmission line between the Edic Substation in the Town of Marcy, Oneida County, to the Rock Tavern Substation in the Town of New Windsor, Orange County. It is Project No. 96 in the NYISO Interconnection Queue.

Based on updated information and modeling, the NYISO had determined that there is no need to require a regulated backstop solution at this time. As a result, the alternative regulated transmission proposal was not evaluated as a specific alternative to regulated backstop solutions. Rather, this proposal was evaluated as a generic increase to transfer capability.

To evaluate the benefits of increased transfer capability associated with this transmission proposal, selected interfaces in the MARS model were increased to simulate the potential benefits of additional transmission capability.

Although this proposal would potentially increase the Zones E to G interface by 1,200 MW, there are simultaneous constraints that need to be recognized. To capture these simultaneous constraints, this project was evaluated using a reduced increase of only 1,000 MW for UPNY/SENY. The impact of this proposal on LOLE is presented in Table 6.17.

[24] The results include the updated TO plans.
[25] Negative LOLE differences in this and other tables indicate that the project improves reliability.

Table 6.17: Impact NYRI Transmission Proposal on NYCA LOLE[26]

	2011	2012	2013	2014	2015	2016
Zone B (Upstate NY)	0.06	0.10	0.12	0.18	0.24	0.29
Zone E (Upstate NY)	0.02	0.04	0.05	0.06	0.10	0.13
Zone G (Hudson Valley or SENY)	0.00	0.01	0.01	0.01	0.01	0.02
Zone I (Hudson Valley or SENY)	0.06	0.10	0.14	0.19	0.27	0.33
Zone J (Hudson Valley or SENY)	0.07	0.12	0.16	0.23	0.31	0.39
Zone K (Long Island or SENY)	0.01	0.02	0.03	0.05	0.09	0.14
NYCA	0.08	0.12	0.17	0.24	0.33	0.42
NYCA Differences (W and W/O ARR)	-0.02	-0.03	-0.05	-0.08	-0.13	-0.17

Alternative Demand Response Proposal

As discussed, the NYISO received one alternative regulated demand response proposal. This alternative regulated solution was submitted by EnerNOC, Inc. EnerNOC offers 250 MW of demand response resources to the NYISO. The impact of this proposal on NYCA LOLE is presented in Table 6.18.

Table 6.18: Impact of Demand Response on NYCA LOLE[27]

	2011	2012	2013	2014	2015	2016
Zone B (Upstate NY)	0.05	0.07	0.09	0.12	0.15	0.17
Zone E (Upstate NY)	0.02	0.21	0.03	0.05	0.07	0.09
Zone G (Hudson Valley or SENY)	0.00	0.01	0.01	0.01	0.01	0.02
Zone I (Hudson Valley or SENY)	0.06	0.10	0.14	0.20	0.29	0.37
Zone J (Hudson Valley or SENY)	0.07	0.12	0.16	0.23	0.33	0.42
Zone K (Long Island or SENY)	0.01	0.02	0.03	0.05	0.09	0.14
NYCA	0.08	0.12	0.17	0.24	0.35	0.45
NYCA Differences (W and W/O ARR)	-0.02	-0.03	-0.05	-0.08	-0.11	-0.13

Assessment of the Alternative Regulated Responses

The above analysis indicates that all of the alternative regulated responses would improve reliability and satisfy some portion of the need. The demand response proposal is the only alternative regulated solution proposal that has some MWs of resources located in Zone J.

Besides providing available capacity, the generation alternative regulated solution would provide voltage support, and increase transfer capability, which would be beneficial to the Lower Hudson Valley region.

The transmission alternative regulated solution would benefit resource adequacy only if there is additional capacity available to be delivered. Transmission projects also provide the flexibility to site additional resources in upstate New York, and can provide other benefits. For instance, the NYRI has included reactive power capability for the Rock Tavern terminal, which could provide additional reactive capability for the Lower

[26] ibid
[27] ibid

Hudson Valley. The full impact of this transmission project will studied in the SRIS, which is under review by the NYISO.

E. Summary of Evaluation of Proposed Solutions

In summary, the Updated TO Plans will satisfy New York's Reliability Needs for the first five years of the Study Period. If the market responses remain on schedule as proposed, the NYCA would well exceed LOLE criteria throughout the 10-year Study Period. Given that the total capacity of the market solutions[28] are nearly 1,000 MW in excess of resource requirements and the planned in-service dates are well in advance of the need dates, Reliability Needs will still be met if a portion of the market solutions come into service later than presently planned. Consequently, neither a regulated backstop solution nor an alternative regulated response needs to be implemented at this time. Going forward, the NYISO will monitor the progress of proposed solutions in the next cycle of CRPP to determine that these planned resources will be available in a timely manner.

F. Transmission System Short Circuit Assessment

The NYISO updated the short circuit assessment in the 2007 RNA to include the TO solutions that were evaluated for this CRP. The methodology employed was the same as used for the RNA. It is described in the "NYISO Guideline for Fault Current Assessment," contained in Appendix B of the RNA supporting document. The fault current levels arising from the implementation of the updated TO plans were assessed and compared against the most recent Annual Transmission Reliability Assessment 2006 (ATRA) fault levels to determine if breakers would become over-dutied. The market solutions were evaluated in aggregate. Assumptions were made as to the exact locations for the solutions in the second five years of the Study Period. The exact location of solutions can greatly impact the fault current levels calculated. Based on the locations assumed for the solutions, fault current duties did not indicate over-dutied breakers in addition to those identified in the 2006 ATRA.

[28] At the end of July, Besicorp-Empire Development Company, LLC (BEDCO) announced that it had obtained sufficient funding to proceed with the construction of the Besicorp-Empire power project located in Rensselaer, New York. This project has met all the NYISO interconnection requirements and has an Article X certificate as well as an Article VII certificate for the transmission lines to connect it to the bulk power system. The project was studied as a 660 MW combined cycle unit. At the time of the development of the 2007 RNA, this facility did not meet the requirements for inclusion in the base line Study Period nor did the developers submit it as a market solution.

VII. Findings, Conclusions, and Recommendation

The NYISO OATT Attachment Y in Section 8 states that:

> Following the NYISO's evaluation of the proposed market-based and regulated solutions to Reliability Needs, the NYISO will prepare a draft CRP. The draft CRP shall set forth the NYISO's findings and recommendations; including any determination, that implementation of a regulated solution (which may be a Gap Solution) is necessary to maintain system reliability.

After Committee review and vote as described in Attachment Y of the OATT, the draft CRP will become final once approved by the NYISO Board of Directors.

A. The 2007 Reliability Plan[29] – A Summary

The 2007 RNA determined that additional resources would be needed over the 10-year Study Period in order for the NYCA to comply with applicable reliability criteria[30]. As a result, the NYISO requested market-based, regulated backstop, and alternative regulated solutions to the Reliability Needs. The preference is to provide an opportunity for market solutions to meet the future needs with regulated backstops and alternative regulated solutions available, if needed.

The NYISO designated the TOs responsible for developing regulated backstop solutions to address the Reliability Needs identified in the RNA. The Responsible Transmission Owners submitted their updated TO plans, which had the effect of meeting needs in the first Five Year Base Case. They also submitted regulated backstop solutions, which were sufficient to meet the identified Reliability Needs over the second five year period.

In addition, a broad range of solutions, including market proposals, and alternative regulated responses were submitted. Based upon its evaluation of the market proposals, updated TO Plans, and continued operation of the Charles A. Poletti generating unit through January 2010, the NYISO has concluded that there are sufficient resource additions to the NYCA planned or under development to meet the reliability need for the next 10 years. Accordingly, the NYISO has determined that no action needs to be taken at this time to implement any regulated backstop solution or an alternative regulated solution to address the Reliability Needs identified in the 2007 RNA.

The plan consists of the following actions:

1. Deferring retirement of the New York Power Authority's Charles A. Poletti generating unit in New York City from 2009 until 2010. It is particularly important that the existing Poletti unit stay in-service until 2010 because the Consolidated Edison M29 transmission project will not be in-service until late 2009.

[29] All supporting databases and analysis utilized in developing this plan are available for inspection subject to confidentiality and critical energy infrastructure information requirements (CEII).

[30] Reliability Needs are identified with respect to approved reliability criteria, including through MARS LOLE studies. These studies reflect realistic capabilities of the NYCA transmission system with appropriate interface limits in the presence of thermal, voltage or stability constraints.

2. Implementing certain Responsible TO plans, which include transmission upgrades, such as the addition of capacitor banks at the Millwood Substation and a breaker replacement at the Gowanus Substation.
3. Developing upwards of 1,800 MW of market-based resources from the 3,007 MW of the merchant generation and transmission projects that have been proposed for New York. At least 1,000 MW of these resources should be located in New York City or have UDRs into New York City; 500 MW of resources in the Lower Hudson Valley; and the remaining 300 MW of additional resources in New York State as a whole, including Upstate New York. The NYISO has received market-based proposals for more than the minimum resources needed to meet resource adequacy criteria. The NYISO does not choose which of the market-based projects submitted to it will be built. Rather, it is up to the proponents to proceed with, and the relevant state siting and permitting agencies to approve, the specific resources that will be added in New York. The NYISO will continue to monitor the viability of these projects in accordance with established procedures and will report on its evaluation in the next CRP. As identified in Section 5.3 of the 2007 RNA, there are other combinations of resources that would meet resource adequacy criteria on a statewide basis.
4. In summary, based upon the solutions submitted to the NYISO, the resource additions required for the next 10 years, by 2016, total approximately 1,800 MW.

B. Findings, Conclusion, and Recommendation

Finding Number One – Transmission Security and Adequacy

As in the 2005 CRP approved by the NYISO Board of Directors in August 2006, transfer limits for the 10-year Study Period were reduced to maintain the security of the transmission system. The lower transfer limits were largely located in SENY, and reduced the ability of the transmission system to deliver capacity downstream of the constraints. The result was an increase in the LOLE, which translates into increased resource requirements downstream. The major factor driving the reduction in transfer limits was the voltage performance of the New York Transmission System, which is being impacted by load growth and generator retirements.

However, the necessary transfer limit reductions identified in the 2007 RNA were not as severe as in the 2005 RNA because of system improvements incorporated into the baseline from the first CRP and updated TO plans, designed to improve the voltage performance of the system. The 2005 CRP identified actions required to address transmission security and adequacy concerns. These concerns are still relevant to the 2007 CRP, and are reiterated herein along with a summary of the steps that have already been taken to address the required actions.

2005 CRP Recommended Actions

The 2005 CRP recommended the following actions in response to its finding number one that, in order to maintain transmission security, transfer limits needed to be reduced because of degradation in the voltage performance of the New York transmission system. They were:

1. The determination of Reliability Needs for resource adequacy deficiencies should differentiate between the needs that are solely attributable to transmission system performance in the form of thermal, voltage, or stability constraints versus those that are attributable to an overall NYCA system-wide resource adequacy deficiency.

2. Continued progress on the part of a number of NYISO-related initiatives to address issues and concerns with the voltage performance of the bulk power system. They include:

   - Continuation of the initiative to complete a comprehensive reliability analysis of reactive power demand and resources in the NYCA.
   - Development of a work plan and time table for the Reactive Power Working Group (RPWG) to complete its initiative to improve modeling of reactive power sinks and sources in the NYCA power system model.
   - A benchmarking of New York's reactive power planning and voltage control practices to the "best practices" identified in NERC Blackout Recommendation 7a, to the extent applicable. A review of NERC's other blackout recommendations related to voltage, such as load modeling and generator performance, is recommended to identify factors that could enhance or improve reliability through managing the voltage performance of New York's bulk power system.

<u>Actions Taken</u>

Since the approval of the first CRP, the NYISO has taken the following actions:

1. To address the 2005 CRP recommended action 1 above, the resource adequacy needs for the 2007 RNA were evaluated to determine if they were solely attributable to transmission constraint(s) and/or attributable to an overall NYCA system wide resource adequacy deficiency. Based on this evaluation, the Responsible TOs were identified.

2. To address the initial CRP recommended action 2 above, the NYISO RPWG has continued to make progress on several initiatives it has underway. They include, but are not limited to the following:

   - A review of the NYISO Voltage Guidelines such as the adequacy of the five percent margin used to determine interface transfer limits above which voltage collapse potentially would occur.

- A review of a number of the factors that impact the voltage performance of the power system. They include the load forecast, the modeling of system loads, and the testing of generator reactive capability, metering, load power factor, and a review of the tools that are used for power system simulation.

These efforts are ongoing and the RPWG has been providing monthly reports to the Operating Committee regarding their progress. The reports have covered such topics as complex load modeling, survey of reactive power resources, metering needs, and power factor sensitivity testing. The NYISO supports and endorses the work of the RPWG.

Finding Number Two – Plan Risk Factors:

Although the planned system meets reliability criteria based on the conditions studied, the NYISO has identified a number of risk factors that could adversely affect the plan. These factors will require ongoing review and assessment.

They are:

1. First and foremost, construction of planned resources and transmission upgrades should move forward on the schedules provided so that at least 500 MW of resources are added to New York City by 2012, or approximately 750 MW of resources are added in the Lower Hudson Valley by that date, and a total of 1,800 MW of resources are added across New York by 2016. In accordance with criteria adopted by the NYISO Operating Committee, the NYISO will continue to monitor the progress of market-based transmission, capacity and DSM resource additions to determine their ongoing viability, and to determine whether regulated backstop solutions need to be "triggered." If solutions are not implemented on a timely basis, electric system reliability could be put at risk. Also, the absence of a "one-stop" siting process could impede the construction and operation of new generating facilities to meet Reliability Needs. New York State once had a streamlined siting process for large power plants, but that law (Article X of the New York Public Service Law) expired at the end of 2002. The NYISO should reflect the absence of an Article X process when evaluating the viability of project timelines.

   <u>Action Required:</u>

   The Operating Committee has approved the criteria and process for monitoring all planned system additions that are identified as necessary to maintain reliability. The NYISO will continue to monitor the progress of market proposals twice annually in accordance with those procedures. The New York State Legislature should reenact a comprehensive siting process for major electric generating facilities in Article X of the Public Service Law.

2. The planned generator additions in this plan will be natural gas fired units with Number 2 fuel oil or kerosene as the back up fuel.

Action Required:

The fuel diversity of the power supply system and its overall impact on fuel availability, reliability and prices needs to be monitored on a continuous basis. The NYISO will also monitor changes to the fuel supply infrastructure, such as new fuel gas pipelines and liquefied natural gas facilities.

3. The plan depends increasingly on the availability of capacity resources in neighboring control areas delivered as UDRs for New York to maintain its compliance with reliability criteria.

   Action Required:

   The Northeast Coordinated System Plan, which is specified in the Northeast Planning Protocol, will need to assess whether sufficient resources are being developed on a regional basis to maintain resource adequacy in all areas. As capacity markets become increasingly more regional in nature, New York will need to monitor its capacity markets to determine that they remain competitive and attract sufficient investment to maintain reliability. The NYISO's neighboring control areas, ISO-New England and PJM, have implemented multi-year forward capacity markets. The NYISO will also review its capacity market structures to determine whether forward capacity markets longer than one year should be implemented to encourage resource additions in New York. This examination is already proceeding in the NYISO's Installed Capacity Working Group (ICAPWG), and should continue.

4. The proponents of market-based generation and transmission solutions stated that their viability may depend upon entry into long-term contracts for the sale of their output in combination with spot market sales.

   Action Required:

   Section 8.2 of Attachment Y of the OATT states that, concurrently with submission for Board Review, "the draft CRP will also be provided to the Independent Market Advisor for his review." The Independent Market Advisor will review whether market rule changes are necessary to address and identify failure in one or more of the NYISO competitive markets. (OATT Attachment Y, Section 5.2). As stated in Item 3 above, the NYISO should continue examining whether forward capacity markets longer than one year should be implemented in New York to encourage investment in new infrastructure resources. In addition, the NYISO should continue monitoring the progress of the PSC's long-term contracts and integrated resource planning proceeding.

5. Greater than expected load growth or retirement of additional generating units beyond those already included in the plan for either economic and/or environmental factors, as well as continued degradation of the voltage performance of the New York bulk power system, would adversely affect reliability.

   Action Required:

   The next round of the CRPP should progress on schedule. A draft 2008 RNA Assessment is due to be completed in September 2007. Just as important as the plan itself is the process of planning and the ongoing monitoring it provides. Emphasis should be placed on thoroughly identifying and addressing environmental factors that may lead to additional generating unit retirements. The NYISO identified these environmental programmatic issues in its 2007 Power Trends Report. They include implementation of the Regional Greenhouse Gas Initiative (RGGI), the High Energy Demand Days (HEDD) program to achieve reduction in emissions of ozone smog precursors, and consent orders requiring power plant owners to take certain actions to control emissions or retire their units. The important environmental goals sought to be achieved by these regulatory requirements should be undertaken in a manner that is mindful of New York's long-term bulk power system needs. The NYISO should continue monitoring the progress of these environmental initiatives to determine the impact on resource adequacy and bulk power system reliability.

6. New York's initiative to reduce demand. New York's Governor Spitzer announced a goal to reduce New York's energy consumption by 15% of forecasted levels by 2015. The PSC is examining alternatives for implementation of reduction of energy usage. Implementation of this initiative would also affect the State's future capacity needs.

   Action Required:

   The PSC proceeding should be undertaken in coordination with the NYISO's planning processes and based upon consistent data inputs and analytical models and methodologies. The NYISO should continue to monitor the progress of this proceeding and achievement of the State's energy efficiency goals to determine their impact on bulk power system reliability.

C. Analysis by NYISO Independent Market Advisor

The analysis of Dr. David Patton, the NYISO Independent Market Advisor, on the 2007 CRP is attached as Appendix B.

D. Recommendation

This 2007 CRP has determined that under the conditions studied, the market-based solutions submitted and the Responsible TO Updated Plans, the proposed system upgrades will maintain the reliability of the New York bulk power system without the need for regulated backstop or alternative regulated solutions at this time. Therefore, the NYISO Staff recommends that the Operating Committee and the Management Committee recommend that the Board of Directors approve the 2007 CRP.

Appendix A

Statement of Dr. David Patton

Independent Market Advisor
to the NYISO
on
The 2007 Reliability Needs Assessment

Dr. David Patton, the NYISO's Independent Market Advisor, reviewed the RNA. With regard to the locational needs identified in the RNA, Dr. Patton indicated that the ongoing work of the NYISO and its Market Participants to identify when new capacity zones and associated local capacity requirements are appropriate will likely improve the economic signals needed to allow the market to resolve these needs.

Appendix B

Statement of Dr. David Patton

Independent Market Advisor
to the NYISO
on

The 2007 Comprehensive Reliability Plan

Insert Text

Appendix C

Comprehensive Reliability Plan Glossary

Term	Definition
Adequate:	A system is considered adequate if the probability of having sufficient transmission and generation resources to meet expected demand is greater than the minimum standard to avoid a blackout. A system has adequate resources under the standard if the probability of an involuntary loss of service is no greater than one occurrence in 10 years. This is known as the loss of load expectation (LOLE), which forms the basis of New York's installed capacity (ICAP) requirement.
Aggregator:	An entity that buys or brokers electricity in bulk for a group of retail customers to increase their buying power.
Annual Transmission Reliability Assessment (ATRA):	The Annual Transmission Reliability Assessment. An assessment, conducted by the NYISO staff in cooperation with Market Participants, to determine the System Upgrade Facilities required for each generation and merchant transmission project included in the Assessment to interconnect to the New York State Transmission System in compliance with Applicable Reliability Requirements and the NYISO Minimum Interconnection Standard.
Article X:	New York's siting process (Article X of the state Public Service Law) for new large power plants which expired Dec. 31, 2002. Article X provided a streamlined process to review, approve and locate new generation facilities in the state.
Capability Period:	The Summer Capability Period lasts six months, from May 1 through October 31. The Winter Capability Period runs from November 1 through April 30 of the following year.

Term	Definition
Comprehensive Reliability Plan (CRP):	An annual study undertaken by the NYISO that evaluates projects offered to meet New York's future electric power needs, as identified in the Reliability Needs Assessment (RNA). The CRP may trigger electric utilities to pursue regulated solutions to meet Reliability Needs if market-based solutions will not be available by that point. It is the second step in the Comprehensive Reliability Planning Process (CRPP).
Comprehensive Reliability Planning Process (CRPP):	The annual process that evaluates resource adequacy and transmission system security of the state's bulk electricity grid over a 10-year period and evaluates solutions to meet those needs. The CRPP consists of two studies: RNA, which identifies potential problems, and the CRP, which evaluates specific solutions to those problems.
Congestion:	Transmission paths that are constrained, which may limit power transactions because of insufficient capacity. Congestion can be relieved by increasing generation or by reducing load.
Contingencies:	Contingencies are electrical system events (including disturbances and equipment failures) that are likely to happen.
Day-Ahead Demand Response Program (DADRP):	A NYISO Demand Response program to allow energy users to bid their load reductions, or "megawatts", into the Day-Ahead energy market.
Day-Ahead Market (DAM):	A NYISO-administered wholesale electricity market in which capacity, electricity, and/or ancillary services are auctioned and scheduled one day prior to use. The DAM sets prices as of 11 a.m. the day before the day these products are bought and sold, based on generation and energy transaction bids offered in advance to the NYISO. More than 90 percent of energy transactions occur in the DAM.
Demand Response Programs:	A series of programs designed by the NYISO to maintain the reliability of the bulk electrical grid by calling on electricity users to reduce consumption, usually in capacity shortage situations. The NYISO has three Demand Response programs: Day Ahead Demand Response Program (DADRP), Emergency Demand Response Program (EDRP), and Special Case Resources (SCR).

Term	Definition
Distributed Generation:	A small generator, typically 10 megawatts or smaller, attached to the distribution grid. Distributed generation can serve as a primary or backup energy source, and can use various technologies, including wind generators, combustion turbines, reciprocating engines, and fuel cells.
Electric Reliability Organization (ERO):	Under the Energy Policy Act of 2005, the Federal Energy Regulatory Commission (FERC) is required to identify an ERO to establish, implement and enforce mandatory electric reliability standards that apply to bulk electricity grid operators, generators and transmission owners in North America. In July 2006, the FERC certified the North American Electric Reliability Corporation (NERC) as America's ERO.
Electric System Planning Work Group (ESPWG):	Market Participant working group designated to fulfill the planning functions assigned to it. A working group that provides a forum for stakeholders and Market Participants to provide input into the NYISO's comprehensive reliability planning process, the NYISO's response to FERC reliability-related Orders and other directives, other system planning activities, policies regarding cost allocation and recovery for reliability projects, and related matters.
Emergency Demand Response Program (EDRP):	A NYISO Demand Response program designed to reduce power usage through the voluntary electricity consumption reduction by businesses and large power users. The companies are paid by the NYISO for reducing energy consumption upon NYISO request.
Energy Policy Act of 2005 (EPAct):	An extensive energy statute approved by President George W. Bush in August 2005 that requires the adoption of mandatory electric reliability standards. The EPAct also made major changes to federal energy law concerning wholesale electricity markets, fuels, renewable resources, electricity reliability and the energy infrastructure needs of the nation.
Federal Energy Regulatory Commission (FERC):	The federal energy regulatory agency within the U.S. Department of Energy that approves the NYISO's tariffs and regulates its operation of the bulk electricity grid, wholesale power markets, and planning and interconnection processes.
Five Year Base Case:	The model representing the New York State Power System over the first five years of the Study Period.

Term	Definition
Forced Outage:	An unanticipated loss of capacity, due to the breakdown of a power plant or transmission line. It can also mean the intentional shutdown of a generating unit or transmission line for emergency reasons.
Fuel Capacity:	The amount, or percentage, of fuel available for use to produce electricity.
Gap Solution:	A solution to a Reliability Need that is designed to be temporary and to strive to be compatible with permanent market-based proposals. A permanent regulated solution, if appropriate, may proceed in parallel with a Gap Solution.
High Electric Demand Days (HEDD):	Days of high electricity demand, which can dramatically increase ozone-forming air pollution from electric generation, often resulting in nitrogen oxide (NOx) emissions that can be greater than two times their average levels. Days of high electrical use often coincide with days with high ozone levels.
Installed Capacity (ICAP):	A Generator or Load facility that complies with the requirements in the Reliability Rules and is capable of supplying and/or reducing the demand for energy in the NYCA for the purpose of ensuring that sufficient energy and capacity are available to meet the Reliability Rules.
Installed Reserve Margin (IRM):	The amount of installed electric generation capacity above 100 percent of the forecasted peak electric consumption that is required to meet New York State Reliability Council (NYSRC) resource adequacy criteria. Most planners consider a 15-20 percent reserve margin essential for good reliability.
Interconnection Queue:	A queue of merchant transmission and generation projects (greater than 20 MW) that have submitted an Interconnection Request to the NYISO to be interconnected to the state's bulk electricity grid. All projects must undergo three studies – a Feasibility Study (unless parties agree to forgo it), a System Reliability Impact Study (SRIS) and a Facilities Study – before interconnecting to the grid.
Load:	A consumer of energy (an end-use device or customer) or the amount of energy (MWh) or demand (MW) consumed.
Locational Installed	A NYISO determination of that portion of the statewide

Term	Definition
Capacity Requirement:	ICAP requirement that must be located electrically within a locality to provide that sufficient capacity is available there to meet the reliability standards.
Loss of load expectation (LOLE):	LOLE establishes the amount of generation and demand-side resources needed - subject to the level of the availability of those resources, load uncertainty, available transmission system transfer capability and emergency operating procedures - to minimize the probability of an involuntary loss of firm electric load on the bulk electricity grid. The state's bulk electricity grid is designed to meet an LOLE that is not greater than one occurrence of an involuntary load disconnection in 10 years, expressed mathematically as 0.1 days per year.
Lower Hudson Valley:	The southeastern section of New York, comprising New York Control Area Load Zones G, H and I. Greene, Ulster, Orange Dutchess, Putnam, Rockland and Westchester counties are located in those Load Zones.
Management Committee (MC):	The standing committee of the NYISO of that name created pursuant to the ISO Agreement. A group of Market Participants that, among other things, supervises and reviews the work of all other NYISO Committees, develops positions on NYISO operations, policies, rules and procedures; provides recommendations to the NYISO Board; proposes changes to and makes recommendations to the NYISO Board on the NYISO's tariffs; and prepares the NYISO capital and operating budgets for review and approval by the NYISO Board.
Market-Based Solutions:	Investor-proposed projects that are driven by market needs to meet future reliability requirements of the bulk electricity grid as outlined in the RNA. Those solutions can include generation, transmission and Demand Response Programs.
Market Participant:	An entity, excluding the NYISO, that produces, transmits sells, and/or purchases for resale capacity, energy and ancillary services in the wholesale market. Market Participants include: customers under the NYISO's tariffs, power exchanges, transmission owners, primary holders, load serving entities, generating companies and other suppliers, and entities buying or selling transmission congestion contracts.

Term	Definition
Megawatt (MW):	A measure of electricity that is the equivalent of 1 million watts.
New York Control Area (NYCA):	The area under the electrical control of the NYISO. It includes the entire state of New York, and is divided into 11 zones.
New York Independent System Operator (NYISO):	Formed in 1997 and commencing operations in 1999, the NYISO is a not-for-profit organization that manages New York's bulk electricity grid – a 10,775-mile network of high voltage lines that carry electricity throughout the state. The NYISO also oversees the state's wholesale electricity markets. The organization is governed by an independent Board of Directors and a governance structure made up of committees with Market Participants and stakeholders as members.
New York Power Pool (NYPP):	The predecessor to the NYISO. The New York Power Pool, at the time NYISO began operations, consisted of the State's six investor-owned utilities plus New York's power authority. The NYPP was established July 21, 1966, in response to the Northeast Blackout of 1965.
New York State Public Service Commission (PSC):	The New York State Public Service Commission, as defined in the New York Public Service Law.
New York State Bulk Power Transmission Facilities:	The facilities identified as the New York State Bulk Power Transmission Facilities in the annual Area Transmission Review submitted to NPCC by the NYISO pursuant to NYSRC requirements.
New York State Department of Public Service (DPS):	The New York State Department of Public Service, as defined in the New York Public Service Law, which serves as the staff for the New York State Public Service Commission.
Operating Committee (OC):	The standing committee of the NYISO of that name created pursuant to the ISO Agreement. A group of Market Participants that, among other things, establishing procedures related to the coordination and operation of the NYS bulk power system, Power System; overseeing operating and performance studies, and determining minimum system operating reserves and locational ICAP requirements.
Order 890:	Adopted by FERC in February 2007, Order 890 is a change

Term	Definition
	to FERC's 1996 open access regulations (established in Orders 888 and 889). Order 890 is intended to provide for more effective competition, transparency and planning in wholesale electricity markets and transmission grid operations, as well as to strengthen the Open Access Transmission Tariff (OATT) with regard to non-discriminatory transmission service. Order 890 requires Transmission Providers – including the NYISO – have a formal planning process that provides for a coordinated transmission planning process, including reliability and economic planning studies.
Other Developers:	Parties or entities sponsoring or proposing to sponsor regulated solutions to Reliability Needs who are not Transmission Owners.
Outage:	Removal of generating capacity or transmission line from service either forced or scheduled.
Peak Demand:	The maximum instantaneous power demand averaged over any designated interval of time, which is measured in megawatt hours (MWh). Peak demand, also known as peak load, is usually measured hourly.
Reactive Resources:	Facilities such as generators, high voltage transmission lines, synchronous condensers, capacitor banks, and static VAr compensators that provide reactive power. Reactive power is the portion of electric power that establishes and sustains the electric and magnetic fields of alternating-current equipment. Reactive power is usually expressed as kilovolt-amperes reactive (kVAr) or megavolt-ampere reactive (MVAr).
Regulated Backstop Solutions:	Proposals required of certain Transmission Owners to meet Reliability Needs as outlined in the RNA. Those solutions can include generation, transmission or Demand Response. Non-Transmission Owner developers may also submit regulated solutions. The NYISO may call for a Gap solution if neither market-based nor regulated backstop solutions meet Reliability Needs in a timely manner. To the extent possible, the Gap solution should be temporary and strive to ensure that market-based solutions will not be economically harmed. The NYISO is responsible for evaluating all solutions to determine if they will meet identified Reliability Needs in a timely manner.

Term	Definition
Reliability Criteria:	The electric power system planning and operating policies, standards, criteria, guidelines, procedures, and rules promulgated by the North American Electric Reliability Council (NERC), Northeast Power Coordinating Council (NPCC), and the New York State Reliability Council (NYSRC), as they may be amended from time to time.
Reliability Need:	A condition identified by the NYISO in the RNA as a violation or potential violation of Reliability Criteria.
Reliability Needs Assessment (RNA):	An annual report that evaluates resource adequacy and transmission system security over a 10-year planning horizon, and identifies future needs of the New York electric grid. It is the first step in the NYISO's CRPP.
Responsible Transmission Owner (Responsible TO):	The Transmission Owner or Transmission Owners designated by the NYISO, pursuant to the NYISO Planning Process, to prepare a proposal for a regulated solution to a Reliability Need or to proceed with a regulated solution to a Reliability Need. The Responsible TO will normally be the Transmission Owner in whose Transmission District the NYISO identifies a Reliability Need.
Security:	The ability of the power system to withstand the loss of one or more elements without involuntarily disconnecting firm load.
Special Case Resources (SCR):	A NYISO Demand Response program designed to reduce power usage by businesses and large power users qualified to participate in the NYISO's ICAP market. Companies that sign up as SCRs are paid in advance for agreeing to cut power upon NYISO request.
Study Period:	The ten-year time period evaluated in the RNA.
Transfer Capability:	The amount of electricity that can flow on a transmission line at any given instant, respecting facility rating and reliability rules.
Transmission Constraints:	Limitations on the ability of a transmission facility to transfer electricity during normal or emergency system conditions.
Transmission Planning Advisory Subcommittee (TPAS):	A group of Market Participants that advises the NYISO Operating Committee and provides support to the NYISO Staff in regard to transmission planning matters including transmission system reliability, expansion, and

Term	Definition
	interconnection.
UDR:	Unforced capacity delivery rights are rights granted to controllable lines to deliver generating capacity from locations outside the NYCA to Localities within NYCA.
Upstate New York:	The NYCA north of the interface between Upstate New York (UPNY) and southeastern New York (SENY).
Volt Ampere Reactive (VAr):	A measure of reactive power.
Weather Normalized:	Adjustments made to remove fluctuation due to weather changes when making energy and peak demand forecasts. Using historical weather data, energy analysts can account for the influence of extreme weather conditions and adjust actual energy use and peak demand to estimate what would have happened if the hottest day or the coldest day had been the typical, or "normal," weather conditions. Normal is usually calculated by taking the average of the previous 30 years of weather data.
Zone:	One of the eleven regions in the NYCA connected to each other by identified transmission interfaces. Designated as Load Zones A-K.