NEW YORK INDEPENDENT SYSTEM OPERATOR

2010 Reliability Needs Assessment

Comprehensive System Planning Process

DRAFT 1 REPORT

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NEW YORK INDEPENDENT SYSTEM OPERATOR

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Executive Summary

1. Introduction

Developed with NYISO stakeholders, the biennial Comprehensive System Planning Process (CSPP) combines the expertise of the NYISO and its stakeholders to assess and establish the bulk electricity grid's reliability needs, to develop and evaluate the solutions to maintain bulk power system reliability, to identify and assess congestion on the bulk power system, and to evaluate potential projects that mitigate such congestion. Each biennial cycle begins with the Local Transmission Planning Process (LTPP). The LTPP provides inputs for the NYISO's Reliability Planning Process. The NYISO then conducts the Reliability Needs Assessment (RNA). The RNA evaluates the adequacy and security of the bulk power system over a 10-year Study Period. In identifying resource adequacy needs, the NYISO identifies the amount of resources in megawatts (known as "compensatory megawatts") and the locations in which they are needed to meet those needs. After the RNA is complete, the NYISO requests and evaluates market-based and regulated backstop and alternative solutions to address the identified reliability needs. This step results in the development of the NYISO's Comprehensive Reliability Plan (CRP) for the 10-year Study Period. The next step of the CSPP is the completion of the Congestion Assessment and Resource Integration Study (CARIS) for economic planning. CARIS examines congestion on the New York bulk power system and the costs and benefits of alternatives to alleviate that congestion. During the second phase of this step, the NYISO will evaluate specific transmission project proposals for regulated cost recovery.

This document reports the RNA findings for the Study Period 2011-2020. If the RNA identifies a reliability need in the 10-year Study Period, the NYISO will designate one or more Responsible Transmission Owners (Responsible TOs) who are responsible for the development of a regulated backstop solution to address the identified need if the market should fail to respond. In addition, the NYISO will request market-based and alternative regulated solutions to address the identified need. Solutions must satisfy reliability criteria, including resource adequacy. Nevertheless, the solutions submitted to the NYISO do not have to be in the same amounts or locations used in the RNA to quantify the reliability needs. There are various combinations of resources and transmission upgrades that could meet the needs identified in the RNA. The reconfiguration of transmission facilities and/or modifications to operating protocols identified in the solution phase could result in changes and/or modifications of the needs identified in the RNA.

Continued reliability of the bulk power system during the Study Period depends on a combination of additional resources, provided by independent developers in response to market forces and by the electric utility companies are obligated to provide reliable and adequate service to their customers.. To maintain the system's long-term reliability, those resources must be readily available or in development to meet future needs. Just as important as the electric system plan is the process of planning itself. Electric system planning is an ongoing process of evaluating, monitoring and updating as conditions warrant. Along with addressing reliability, the CSPP is also designed to provide information that is both informative and of value to the New York wholesale electricity marketplace.

This report begins with an overview of the CSPP. The 2009 CRP and prior reliability plans are then summarized. The report continues with a summary of the 2010 RNA Base Case assumptions and methodology. Detailed analyses, data and results underlying the modeling assumptions are contained in the Appendices.

The report then presents the 2010 needs assessment wherein the NYISO finds, using Base Case assumptions, that New York State does not have bulk power system reliability needs during the Study Period from 2011 through 2020 that will need to be addressed by the CRP. One need is identified in the short circuit analysis, but possible solutions will be addressed within the applicable Class Year studies pursuant to Attachment S of the NYISO OATT. The RNA then analyzes certain scenarios to test the robustness of the system and the conditions under which needs would arise. Attention is given to risks that may give rise to reliability needs, including unusually high loads, unexpected plant retirements, and delay in implementation of state-sponsored energy efficiency programs. Accordingly, while this RNA reports that while the NYISO will not need to request market-based and regulated backstop solutions this year, it will continue to monitor the bulk power system for risks to this assessment. The NYISO will address any newly identified reliability need in the subsequent RNA or, if necessary, issue a request for a Gap solution. Most importantly, the NYISO will continue to monitor the progress of the market-based solutions submitted in earlier CRPs, State energy efficiency program implementation, the ongoing developments in State and Federal environmental regulatory programs, transmission owner projects identified in the LTPs and other planned projects on the bulk power system to determine that these projects progress as expected and that any delays will not adversely impact system reliability.

Finally, the NYISO will issue a 2010 CRP based upon this RNA report. This RNA report also provides the latest information available regarding the past five years of congestion via a link to the NYISO's website. This historic congestion information is provided to the market place for informational purposes. The NYISO completed its first forward-looking economic planning assessment of future congestion in the CARIS process in January 2010, which was based upon the 2009 CRP. The 2010 CRP will be the foundation for the next CARIS report.

1.1. Related Planning Activities

To Be Updated in Future Revision

2. The CSPP's Reliability Planning Process and Summary of Prior RNA/CRPs

This section presents an overview of the CSPP' Reliability Planning Processes followed by a summary of the 2005, 2007, 2008 and 2009 CRPs and their current status[1]. A detailed discussion of the Reliability Planning Process, including applicable reliability criteria, is contained in NYISO Manual 26 entitled: "Comprehensive Reliability Planning Process Manual," which is posted on the NYISO's website and can be accessed at the following link:

http://www.nyiso.com/public/webdocs/documents/manuals/planning/CRPPManual120707.pdf.

2.1. Overview of the Reliability Planning Process

The NYISO's Reliability Planning Process 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. As an integral part of the CSPP, the Local Transmission Owner Planning Process (LTPP) provides opportunities for stakeholders to have input into each Transmission Owner's system specific plans, which, in turn, are input used in the RNA. Links to the Transmission Owner's LTPs can be found on the NYISO's website at:

NYISO (Markets & Operations - Services - Planning - Long Term Transmission Planning)

There are two different aspects to analyzing the bulk power system's reliability in the RNA: adequacy and security. Adequacy is a planning and probabilistic concept. A system is adequate if the probability of having sufficient transmission and generation to meet expected demand is equal to or less than the system's standard, which is expressed as a loss of load expectation (LOLE). The New York State bulk power system is planned to meet an LOLE that, at any given point in time, is less than or equal to an involuntary load disconnection that is not more frequent than once in every 10 years, or 0.1 days per year. This requirement forms the basis of New York's installed capacity (ICAP), or resource adequacy requirement.

Security is an operating and deterministic concept. This means that possible events are identified as having significant adverse reliability consequences, and the system is

[1] The first CRP was entitled the "2005 Comprehensive Reliability Plan," while the second CRP, released the following year, was entitled the "2007 Comprehensive Reliability Plan." A year was skipped in the naming convention because the title of the first CRP, which covered the Study Period 2006-2015, designated the year the study assumptions were derived, or 2005, but for the second CRP a different year designation convention was adopted, which identified the first year of the Study Period. The latter naming convention continue to be applied to for the 2008 and 2009 CRP documents. However, the original naming convention is used for the 2010 CRP and subsequent CRP documents.

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. N is the number of system components; an N-1 requirement means that the system can withstand single disturbance events (e.g., one component outage) without violating thermal, voltage and stability limits or before affecting service to consumers. N-1-1 means that the reliability criteria apply after any critical element such as a generator, transmission circuit, transformer, series or shunt compensating device, or high voltage direct current (HVDC) pole has already been lost, and after generation and power flows have been adjusted between outages by the use of 10-minute operating reserve and, where available, phase angle regulator control and HVDC control. Each control area usually maintains a list of critical elements and most severe contingencies that need to be assessed.

The CSPP is anchored in the market-based philosophy of the NYISO and its Market Participants, which posits that market solutions should be the preferred choice to meet the identified reliability needs reported in the RNA. In the CRP, the reliability of the bulk power system is assessed and solutions to reliability needs 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. These criteria and a description of the nature of long-term bulk power system planning are described in detail in the CRPP Manual, and are briefly summarized below. 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 Responsible TOs to proceed with a regulated backstop solution in order to maintain system 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 Responsible TO's regulated backstop solutions[2]. Under the CSPP, the NYISO also has an affirmative obligation to report historic congestion across the transmission system. In addition, the draft RNA is provided to the Independent Market Advisor for review and consideration of whether the market rules changes are necessary to address an identified failure, if any, in one of the NYISO's competitive markets. 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 and Independent Market Advisor. The CSPP does not substitute for the planning that each TO conducts to maintain the reliability of its own bulk and non-bulk power systems.

The NYISO does not have the authority to license or construct projects to respond to identified reliability needs reported in the RNA. The ultimate approval of those projects lies with regulatory agencies such as the FERC, the NYSPSC, 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 reliability planning process

[2] The procedures for reviewing alternative regulated solutions for a reliability need are currently being discussed in NYPSC Case 07-E-1507.

and Figure 2-2 summarizes the economic planning process which collectively comprises the CSPP process.

The 2010 CRP will form the basis for the NYISO's economic planning process. That process will examine congestion on the New York bulk power system and the costs and benefits of alternatives to alleviate that congestion.

NYISO Reliability Planning Process

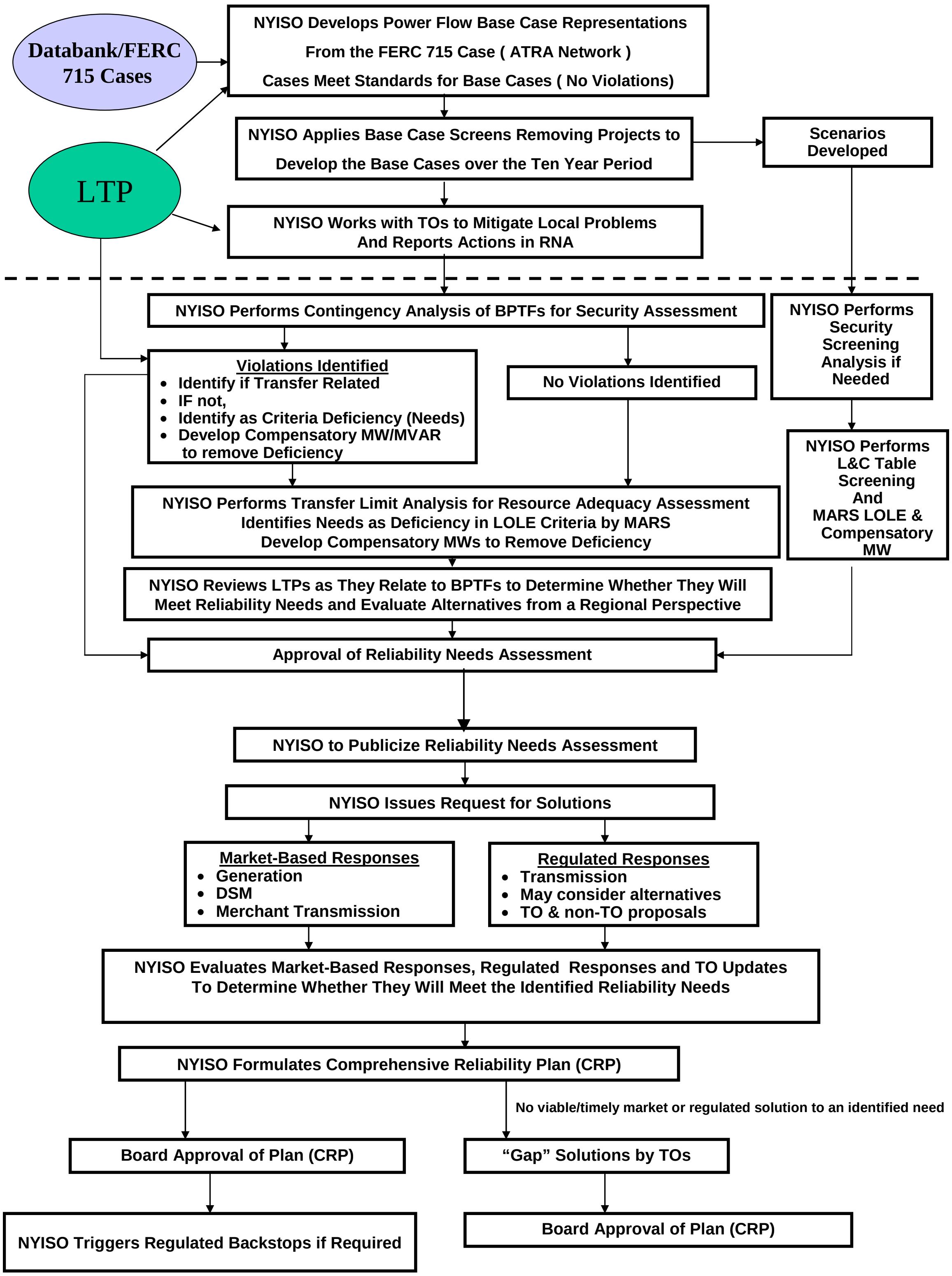


Figure 2-1: NYISO Reliability Planning Process

NYISO Comprehensive System Planning Process (CSPP) Economic Planning Process (CARIS)

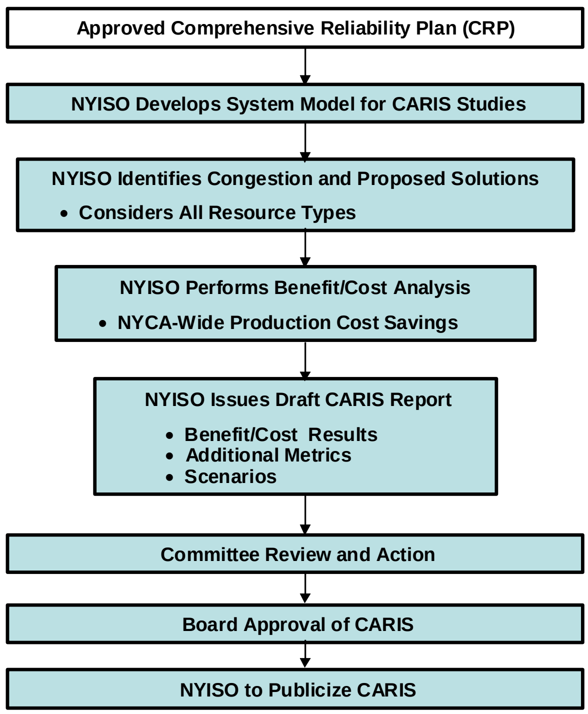


Figure 2-2: Economic Planning Process

2.2. Summary of Prior CRPs

This is the fifth RNA since the NYISO's planning process was approved by FERC in December 2004. The 2005 CRP, which was approved by the NYISO Board of Directors in August 2006, identified 3,105 MW of resource additions needed through the 10-year Study Period ending in 2015. Market solutions totaled 1,200 MW, with the balance provided by updated Transmission Owners' (TOs) plans. The 2007 CRP, which was approved by the NYISO Board of Directors in September 2007, identified 1,800 MW of resource additions needed over the 10-year Study Period ending in 2016. Proposed market solutions totaled 3,007 MW, in addition to updated Transmission Owners' (TOs) plans. The 2008 CRP, which was approved by the NYISO Board of Directors in July 2008, identified 2,350 MW of resource additions needed through the 10-year Study period ending in 2017. Market solutions totaling 3,380 MW were submitted to meet these needs. The 2009 CRP, which was approved by the NYISO Board of Directors in January 2009, identified that there were no resource addition needs through the 10-year Study period ending in 2018. Therefore, market solutions were not requested. The NYISO has not had to trigger any regulated backstop solutions to meet reliability needs.

Table 2-1 presents the market solutions and TOs' plans that were submitted in response to requests for solutions and were included in the 2008 CRP. The table also indicates that 2,115 MW of solutions are either in-service or are still being reported to the NYISO as moving forward with the development of their projects. Although the 2009 CRP did not identify any needs, as a risk mitigation measure, the NYISO has continued to monitor the market based solutions submitted for the 2008 CRP continued to be monitored throughout 2009 and 2010. It should be noted that there are a number of other projects in the NYISO queue that are also moving forward with the interconnection process, but that have not been offered as market solutions in this process. Some of these additional resources are listed in Table 2-2. These projects have either accepted their cost allocation as part of the Facilities Study process or are currently included in the 2009 or 2010 Facilities Class Year. Both tables note the projects that meet the RNA Base Case inclusion rules.

Table 2-1: Current Status of Tracked Market – Based Solutions and TOs' Plans Included in the 2008 CRP

Project Type	NYISO Queue #	Submitted	MW	Zone	Original In-Service Date	Current Status[1]	Included in 2010 RNA Base Case?
Resource Proposals							
Gas Turbine NRG Astoria Re-powering[2]	**201 and 224**	CRP 2005, CRP 2007, CRP 2008	520 MW	J	Jan - 2011	New Target June 2012	No
Simple Cycle GT Indian Point		CRP 2007, CRP 2008	300	H	May - 2011	Withdrawn	No
Empire Generation Project	**69**	CRP 2008	635	F	Q1 2010	New Target July 2010 Under Construction	Yes
Transmission Proposals							
Controllable AC Transmission Linden VFT	**125**	CRP 2007, CRP 2008	300 (No specific capacity identified)	PJM - J	Q4 2009 PJM Queue G22	Placed In-Service November, 2009	Yes
Back-to-Back HVDC, AC Line HTP	**206**	CRP 2007, CRP 2008 and was an alternative regulated proposal in CRP 2005	660 (500 MW specific capacity identified)	PJM - J	Q2/2011 PJM Queue O66	New Target Q2 2012 Article VII Pending	No
Cross Hudson	**255**	CRP 2008	550	J	Jun - 2010	Withdrawn as Solution Replaced with queue # 295	No
Cross Hudson II	**295**	CRP 2008	800	J	Jun - 2010	Project No Longer Considered Viable as Solution	No
TOs' Plans							
ConEd M29 Project	**153**	CRP 2005	N/A	J	May - 2011	On Target Under Construction	Yes
Caithness	**107**	CRP 2005	310	K	Jan - 2009	Placed In-Service August, 2009	Yes
Millwood Cap Bank	**N/A**	CRP 2007	240 MVAr	H	Q1 2009	Placed In-Service May, 2009	Yes

[1] Status as provided by Market Participant as of March 31, 2010

[2] NRG sumbitted three proposals, one of them was withdrawn. For the purposes of the Market-Based solutions' evaluation NYISO assumed the lowest MW proposal. There is a retirement of 112 MWs at this location reflected in the base case.

Table 2-2: Proposed Resources per 2010 Gold Book
(updated to reflect most current information as noted)

Queue	Developer	Project Name	POI	CTO	Zone	Rating (MW)	CRIS (MW) (1)	UNIT TYPE	Completed Class Year
		Completed Class Year Facilities Study							
19	NYC Energy LLC	NYC Energy LLC	Kent Ave 138kV	ConEd	J	79.9	79.9	Combustion Turbine(s)	2002
69	Empire Generating Company, LLC (2)	Empire Generating	Reynolds Road 345kV	NM-NG	F	635.0	635.0	Combined Cycle	2003-05
119	ECOGEN, LLC	Prattsburgh Wind Farm	Eelpot Rd-Flat St. 115kV	NYSEG	C	78.2	78.2	Wind Turbines	2003-05
127A	Airtricity Munnsville Wind Farm, LLC	Munnsville	OriskanyTap-MorrisvilleTap 46kV	NYSEG		40.0			2006
147	NY Windpower, LLC	West Hill Windfarm	Oneida-Fenner 115kV	NM-NG	C	31.5	31.5	Wind Turbines	2006
156	PPM Energy/Atlantic Renewable	Fairfield Wind Project	Valley-Inghams 115kV	NM-NG	E	74.0	74.0	Wind Turbines	2006
161	Marble River, LLC	Marble River Wind Farm	Willis-Plattsburgh WP-1 230kV	NYPA	D	84.0	84.0	Wind Turbines	2006
166	AES-Acciona Energy NY, LLC	St. Lawrence Wind Farm	Lyme Substation 115kV	NM-NG	E	79.5	79.5	Wind Turbines	2007
171	Marble River, LLC	Marble River II Wind Farm	Willis-Plattsburgh WP-2 230kV	NYPA	D	132.3	132.3	Wind Turbines	2006
182	Howard Wind, LLC	Howard Wind	Bennett-Bath 115kV	NYSEG	C	62.5	62.5	Wind Turbines	2007
185	New York Power Authority (2)	Blenheim Gilboa Storage	Gilboa 345 kV	NYPA	F	incr 120	120.0	Pump storage	2006
186	Jordanville Wind, LLC	Jordanville Wind	Porter-Rotterdam 230kV	NM-NG	E	80.0	80.0	Wind Turbines	2006
197	PPM Roaring Brook, LLC/PPM	Tug Hill	Boonville-Lowville 115kV	NM-NG	E	78.0	0.0	Wind Turbines	2008
206	Hudson Transmission Partners	Hudson Transmission	West 49th Street 345kV	ConEd	J	660.0	660.0	DC/AC	2008
207	BP Alternative Energy NA, Inc.	Cape Vincent	Rockledge Substation 115kV	NM-NG	E	210.0	0.0	Wind Turbines	2008
213	Noble Environmental Power, LLC	Ellenburg II Windfield	Willis-Plattsburgh WP-2 230kV	NYPA	D	21.0	21.0	Wind Turbines	2007
216	Nine Mile Point Nuclear, LLC (2)	Nine Mile Point Uprate	Scriba Station 345kV	NM-NG	C	incr 168	0.0	Nuclear Uprate	2008
231	Seneca Energy II, LLC (3)	Seneca	Goulds Substation 34.5kV	NYSEG	C	incr 6.4 (total 24 MW)	0.0	Methane	2008
234	Steel Winds, LLC (2)	Steel Winds II	Substation 11A 115kV	NM-NG	A	15.0	0.0	Wind Turbines	2008

Class 2009 Projects

~~142~~	~~EC&R Northeast, LLC~~ (4)	~~Steuben Wind~~	~~Bennett-Palmiter 115kV~~	~~NYSEG~~	~~C~~	~~50.0~~	~~TBD~~	~~Wind Turbines~~	~~CY09 in progress~~
222	Noble Environmental Power, LLC	Ball Hill	Dunkirk-Gardenville 230kV	NM-NG	A	90.0	TBD	Wind Turbines	CY09 in progress
232	Bayonne Energy Center, LLC (2)	Bayonne Energy Center	Gowanus 345kV	ConEd	J	512.0	TBD	Dual Fuel	CY09 in progress
245	Innovative Energy Systems Inc.	Fulton County Landfill	Ephratah – Amsterdam 69kV	NM-NG	F	3.2	TBD	Methane	CY09 in progress
251	CPV Valley, LLC	CPV Valley	Coopers – Rock Tavern 345kV	NYPA	G	630.0	TBD	Combined Cycle	CY09 in progress

Class 2010 Projects

237	Allegany Wind, LLC	Allegany Wind	Homer Hill – Dugan Rd. 115kV	NM-NG	A	72.5	TBD	Wind Turbines	CY10 in progress
254	Ripley-Westfield Wind, LLC	Ripley-Westfield Wind	Ripley - Dunkirk 230kV	NM-NG	A	124.8	TBD	Wind Turbines	CY10 in progress
260	Beacon Power Corporation (2)	Stephentown	Greenbush - Stephentown 115kV	NYSEG	F	20.0	0.0	Flywheel	CY10 in progress
261	Astoria Generating Company	South Pier Improvement	Gowanus 138 kV Switchyard	ConEd	J	95.5	TBD	Combustion Turbine(s)	CY10 in progress
263	Stony Creek Wind Farm, LLC (5)	Stony Creek Wind Farm	Stolle Rd - Meyer 230kV	NYSEG	C	88.5	TBD	Wind Turbines	CY10 in progress
266	NRG Energy, Inc.	Berrians GT III	Astoria (Poletti) 345kV	NYPA	J	789.0	TBD	Combustion Turbine(s)	CY10 in progress
308	Astoria Energy II, LLC (2)	Astoria Energy II	Astoria (Poletti) 345kV	NYPA	J	650.0	TBD	Combined Cycle	CY10 in progress
330	BP Solar	Upton Solar Farms	Brookhaven 8ER 69kV Substation	LIPA	K	32.0	TBD	Solar	CY10 in progress

Other Non-Class Generators

	Riverbay Corporation (2) (6)	Co-op City			J	40.0	40.0	Gas Turbine	N/A
180A	Green Power	Cody Road	Fenner - Cortland 115kV	NM-NG	C	10.0	10.0	Wind Turbines	N/A
204A	Duer's Patent Project, LLC	Beekmantown Windfarm	Kent Falls-Sciota 115kV	NYSEG	D	19.5	19.5	Wind Turbines	N/A
250	Seneca Energy II, LLC	Ontario	Haley Rd. - Hall 34.5kV	NYSEG	B	6.4	TBD	Methane	N/A

Notes:

(1) CRIS caps reflect capacity level of the unit that is deemed deliverable. See Definitions of Labels on Load & Capacity Schedule (Sec. V) for

(2) Included in 2010 RNA Base Case

(3) Seneca Energy II/ Seneca was added back to the Class Year 2008

(4) Steuben Wind gave notice May 6, 2010 to withdraw from queue

(5) Stony Creek Wind revised their capacity from 142.5 MW to 88.5 MW.

(6) Since Riverbay will be serving its own load, only 24 MW is available as capacity

3. RNA Base Case Assumptions, Drivers and Methodology

The NYISO has established procedures and a schedule for the collection and submission of data and for the preparation of the models used in the RNA. The NYISO's procedures are designed to allow its planning activities associated with the CSPP to be aligned and coordinated with the related activities of the NERC, NPCC, and NYSRC and to be performed in an open and transparent manner. The assumptions underlying the RNA were reviewed at the Transmission Planning Advisory Subcommittee (TPAS) and the Electric System Planning Working Group (ESPWG). The RNA Base Case consists of the Five Year Base Case and the second five years of the Study Period. The Study Period analyzed in the 2010 RNA is the 10-year period from 2011 through 2020. The load models developed for the RNA Base Case are based on the load forecast from the 2010 Load and Capacity Data report, also known as the "Gold Book". The Five Year Base Case was developed based on: 1) the most recent Annual Transmission Reliability Assessment (ATRA) Base Case, 2) input from Market Participants, and (3) the procedures set forth in the CRPP Manual.

The NYISO developed the system representation for the second five years of the Study Period starting with the First Five Year Base Case and using: 1) the most recent Load and Capacity Data Report published by the NYISO on its Web site; 2) the most recent versions of NYISO reliability analyses and assessments provided for or published by NERC, NPCC, NYSRC, and neighboring control areas; 3) information reported by neighboring control areas such as power flow data, forecasted load, significant new or modified generation and transmission facilities, and anticipated system conditions that the NYISO determines may impact the bulk power transmission facilities (BPTF);
4) Market Participant input; and 5) procedures set forth in the CRPP manual. Based on this process, the network model for the second five-year period incorporates TO and neighboring system plans in addition to those incorporated in the Five Year Base Cases. The changes in the MW and MVAr components of the load model were made to maintain a constant power factor.

The 2010 RNA Base Case model of the New York bulk power system includes the following new and proposed facilities and forecasts in the Gold Book:

- TO projects on non-bulk power facilities included in the FERC 715 Cases
- Facilities that have accepted their Attachment S cost allocations and are in service or under construction as of April 1, 2010
- Facilities that have obtained a PSC Certificate (or other regulatory approvals and SEQRA review) and an approved System Reliability Impact Study ("SRIS") and an executed contract with a credit-worthy entity.
- Transmission upgrades related to any projects and facilities that are included in the RNA Base Case, as defined above
- TO plans identified in the 2010 Gold Book as firm plans
- Facility reratings and uprates

- Scheduled retirements
- Special Case Resources (SCR) and the impacts of the NYSPSC EEPS Order, as developed and reviewed at the ESPWG
- External System Modeling.

The RNA Base Case does not include all projects currently listed on the NYISO's interconnection queue or those shown in the 2010 Gold Book. It includes only those which meet the screening requirements for inclusion.

3.1. RNA Base Case Assumptions and Drivers

Forecasts for peak load and energy as well as the impacts of programs such as EEPS and SCRs were developed for the 10-year study period. Projections for the installation and retirement of resources and transmission facilities are developed in conjunction with Market Participants and Transmission Owners and included in the Base Case. Resources that may choose to participate in markets outside of New York are modeled as contracts thus removing their available capacity for meeting resource adequacy requirements in New York.

3.2. Impact of Energy Efficiency Programs on the Load Forecast

The 2010 Gold Book contains two forecasts. The first forecast, which includes an adjustment for the statewide energy efficiency programs described below, is also the base case forecast for the 2010 RNA. The energy efficiency impacts reflect an achievement of 50% of the entire EEPS goal by the end of the forecast horizon in 2020. The second 2010 Gold Book forecast is an econometric forecast of annual energy and peak demand that does not account for the impacts of the State's EEPS programs.

As part of the EEPS Proceeding, the NYSPSC directed a series of working groups composed of all interested parties to the proceeding to obtain information needed to further elaborate the goal. The NYSPSC issued an Order on June 23, 2008, setting short-term goals for programs to be implemented in the 2008-2011 period to begin the process of satisfying the NYSPSC's goal as applied to the entities over which it has jurisdiction. The NYSPSC anticipated that LIPA and NYPA and other state agencies would implement their own programs, including energy efficiency, improvements in building codes and new appliance standards.

The NYISO has been a party to the EEPS proceeding from its inception and is a member of the Evaluation Advisory Group, responsible for advising the DPS on the methods to be used to track program participation and measure the program costs, benefits, and impacts on electric energy usage. In conjunction with market participants in the Electric System Planning Working Group, the NYISO developed load forecasts for the potential impact of the EEPS over the 10-year planning period. The following factors were considered in developing the 2010 RNA Base Case forecast:

- NYSPSC-approved spending levels for the programs under its jurisdiction, including the Systems Benefit Charge and utility-specific programs
- Expectation of increased spending levels after 2011
- Expected realization rates, participation rates and timing of planned energy efficiency programs
- Degree to which energy efficiency is already included in the NYISO's econometric load forecast
- Impacts of new appliance efficiency standards, and building codes and standards
- Specific energy efficiency plans proposed by LIPA, NYPA and Consolidated Edison Company of New York, Inc. (Con Edison)

Table 3-1 below summarizes the 2010 Gold Book econometric forecast, the 2010 RNA Base Case forecast and a 2010 15x15 forecast. The 15x15 energy forecast for 2015 is 157,380 GWH, the same as it was in the 2009 RNA and represents a 15% reduction from the 2015 econometric forecast current at that time. Since then, the 2015 forecast has been reduced by 8,976 GWh due to the 2009 recession and lower economic growth projections, compared to the 2009 RNA. That is why the energy savings in 2015 for the 15x15 case are only 17,906 GWh instead of 26,880 GWh.

Table 3-1 - RNA Forecast Scenarios

Annual GWh	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010 High Load Scenario	161,334	163,305	166,616	170,360	172,969	175,286	177,827	179,844	182,172	184,540	187,015
2010 RNA Base Case	160,358	160,446	161,618	163,594	164,556	165,372	166,472	167,517	169,132	171,161	173,332
2010 15x15 Scenario	159,914	159,402	158,892	158,384	157,877	157,380	159,660	161,469	163,558	165,682	167,902

EEPS Energy Impacts

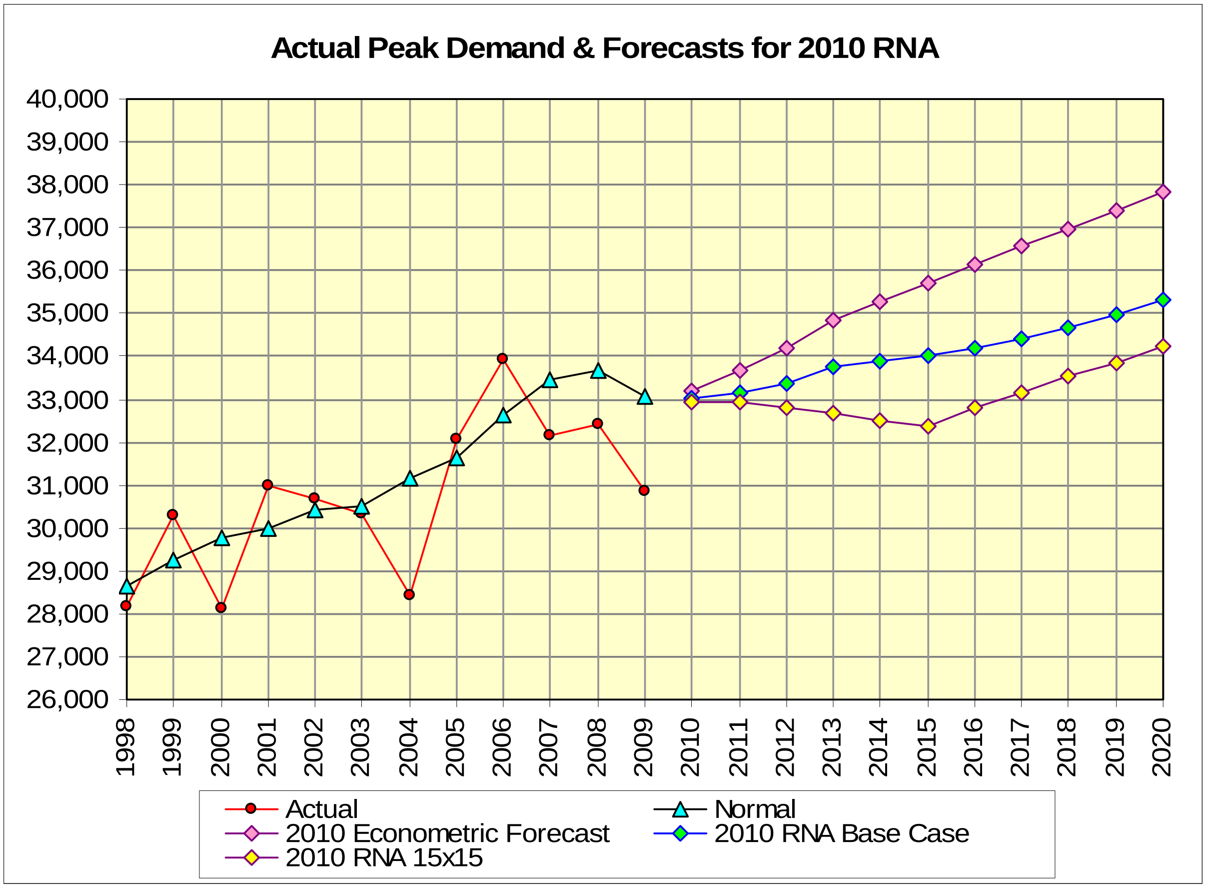
Cumulative GWh	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010 RNA Base Case	976	2,860	4,997	6,765	8,413	9,914	11,355	12,327	13,040	13,379	13,684
2010 15x15 Scenario	1,420	3,903	7,723	11,976	15,092	17,906	18,167	18,375	18,615	18,858	19,113

Annual MW	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010 High Load Scenario	33,199	33,651	34,192	34,844	35,285	35,696	36,147	36,565	36,983	37,401	37,843
2010 RNA Base Case	33,025	33,160	33,367	33,737	33,897	34,021	34,193	34,414	34,672	34,986	35,334
2010 15x15 Scenario	32,934	32,945	32,805	32,662	32,521	32,377	32,794	33,172	33,529	33,866	34,227

EEPS Demand Impacts

Cumulative MW	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2010 RNA Base Case	174	491	825	1,107	1,388	1,675	1,954	2,151	2,311	2,415	2,510
2010 15x15 Scenario	266	706	1,387	2,181	2,764	3,320	3,353	3,393	3,453	3,535	3,616

Figure 3-1: 2010 Base Case Forecast and Scenarios



3.3. Forecast of Special Case Resources

The SCR forecast for the 2010 RNA Base Case was based on the 2010 Gold Book value of 2251 MW. This value was modeled in the Emergency-Operating-Procedure-Data by SCR load (second step of EOPs) specified as a per unit of area load and SCR generation (third step of EOPs) specified in MWs. An annual profile of SCR EOP data was developed for each area and each month of a year. This annual profile was used for each year, 2011 through 2020. Its impact can be seen in the RNA Load and Resource Margin Table (Table 3-6) below. From an ICAP perspective, this represents an approximate increase of 167 MW of resource capacity over the 2009 RNA.

3.4. Resource Additions

Table 3-3 presents the unit additions, which were represented in the RNA Base Case.

3.5. TO Firm Plans

Table 3-4 presents all of the firm transmission plans that were included the 2010 Gold Book and were included in the RNA Base Case.

Table 3-3: Unit Additions

	Queue	Project Name	2010	2011	2012	2013	Total MW
New Thermal Units							
	69	Empire Generating (July 2010) (3)	635				635
	232	Bayonne Energy (June 2011)		512.5			512.5
	308	Astoria Energy II (June 2011)		550			550
	237A	Chautauqua Landfill (Feb 2010)	6.4				6.4
	N/A(1)	Riverbay (June 2010) (3)	24				24
		New Thermal Units Sub-Total	**665.4**	**1062.5**	**0**	**0**	**1727.9**
New Wind							
	234	Steel Winds II (Nov 2010) (3)	15				15
		New Wind Sub-Total	**15**	**0**	**0**	**0**	**15**
Unit Uprates							
	185	Blenheim-Gilboa Unit 4 uprate (June 2010) (3)	30				30
	216	Nine Mile Point II (June 2012) (3)			168		168
	127A	Munnsville Wind Power (Dec 2013) (3)				6	6
		Unit Uprates Sub-Total	**30**	**0**	**168**	**6**	**204**
Other							
	260	Stephentown 20 MW Flywheel (Sept. 2010)(2)					
Retired Units							
		Retired Units	**0**	**0**	**0**	**0**	**0**
		Grand Total	**710.4**	**1062.5**	**168**	**6**	**1946.9**

Notes:
(1) Riverbay did not go through the NYISO Interconnection study process since it is connected to a non-FERC jurisdictional line. Only the available capacity is shown.
(2) Stephentown is modeled as a regulation resource.
(3) Included in 2009 RNA

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Table 3-4: Firm Transmission Plans (2010 Gold Book)

Queue Pos.	Transmission Owner	Terminals		Line Length miles (1)	Expected Service Date/Yr Prior to (2)	Year	Nominal Voltage in kV Operating	Design	# of ckts	Thermal Ratings* Summer	Winter	Project Description (10) / Conductor Size	Class Year / Type of Construction
	Merchant												
206	Hudson Transmission Partners	Bergen 230 kV (New Jersey)	West 49th Street 345kV			2011	345	345		660 MW	660 MW	back- to- back AC/DC/AC converter, 345 kV AC cable	2008
	Firm Plans (included in 2010 RNA)												
	CHGE	E. Fishkill	E. Fishkill	xfmr #2	S	2010	345/115	345/115	1	440MVA	560MVA	Transformer #2 (Standby)	
	CHGE	Hurley Ave	Saugerties	11.11	W	2018	115	115	1	1114	1359	1-795 ACSR	OH
	CHGE	Saugerties	North Catskill	12.25	W	2018	115	115	1	1114	1359	1-795 ACSR	OH
	CHGE	Hurley Ave	North Catskill	23.36	S	2020	115	115	1	1114	1359	1-795 ACSR	OH
	CHGE (4)	Pleasant Valley	Todd Hill	5.60	S	2015	115	115	1	1280	1563	1-795 ACSR	OH
	CHGE (4)	Todd Hill	Fishkill Plains	5.23	S	2015	115	115	1	1280	1563	1-795 ACSR	OH
	ConEd	Sprain Brook	Sherman Creek	10.00	S	2011	345	345	1	872	1010	2000 CU	UG
	ConEd	Vernon	Vernon	Phase Shifter	S	2012	138	138	1	300MVA	300MVA	Phase Shifter	-
	ConEd	Farragut	East 13th Street	1.98	S	2010	345	345	1	1350	n/a	Refrigeration Cooling	UG
	ConEd	Farragut	East 13th Street	1.98	S	2010	345	345	1	1395	n/a	Refrigeration Cooling	UG
	LIPA	Riverhead	Canal	16.40	S	2012	138	138	1	846	973	2368 KCMIL (1200 mm^2) Copper XLPE	UG
	NYPA (5)	Willis 1	Duley	-24.38	S	2011	230	230	1	996	1200	1-795 ACSR	OH
	NYPA (5)	Willis 1	Patnode	9.10	S	2011	230	230	1	996	1200	1-795 ACSR	OH
	NYPA (5)	Patnode	Duley	15.27	S	2011	230	230	1	996	1200	1-795 ACSR	OH
	NYSEG (6)	Wood Street	Carmel	1.34	S	2012	115	115	1	775	945	477 ACSR	OH
	NYSEG (6)	Wood Street	Katonah	11.70	S	2012	115	115	1	775	945	477 ACSR	OH
	NYSEG (4)	Etna	Clarks Corners	14.95	W	2010	115	115	1	1410	1725	1277 KCM ACAR	OH
	NYSEG	Etna	Clarks Corners	14.95	W	2010	115	115	1	1410	1725	1277 KCM ACAR	OH
	NYSEG	Clarks Corners	Clarks Corners	xfmr	W	2010	345/115	345/115	1	200MVA	220MVA	Transformer	
	NYSEG	Clarks Corners	Clarks Corners	xfmr	W	2010	345/115	345/115	1	200MVA	220MVA	Transformer	
	NYSEG	Avoca	Stony Ridge	20.10	S	2011	230	230	1	1200	1200	1033.5 ACSR	OH
	NYSEG	Stony Ridge	Hillside	26.70	S	2011	230	230	1	1200	1200	1033.5 ACSR	OH
	NYSEG	Stony Ridge	Stony Ridge	xfmr	S	2011	230/115	230/115	1	225MVA	270MVA	Transformer	OH
	NYSEG	Stony Ridge	Sullivan Park	6.20	S	2011	115	115	1	1255	1531	1033.5 ACSR	OH
	NYSEG	Sullivan Park	West Erie	3.20	S	2011	115	115	1	1255	1531	1033.5 ACSR	OH
	NYSEG	Meyer	Meyer	Cap Bank	S	2011	115	115	1	15MVAr	15MVAr	Capacitor Bank Installation	-
	NGRID	Paradise Ln 115 kV	Paradise Ln 115 kV	-	S	2012	-	-	-	-	-	115 kV Switchyard	-
	NGRID	Spier	Rotterdam	7.80	S	2010	115	115	1	1114	1359	Replace 7.8 miles of 795kcmil ACSR (Brook-Balstn Tps)	OH
	NGRID	Spier	Luther Forest (New Station)	33.50	W	2010	115	115	1	TBD	TBD	Spier-Rotterdam Loop (2.8 miles new)	OH+UG
	NGRID	Luther Forest (New Station)	Rotterdam	19.90	W	2010	115	115	1	TBD	TBD	Spier-Rotterdam Loop (2.8 miles new)	OH+UG
	NGRID	Mohican	Luther Forest (New Station)	39.00	W	2010	115	115	1	TBD	TBD	Mohican-North Troy #3 Loop w/Mulb Tap (5.9 miles new)	OH
	NGRID	Luther Forest (New Station)	North Troy	17.90	W	2010	115	115	1	TBD	TBD	Mohican-North Troy #3 Loop w/Mulb Tap (5.9 miles new)	OH
	NGRID	Gardenville	Homer Hill	21.00	S	2011	115	115	2	TBD	TBD	115 kV line Replacement	-
	O & R	Ramapo	Sugarloaf	16.00	W	2010	138	138	1	1089	1298	2-1590 ACSR	OH
	O & R	Hillburn	Sloatsburg	3.00	W	2010	69	69	1	1982	2364	2- 795 ACSR	OH
	RGE	Station 135	Station 424	4.98	W	2010	115	115	1	1225	1495	1-1033.5 ACSR	OH
	RGE	Station 13A	Station 135	3.17	W	2010	115	115	1	1225	1495	1-1033.5 ACSR	OH
	RGE	Station 180	Station 180	Cap Bank	S	2011	115	115	1	10MVAr	10MVAr	Capacitor Bank Installation	-
	RGE	Station 128	Station 128	Cap Bank	S	2011	115	115	1	20MVAr	20MVAr	Capacitor Bank Installation	-
	RGE	Station 124	Station 124	Phase Shifter	S	2013	115	115	2	250MVA	250MVA	Phase Shifter	
	RGE	Station 124	Station 124	SVC	S	2013	115	115	1	200MVAr	200MVAr	SVC	

(1) Line Length Miles - negative values indicate removal of Existing Circuit being tapped
(2) S = Summer Peak Period W = Winter Peak Period
(3) Class 2009 - in progress
(4) Reconductoring of Existing Line
(5) Segmentation of Existing Circuit
(6) 115 kv operation as opposed to previous 46 kV operation
(7) Upgrade of existing 69 kV to 138 kV operation
(8) Partial NNC upgrade done in 2008 and full NNC upgrade will be done in 2016 with NNC 450 MW Operation (including Northport-Pilgrim Upgrade)
(9) Rerate of the (3 cables) that were replaced in 2008 from 301 MVA, LIPA owns 50% of the NNC cable
Some of these proposed facilities reflect reconfiguration of the existing facilities
* Thermal Ratings in Amperes, except where labeled otherwise.

3.6. Resource Retirements

Table 3-5 below presents the unit retirements which were represented in the 2010 RNA Base Case:

Table 3-5: Scheduled Unit Retirements *

Unit/ Year	2009	2010	
Poletti**		890.7	
Greenidge 3	52.2		
Westover 7	40.2		
Total MW	**92.4**	**890.7**	**983.1**

** Unit retirements included in 2009 RNA

3.7. Base Case Load and Resource Margins

The unit retirements and additions, when combined with the existing generation as of April 1, 2010 in the 2010 Gold Book and other adjustments, resulted in the 2010 RNA Base Case Load and Resource Margins found in Table 3-6 below:

Table 3-6: NYCA Load and Resource Margins 2011 through 2020

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2009 RNA 2018
Peak Load											
NYCA	**33,160**	**33,367**	**33,737**	**33,897**	**34,021**	**34,193**	**34,414**	**34,672**	**34,986**	**35,334**	**35,658**
Zone J	11,775	11,815	11,925	11,995	12,065	12,120	12,218	12,298	12,404	12,510	12,980
Zone K	5,384	5,432	5,455	5,470	5,489	5,554	5,586	5,631	5,685	5,771	5,383
Resources											
NYCA											
Capacity	40,397	40,689	41,380	41,330	41,330	41,330	41,330	41,330	41,330	41,330	40,452
SCR	2,065	2,091	2,151	2,165	2,171	2,180	2,193	2,210	2,230	2,251	2,084
Total	**42,462**	**42,780**	**43,531**	**43,495**	**43,501**	**43,510**	**43,523**	**43,540**	**43,560**	**43,581**	**42,536**
Res./Load Ratio	128.1%	128.2%	129.0%	128.3%	127.9%	127.2%	126.5%	125.6%	124.5%	123.3%	119.3%
Zone J											
Capacity	10,032	10,123	10,123	10,123	10,123	10,123	10,123	10,123	10,123	10,123	9,206
SCR	569	571	576	580	583	586	591	594	600	605	622
Total	**10,601**	**10,694**	**10,699**	**10,703**	**10,706**	**10,709**	**10,714**	**10,717**	**10,723**	**10,728**	**9,828**
Res./Load Ratio	90.0%	90.5%	89.7%	89.2%	88.7%	88.4%	87.7%	87.1%	86.5%	85.8%	75.7%
Zone K											
Capacity	5,551	5,551	5,551	5,551	5,551	5,551	5,551	5,551	5,551	5,551	6,368
SCR	188	189	190	191	191	193	195	196	198	201	216
Total	**5,739**	**5,740**	**5,741**	**5,742**	**5,742**	**5,744**	**5,746**	**5,747**	**5,749**	**5,752**	**6,584**
Res./Load Ratio	106.6%	105.7%	105.2%	105.0%	104.6%	103.4%	102.9%	102.1%	101.1%	99.7%	122.3%

NYCA "Capacity" values include resources electrically internal to NY, Additions, Reratings, Retirements, Purchases and Sales, and UDRs with firm capacity. Generation resources are based on Summer Capability and not Nameplate.

Zone J and K "Capacity" values include UDRs with firm capacity. Does not include Purchases and Sales

SCR values reflect projected August 2010 ICAP capability period values (which are adjusted for the annual growth rate of 8.41%).

Table 3-7 below presents the comparison between the 2009 RNA and 2010 RNA in load forecast, unit additions, unit retirements, and SCRs. The 2010 RNA load forecast decreased by approximately 325 MW, while the overall NYCA capacity increased by approximately 880 MW and SCRs increased by approximately 167 MW. Due to these relatively small incremental changes, the resource adequacy assessment results of the 2010 RNA are similar to those of the 2009 RNA.

Table 3-7: 2009 RNA - 2010 RNA Load and Capacity Comparison

	2009 RNA Year 2018	**2010 RNA Year 2020**	**Delta MW**
NYCA Load	35,658	35,334	-324
SCR	2,084	2,251	167
Capacity without SCRs	40,452	41,330	878
Unit Retirements	1,272	983.1	-289

Pursuant to Section 4.5 of Attachment Y of the OATT, the NYISO also develops reliability scenarios for the first five years and second five years of the Study Period considering, among other things, load forecast uncertainty, new resources, retirements, and potential limitations imposed by environmental programs that are currently either pending or under consideration. The NYISO also conducts sensitivity analyses pursuant to Section 4.6 of OATT Attachment Y to test the robustness of the needs assessment studies and identify conditions under which reliability criteria may not be met.

3.8. Methodology for the Determination of Needs

Reliability needs are defined by the OATT in terms of total deficiencies relative to reliability criteria determined from the assessments of the BPTFs performed for this RNA. There are two different steps to analyzing the reliability of the BPTFs. The first is to evaluate the security of the transmission system; the second is to evaluate the adequacy of the system, subject to the security constraints. The NYISO's existing Planning Process includes both adequacy and security assessments. The NYISO conducts transmission adequacy and resource adequacy assessment jointly.

Adequacy is the ability of the electric systems to supply and deliver the total quantity of electricity demanded at any given time taking into account scheduled and unscheduled outages of system elements. Adequacy considers the transmission systems, generation resources and other capacity resources, such as demand response. Adequacy assessments are performed on a probabilistic basis to capture the randomness of system element outages. A system is adequate if the probability of having sufficient transmission and generation to meet expected demand is equal to or less than the system's standard, which is expressed as a LOLE. As stated in Section 2.0, the New York State bulk electricity system is planned to meet a LOLE that, at any given point in time, is less than or equal to an involuntary load disconnection that is not more frequent than once in every 10 years, or 0.1 days per year. This requirement forms the basis of New York's ICAP requirement.

Security is the ability of the power system to withstand sudden disturbances and/or the unanticipated loss of system elements and continue to supply and deliver electricity. Compliance with security criteria is assessed deterministically. Security is a deterministic concept, with potential disturbances being treated with equal likelihood in the assessment. These disturbances are explicitly defined in the reliability rules as design criteria contingencies. The impact of applying these design criteria contingencies is assessed to ensure no criteria violations exist. These design criteria contingencies are sometimes referred to as N-1, N-1-1, or N-2. In addition, the NYISO performs a short circuit analysis using ASPEN OneLiner software to determine the impact of the maximum generation on the system. The NYISO “Guideline for Fault Current Assessment” was used. Three-phase, single-phase and line-line-ground short-circuit currents were determined.

If reliability needs are identified, compensatory MW for the New York Control Area (NYCA) are developed where appropriate by adding generic 250 MW generating units to zones to address the zone-specific needs. The compensatory MW amounts and locations are based on a review of binding transmission constraints and zonal LOLE in an iterative process to determine when reliability criteria are satisfied. These additions are used to estimate the amount of resources generally needed to satisfy reliability needs. The compensatory MW additions are not intended to represent specific proposed solutions. Resource needs could potentially be met by other combinations of resources in other areas including generation, transmission and demand response measures. Due to the differing natures of supply and demand-side resources and transmission constraints, the amounts and locations of resources necessary to match the level of compensatory MW needs identified will vary. Resource needs could be met in part by transmission system reconfigurations that increase transfer limits, or by changes in operating protocols. Operating protocols could include such actions as using dynamic ratings for certain facilities, operating exceptions, or special protection systems.

4. Reliability Needs Assessment

4.1. Overview

Reliability is defined and measured through the use of the concepts of adequacy and security. The NYISO first performs analysis of Transmission Security criteria violations. Then the NYISO assesses Transmission Adequacy and Resource Adequacy jointly with the use of General Electric's Multi Area Reliability Simulation (MARS) software package. This is done through the development of interface transfer limits and a Monte Carlo base simulation of the probabilistic outages of capacity and transmission outages.

4.2. Reliability Needs for Base Case

Below are the principal findings of the RNA for the 2011-2020 Study Period. The needs assessment evaluated scenarios which are described in Section 4.4 below.

4.2.1. Transmission Security Assessment

Identifying reliability needs requires analysis and assessment of the transmission security of the BPTFs. The NYISO performed AC contingency analysis of the BPTFs to test for thermal and voltage violations using Siemens PTI PSS®MUST program utilizing the AC Contingency Analysis activity. More detailed analysis was performed for critical contingency evaluation and transfer limit evaluation using the power-voltage (P-V) curve approach as described in NYISO Transmission Planning Guideline #2-0 and Operating Engineering Voltage Guideline (dated April 11, 2006) using the Siemens PTI PSS®E (Rev. 30) software package. The impact of the status of critical generators on transfer limits was also quantified. Security for the BPTFs is and will be maintained by limiting power transfers. To assist in its assessment, the NYISO also reviewed many previously completed transmission security assessments.

Additional findings to be added in next revision.

4.2.2. Short Circuit Assessment

Another important element of performing a transmission security assessment is the calculation of short circuit current to ascertain whether the circuit breakers present in the system would be subject to fault levels in excess of their rated interrupting capability. The analysis was performed for the year 2015 reflecting the study conditions outlined in Sections 3.4, 3.5 and 3.6. The calculated fault levels would be constant over the second five years because the methodology for fault duty calculation is not sensitive to load growth. The detailed analysis is presented in Appendix C of this report. Overdutied circuit breakers appear in one substation in the analysis: Farragut. The overdutied circuit breakers at Farragut occur with the addition of two new projects, Bayonne Energy Center (Class Year 2009) and Astoria Energy II (Class Year 2010), connected to the Con

Edison and NYPA systems, respectively. The NYISO will identify necessary mitigation solutions for the overdutied breakers and perform cost allocation of any identified upgrades during the applicable Class Year studies pursuant to Attachment S of the NYISO OATT.

4.2.3. Resource and Transmission Adequacy

The resultant load forecast, adjusted for the EEPS impact, has not resulted in any increased demands on the transmission system to meet capacity and energy needs in the NYCA system. Tables 4-1, 4-2 and 4-3 below provide the thermal and voltage transfer limits for the major NYCA interfaces.

Table 4-1: Transmission System Thermal Transfer Limits for Key Interfaces in MW

Interface	2010 RNA						2009 RNA study		
	2011	2012	2013	2014	2015	2020	2011	2012	2013
Dysinger East	2725	3125	3200	3175	3175	3125	3050	2925	3075
West Central	1475	1875	1850	1900	1900	1750	1825	1800	1825
Central East less PV-20 plus Fraser-Gilboa	3250	3525	3475	3475	3400	3525	3075	3075	3075
F to G	3500	3475	3475	3475	3525	3500	3475	3475	3450
UPNY-SENY less Branchburg-Ramapo	5000	5400	5400	5400	5475	5500	5150	5150	5150
I to J	4350	4350	4350	4350	4400	4400	4400	4400	4400
I to K	1290	1290	1290	1290	1290	1290	1290	1290	1290

Table 4-2: Transmission System Voltage Transfer Limits for Key Interfaces in MW

Interface	2010 RNA study						2009 RNA study		
	2011	2012	2013	2014	2015	2020	2011	2012	2013
Dysinger East	2725	2725	2725	2725	2875	2900	2600	2600	2550
West Central	1525	1475	1475	1475	1575	1475	1700	1650	1425
Central East less PV-20 plus Fraser-Gilboa	3250	3350	3375	3350	3350	3350	3050	3050	3050
UPNY-ConEd	5475	5475	5475	5475	5605	5400	5500	5500	5500
I to J & K	5290	5290	5290	5290	5470	5130	5365	5365	5365

Note: The I to J and I to K interfaces were combined into one interface grouping since the simultaneous limit is less than the sum of each individual limit.

Table 4-3: Transmission System Base Case Transfer Limits for Key Interfaces in MW

Interface	2010 RNA study						2009 RNA study		
	2011	2012	2013	2014	2015	2020	2011	2012	2013
Dysinger East	2725 V	2725 V	2725 V	2725 V	2875 V	2900 V	2550 V	2550 V	2550 V
West Central	1475 T	1475 V	1475 V	1475 V	1575 V	1475 V	1425 V	1425 V	1425 V
Central East less PV-20 plus Fraser-Gilboa	3250 C	3350 V	3375 V	3350 V	3350 V	3350 V	3050 V	3050 V	3050 V
F to G	3500 T	3475 T	3475 T	3475 T	3525 T	3500 T	3450 T	3450 T	3450 T
UPNY-SENY less Ramapo 500kV tie	5000 T	5400 T	5400 T	5400 T	5475 T	5500 T	5150 T	5150 T	5150 T
I to J	4350 T	4350 T	4350 T	4350 T	4400 T	4400 T	4400 T	4400 T	4400 T
I to K	1290 T	1290 T	1290 T	1290 T	1290 T	1290 T	1290 T	1290 T	1290 T
I to J & K	5290 C	5290 C	5290 C	5290 C	5470 C	5130 C	5365 C	5365 C	5365 C

Note: T = Thermal; V = Voltage; C = Combined

When comparing the transfer limits calculated for the 2010 RNA to the transfer limits calculated for the 2009 RNA, increases in the Dysinger East, West Central and UPNY-SENY interfaces are evident. Local transmission system upgrades and the addition of a Static VAr Compensator (SVC) in Zone B contributed to the increases in the Dysinger East and West Central transfer limits. Changes to the 345 kV transmission system and base system conditions in ISO-NE contributed to the increase in the UPNY-SENY transfer limit by impacting the distribution of base flow on the UPNY-SENY circuits. When comparing the transfer limit in 2015 to the limit in 2020 calculated for the 2010 RNA, the I to J & K transfer limit decreased. The change is due primarily to the load growth on the system between study year 2015 and 2020.

Nomograms for the West Central and Central East transmission interfaces to reflect the variation in voltage transfer limits due to load or generation dispatches were developed for the 2010 RNA. For the West Central interface, the limit is a function of load. If the load in Area A is greater than 2529MW and Area B is greater than 1785 MW then the West Central limit would be 1475 MW. If the load in Area A is greater than 2669 MW and Area B is greater than 1884MW then the West Central limit would be 1350 MW. For the Central East (plus Fraser-Gilboa and minus Plattsburgh-Sandbar transmission lines) transmission interface, the transfer limit is a function of the number of generating units in the Oswego Complex. The following table illustrates the changes in transfer limits with the number of units available in the Oswego Complex:

No. Units In Oswego Complex	Central East Limit (MW)
1	2261
2	2586
3	2693
4	2715
5	2819
6	2976
7	2989
8	3250

Resource and transmission adequacy is evaluated for the entire 10-year Study Period. The analysis encompasses the Five Year Base Case and the second five years. The RNA Base Case transfer limits under emergency conditions (from the analysis conducted with the updated base cases) were employed to determine resource adequacy needs (defined as a loss-of-load-expectation or LOLE that exceeds 0.1 days per year).

The transfer limits were calculated for each year of the first five years and for the tenth year of the study period (the end of the second five years). If the transfer limits for the tenth year are extremely lower than fifth year of the study period, and there are Reliability Needs identified, the transfer limits for the second five years are assumed constant at the fifth year values as it can be assumed that the solutions presented would impact the transfer limits. The impact on the transfer limits is determined in the evaluation of solutions to validate this assumption. If not, additional solutions will be developed. For this RNA, actual transfer limits were calculated for year ten and a linear approximation for the annual reduction in limits was assumed.

The LOLE for the NYCA did not exceed 0.10 days per year in any year through 2020. The LOLE[3] results for the entire 10-year RNA Base Case are summarized in Table 4-4.

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[3] It should be noted that the LOLE results presented for each load zone are determined based on the assumption that load in a particular load Zone has "first rights" to that capacity in that load Zone even though that capacity could be contractually obligated to load in another load Zone or area. General Electric's Multi-Area Reliability Simulations (MARS) logic prorates capacity among zones if more than one zone is capacity deficient.

Table 4-4: LOLE for the 2010 RNA Study Base Case*

Area/Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AREA_A										
AREA_B										
AREA_C										
AREA_D										
AREA_E										
AREA_F										
AREA_G										
AREA_H										
AREA_I										0.01
AREA_J									.01	0.01
AREA_K										
NYCA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01

*Note: An LOLE value of 0.00 represents a rounded value, not a zero probability of loss of load.

These results were similar to the results obtained in the 2009 RNA Study. The following Table 4-5 illustrates the NYCA LOLEs from the 2009 RNA Study.

Table 4-5: LOLE for the 2010 RNA Study Base Case

Area/Year	2011	2012	2013	2014	2015	2016	2017	2018
NYCA	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02

4.2.4. Reliability Needs Summary

Given that the Base Case analysis produced LOLE results that were below 0.1 days per year, for all years in the Study Period, there were no identified transmission security violations for the 10-year Study Period. No additional resources are forecasted to be required to maintain reliability at this time. Accordingly, the NYISO did not apply the compensatory MW methodology.

4.3. Scenarios

Scenarios are variations on key assumptions in the RNA Base Case to assess the impact of possible changes in circumstances that could impact the RNA. The following scenarios were evaluated as part of the RNA.

- Load Forecast Scenario
  - 2010 Econometric (2010 Gold Book) Forecast
  - 45 x 15 Forecast
- Indian Point 2 and 3 Nuclear Unit Retirements
- Zonal Transmission Security
- Zonal Resource Adequacy
- PJM-NYSEG Contract
- Wheel Throughs

4.3.1. Load Forecast Scenarios

4.3.1.1. Econometric

4.3.1.2. 45 x 15 Forecast

4.3.2. Nuclear Retirement Scenario

4.3.3. Zonal Transmission Security

4.3.4. Zonal Resource Adequacy

4.3.5. PJM-NYSEG Contract

4.3.6. Wheel Throughs

4.4. Other Areas of Interest

4.4.1. Environmental Regulations

4.4.2. Electric Vehicles

4.4.3. Wind Impact

5. Observations and Recommendations

5.1. Base Case

To be added in future draft

5.2. Scenarios

To be added in future draft

6. Historic Congestion

Appendix A of Attachment Y of the NYISO OATT states: "As part of its Comprehensive Reliability Planning Process, the NYISO will prepare summaries and detailed analysis of historic congestion across the New York Transmission System. This will include analysis to identify the significant causes of historic congestion in an effort to help Market Participants and other stakeholders distinguish persistent and addressable congestion from congestion that results from one time events or transient adjustments in operating procedures that may or may not recur. This information will assist Market Participants and other stakeholders to make appropriately informed decisions." The detailed analysis of historic congestion can be found on the NYISO Web site at: www.nyiso.com/public/services/planning/congestion_cost.jsp

Appendices

Appendix A – Reliability Needs Assessment Glossary

To be added in future draft

Appendix B – Load and Energy Forecast 2010-2020

B.1 To be added in future draft

Introduction

Overview

Executive Summary

B.2 Historical Overview

NYCA System

B.3 Regional Energy and Seasonal Peaks

B.4 Forecast Methodology

B.5 Efficiency Adjustments

Appendix C – Transmission System Assessment

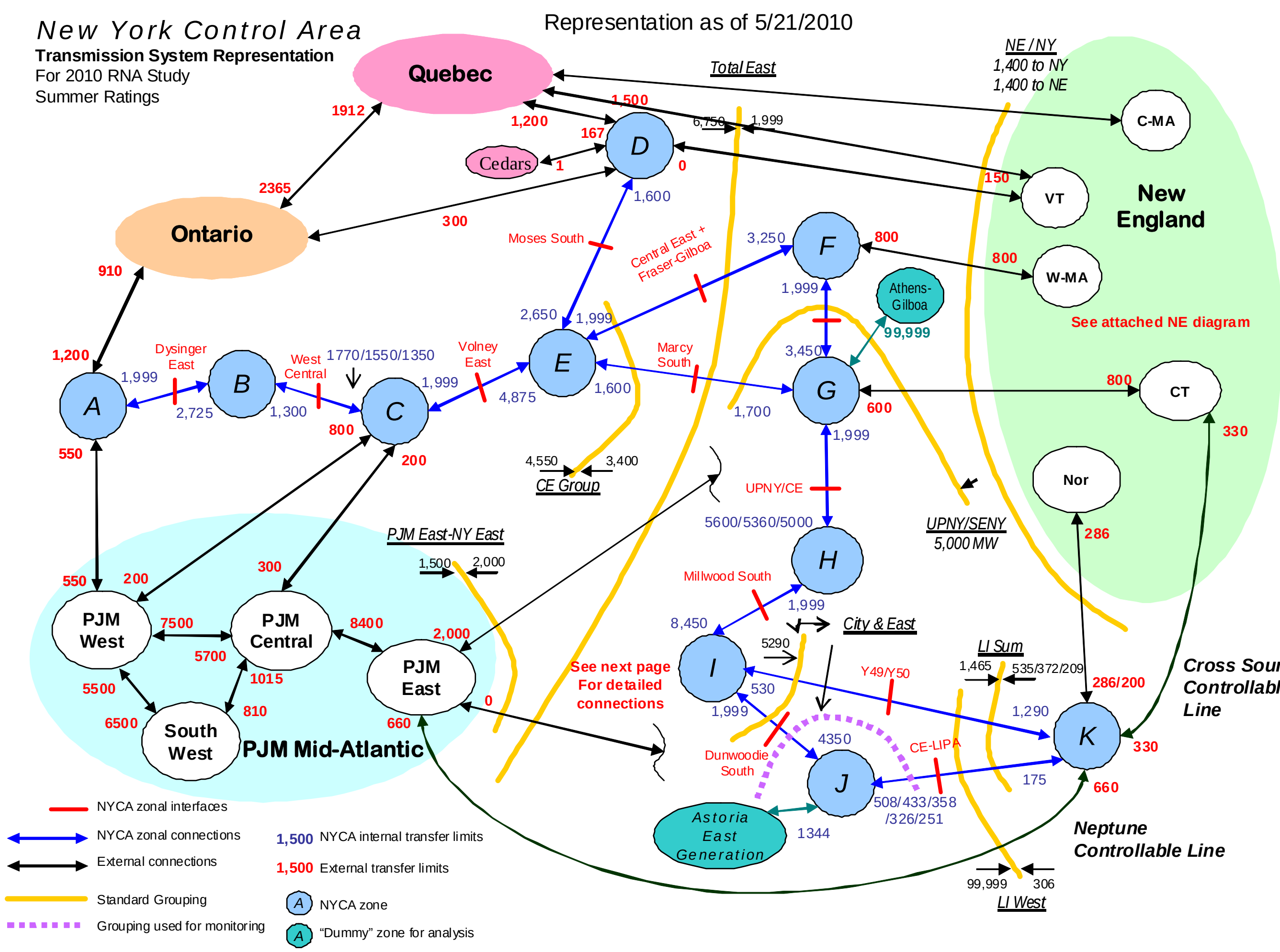
A key element underlying the determination of reliability needs is an assessment to determine if the transmission system meets reliability criteria, and to establish the transfer limits to be used in the Multi-Area Reliability Simulation (MARS) model. This assessment is conducted through a series of power flow, stability and short circuit studies.

In general, the RNA analyses indicated that the bulk power transmission system can be secured, but that transfer limits for certain key interfaces must be reduced in order to respect voltage collapse criteria. However, a reduction in transfer limits or a limiting interface can result in higher LOLE findings and/or needs occurring earlier than they otherwise would. As a result, LOLE analysis was conducted for the RNA Base Case, a case with thermal limits, and finally a case with no internal NYCA transmission limits. These cases were conducted to demonstrate the impact that transmission limits have on the LOLE results.

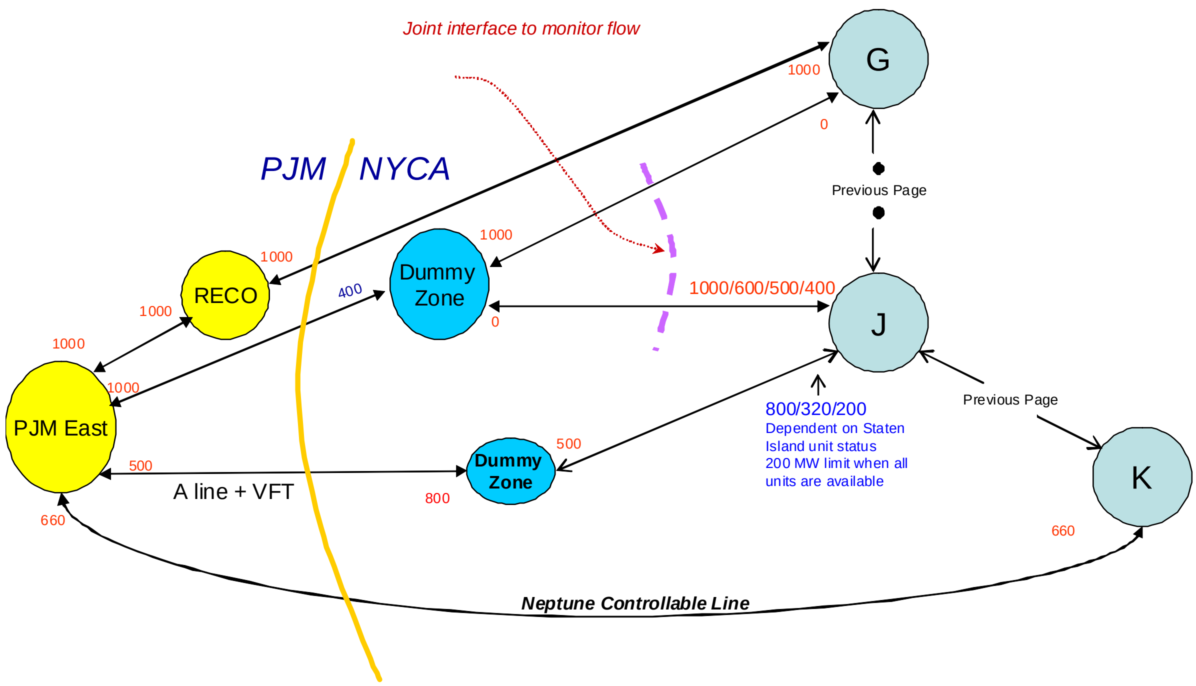
C.1 Development of RNA Base Case System Cases

C.2 Emergency Thermal Transfer Limit Analysis

C.4 Development of the MARS Topology



2010 PJM-NYCA MARS Model - 5/21/2010



New England data to be provided in future draft

C.5 Short Circuit Assessment

2010 RNA Fault Current Analysis Summary Table

		Maximum	Lowest	IBA Needed
BUS	KV	Phase Cur	Rated CB	Y/N
MARCY 765	765	9.7	63	N
MASSENA 765	765	7.9	63	N
RAMAPO	500	15.1	none	n/a
AES SOMERSET	345	17.9	32	N
ALPS	345	17.8	40	N
ATHENS	345	34	50	N
BOWLINE 2	345	27.1	40	N
BOWLINE1	345	27.1	40	N
BUCHAN N	345	29.5	63	N
BUCHAN S	345	39.3	40	N
CLAY	345	34	50	N
COOPERS CRN	345	15.4	32	N
DEWITT	345	19.3	40	N
DUNWOODIE	345	52	63	N
E FISHKILL	345	39.7	63	N
E15ST 45	345	58.2	none	n/a
EDIC	345	32.5	40	N
EGC PAR	345	25.8	63	N
ELBRIDGE	345	16.4	40	N
EV 56-2	345	35	none	n/a
FARRAGUT	345	64.9	63	Y
FITZPATRICK	345	42.9	37	Y
FR KILLS	345	41.7	63	N
FRASER	345	17.5	29.6	N
GILBOA 345	345	25.4	40	N
GOETHL N	345	47.1	63	N
GOETHL S	345	47.1	63	N
GOW N	345	53.2	63	N
GOW S	345	52.3	63	N
HURLEY	345	17.3	40	N
INDEPENDENCE	345	39.6	50	N
LADENTOWN	345	39.5	63	N
LAFAYETTE	345	18.3	40	N
LEEDS	345	34.6	40	N
MARCY 345	345	31.7	63	N
MIDDLETN TAP	345	16	63	N
MILLWOOD	345	45.6	63	N
MOTT HAVEN	345	52.6	63	N
NIAGARA 345	345	33.7	63	N
NMP#1	345	45.3	50	N
NSCOT 99B	345	31.6	32	N

OAKDALE 345	345	12.7	29.6	N
OSWEGO	345	32.7	50	N
PLEASANT VAL	345	41.3	63	N
POLETTI	345	48.6	63	N
PVILLE-1	345	22	63	N
RAINEY	345	60	63	N
RAMAPO	345	43.7	63	N
REYNOLDS	345	14.8	none	n/a
ROCK TAVERN	345	26.3	38	N
Roseton	345	34.9	38	N
S.MAH-A	345	34.2	40	N
S.MAH-B	345	33.9	40	N
S080 345kV	345	17.1	32	N
S122	345	17	32	N
SCRIBA	345	48.9	50	N
SHORE RD	345	28.3	63	N
SPRN BRK	345	53.4	63	N
STOLLE ROAD	345	4	32	N
TREMONT	345	33.5	none	n/a
VOLNEY	345	37.4	40	N
W 49 ST	345	54.6	63	N
W.HAV345	345	28.5	none	n/a
WATERCURE345	345	7.9	29.6	N
WOOD ST A	345	22.1	none	n/a
WOOD ST B	345	25.4	none	n/a
ADIRONDACK	230	9.7	25	N
DUNKIRK	230	15.5	26	N
GARDENVILLE1	230	23.4	30	N
HILLSIDE 230	230	11.8	28.6	N
HUNTLEY	230	27.1	27	Y
MEYER	230	6.6	28.6	N
NIAGRA E 230	230	56.9	63	N
OAKDALE	230	6.4	none	n/a
PACKARD	230	43.7	50	N
PORTER	230	19.6	25	N
ROBINSON RD.	230	14.5	34.4	N
ROTTERDAM66H	230	12.6	20	N
S RIPLEY	230	9.1	40	N
ST LAWRN 230	230	33.6	37	N
STOLLE ROAD	230	14	28.6	N
WATERCURE230	230	11.7	26.4	N
WILLIS 230	230	11.8	37	N
AST-EAST-E	138	57.2	63	N
AST-WEST-N	138	46.7	45	Y
BARRETT1	138	49.3	59.2	N
BRKHAVEN	138	26.6	35.4	N
BUCHANAN	138	15.9	40	N
CORONA N.	138	55.3	63	N

DUN NO	138	34.2	40	N
DUN SO	138	30.9	40	N
E 13 ST	138	48.6	63	N
E 179 ST	138	49.4	63	N
EASTVIEW	138	37.2	63	N
EGC-1	138	72.8	80	N
FOXHLS 1	138	34.5	63	N
FOXHLS 2	138	34.9	40	N
FR KILLS	138	38	40	N
FREEPORT	138	36.3	63	N
GRENWOOD	138	51.5	63	N
HOLBROOK	138	47.9	52.2	N
JAMAICA	138	48.4	45	Y
LKE SCSS1	138	39.7	57.8	N
MILLWOOD	138	19.5	20	N
NEWBRID	138	73.7	80	N
NRTHPRT1	138	60.4	56.2	Y
NRTHPRT2	138	60.4	56.2	Y
PILGRIM	138	59.9	63	N
PT JEFF	138	32.2	63	N
QUEENSBG	138	44.8	63	N
RIVERHD	138	18.7	63	N
RULND RD	138	46	63	N
SHM CRK	138	46.1	63	N
SHORE RD1	138	49.5	57.8	N
SHOREHAM1	138	25.2	52.2	N
TREMNT11	138	43.3	63	N
VERNON E	138	43.1	40	Y
VERNON W	138	34.8	40	N
VLY STRM2	138	53.5	57.8	N
CLAY	115	38	60	N
PORTER	115	41.5	43	N

IBA for 2010 RNA Study

FARRAGUT 345 KV

Breaker ID	Rating (kA)	1LG (kA)	2LG (kA)	3LG (kA)	Overduty
1E	63	63.885	64.917	60.567	Y
2E	63	63.885	64.917	60.567	Y
3E	63	63.540	64.595	60.261	Y
4E	63	63.467	64.612	60.289	Y
5E	63	63.885	64.917	60.567	Y
6E	63	63.885	64.917	60.567	Y
7E	63	63.195	64.561	60.283	Y
8E	63	63.195	64.561	60.283	Y

9E	63	63.885	64.917	60.567	Y
10E	63	63.885	64.917	60.567	Y
11E	63	53.281	55.841	52.622	N
1W	63	63.885	64.917	60.567	Y
2W	63	63.885	64.917	60.567	Y
3W	63	63.885	64.917	60.567	Y
4W	63	63.885	64.917	60.567	Y
5W	63	62.803	64.196	60.009	Y
6W	63	63.143	64.152	59.818	Y
7W	63	63.143	64.153	59.818	Y
8W	63	63.491	64.612	60.293	Y
9W	63	63.885	64.917	60.567	Y
10W	63	63.885	64.917	60.567	Y
11W	63	54.482	56.462	51.378	N

FITZPATRICK 345 KV

Breaker ID	Rating (kA)	1LG (kA)	2LG (kA)	3LG (kA)	Overduty
10042	37	35.663	36.923	33.423	N

Huntley 230 kV

Breaker ID	Rating (kA)	1LG (kA)	2LG (kA)	3LG (kA)	Overduty
R1202	27	23.098	24.602	25.182	N
R1302	27	21.295	22.012	22.138	N
R1402	27	23.608	24.891	25.29	N
R1502	27	21.293	22.012	22.141	N
R1312	27	16.661	17.582	17.863	N

AST-WEST 138kV

Breaker ID	Rating (kA)	1LG (kA)	2LG (kA)	3LG (kA)	Overduty
G1N	45	44.156	42.406	38.984	N
G2N	45	44.156	42.406	38.984	N

JAMAICA 138 KV

Breaker ID	Rating (kA)	1LG (kA)	2LG (kA)	3LG (kA)	Overduty
1	45	36.614	40.301	39.05	N

NORTHPORT 138 KV

Breaker ID	Rating (kA)	1LG (kA)	2LG (kA)	3LG (kA)	Overduty
1310	56.2	50.247	51.733	52.232	N
1320	56.2	50.22	51.772	52.249	N
1450	56.2	51.339	50.469	49.14	N
1460	56.2	27.255	29.617	31.112	N
1470	56.2	32.206	32.637	32.822	N

2010 RNA Fault Current Study

		Maximum	Lowest	IBA	Overdutied
		Phase Cur	Rated CB	Needed	Breakers
BUS	KV	kA	kA	Y/N	Y/N
FARRAGUT	345	64.9	63	Y	Y*
FITZPATRICK	345	42.9	37	Y	N
HUNTLEY	230	27.1	27	Y	N
AST-WEST	138	46.7	45	Y	N
JAMAICA	138	48.4	45	Y	N
NRTHPRT	138	60.4	56.2	Y	N
VERNON E	138	43.1	40*	N	N

*Note: Except 11E and 11W, all other breakers at Farragut 345 kV are overdutied.

*Note: All Vernon E breakers will be upgraded to 63 kA as part of 38M72 PAR project.

Appendix D – Environmental Scenarios