DRAFT 10/26/2005

New York Independent System Operator

CRPP Reliability Needs Assessment

Introduction

In general, electricity deregulation in New York State and, for the most part, the Northeast quadrant of the United States, has led to the unbundling of generation and transmission development. Largely gone are the days of planning in which generation and transmission plans were highly coordinated. In today's world, the reliability of the power system is ensured by a combination of resources provided by market forces and regulated wires companies. The purpose of the Comprehensive Reliability Planning Process (CRPP) is to determine whether the electric system resources provided by a combination of market forces and regulated entities is providing sufficient resources to ensure the reliability of the New York State bulk power system.

The Reliability Needs Assessment (RNA) is the first step in the development of the Comprehensive Reliability Plan (CRP). The second step in the development of the CRP is the development of solutions to reliability needs. The solutions will consist of both market-based and Transmission Owner regulated solutions. Solutions will need to satisfy reliability criteria and not necessarily the specified level of MW or MVAR need identified in the RNA. There are various combinations of resources and transmission upgrades that could meet the needs identified in the RNA. In addition, reconfiguration of transmission facilities and/or modifications to operating protocols identified in the solution phase could result in changes in transfer limits with resultant resolution of or modification of a need identified in the assessment.

This report is the first draft RNA prepared by the New York Independent System Operator. This document represents the first in a series of annual CRPP plans designed to ensure the long-term reliability of the New York State bulk power system. 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. In addition to ensuring reliability, the CRPP is also designed to provide information that is both informative and of value to the New York wholesale electricity marketplace.

Base Case Assumptions, Drivers and Determination of Needs

The NYISO established procedures and a schedule for the collection and submission of data and the preparation of the models used in the underlying studies that were performed during the Comprehensive Reliability Planning Process (CRPP) as defined in Attachment Y of the NYISO OATT.

The NYISO's procedures were designed to allow the NYISO's planning activities associated with the CRPP to be aligned with and coordinated with the related activities of NERC, NPCC, and other regional reliability organizations. The assumptions were reviewed both at TPAS and ESPWG. The Five Year Base Case was developed based on the 2005 ATRA base case, input from Market Participants, and a project screening procedure.

The NYISO developed the system representation for the second five years of the Study Period 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 ~~BPTFs~~bulk-power transmission facilities; and (4) and Market Participant input. Based on this process, the network model for the second five year period was identical to the network model for the year 2010 in the Five Year Base Case except for the MW and MVAR load model. The load model reflected the load forecast from the Gold Book.

The Base Case model of the New York system for the 2005 RNA includes the following new and proposed facilities:

a. TO projects on non-bulk power facilities.
b. The Neptune project.
c. Facilities that have accepted their Attachment S cost allocations and are in service or under construction as of March 31, 2005. The SCS Astoria project is modeled at its contracted-for capacity of 500 MW.
d. Transmission upgrades related to any projects and facilities that are included in the Base Case, as defined above.

The NYISO's scenario analyses will address, among other things, all other TO plans and projects on the bulk power system and merchant projects that as of March 31, 2005 had accepted their cost allocation but had not yet commenced construction.

The table below presents the unit retirements which were represented in the base case:

RETIREMENTS

OWNER / OPERATOR	STATION UNIT	ZONE	DATE	CAPABILITY (kW) SUMMER	WINTER	REASON FOR RETIREMENT
Scheduled Retirements with New Projects						
Consolidated Edison Company of NY, Inc.	Waterside 6,8,9	J	7/1/2005	167200	167800	Station Repowering
New York Power Authority	Poletti 1 *	J	2/1/2008	885300	885700	Station Replacement
PSEG Power NY	Albany 1,2,3,4 **	ROS	3/1/2005	312300	364600	Station Replacement
Scheduled Retirements						
NRG Power, Inc.	Huntley 63,64 **	ROS	11/1/2005	60600	96800	Environmental Restrictions
NRG Power, Inc.	Huntley 65,66	ROS	11/1/2006	166800	170000	Environmental Restrictions
Rochester Gas and Electric Corporation	Russell Station	ROS	12/1/2007	238000	245000	Environmental Restrictions
Planned Retirements						
Mirant Corporation	Lovett 5	ROS	6/1/2007	188500	189700	Environmental Restrictions
Mirant Corporation	Lovett 3	ROS	6/1/2008	68500	68500	Environmental Restrictions
Mirant Corporation	Lovett 4	ROS	6/1/2008	174000	175500	Environmental Restrictions
				2261200	2363600	

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Rochester Gas and Electric Corporation	Russell Station	ROS	12/1/2007	238000	245000	Environmental Restrictions
Planned Retirements						
Mirant Corporation	Lovett 5	ROS	6/1/2007	188500	189700	Company 10-K Report
Mirant Corporation	Lovett 3	ROS	6/1/2008	68500	68500	Company 10-K Report
Mirant Corporation	Lovett 4	ROS	6/1/2008	174000	175500	Company 10-K Report
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The General Electric Multi-Area Reliability Simulation model was used to determine when loss-of-load criteria was violated. Compensatory MWs were added to the system to resolve criteria violations. Compensatory MW needs for the NYCA were developed by adding generic 250 MW generating units to the zones with the highest LOLE. However, resource needs could potentially be met by many different combinations of supply and demand-side resources in other areas in conjunction with transmission upgrades. Due to the differing natures of supply, demand and supply-side resources, the amounts of these resources needed to match the level of compensatory MW needs identified will vary. In addition, resource needs could be met in part by transmission system reconfigurations that increase transfer limit, 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.

Reliability 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 and probability concept. A system is adequate if the probability of having sufficient transmission and generation to meet expected demand is below the system's requirement. The New York State Power System is planned to meet or exceed a loss of load expectation (LOLE) of once in 10 years. This requirement forms the basis of New York's installed capacity 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 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 or N-2. N is the number of system components; an N-1 requirement means that the system can withstand the loss of any one component without affecting service to consumers.

Reliability Needs

This reliability needs assessment for the baseline system for the first Five Year period indicates that the forecasted system does not meet reliability criteria. ~~and~~ Therefore, because of continued load growth and no resource additions, ~~subsequently~~ the second Five Year period does not meet reliability criteria. Load growth in excess of two percent per year which totals almost 5,000 MW in Southeast New York State (SENY), defined as load zones G-K, with the minimal addition of approximately 1250 MW of net new generating capacity in that area over the last ten years, has led to increasing dependence on the transmission system to meet capacity and energy needs in SENY. The demands that are increasingly being placed on the transmission system in conjunction with other system changes, such as generating unit retirements and neighboring system changes, have resulted in voltage criteria violations at much lower transfer levels than had been previously observed. The result is that transfers into SENY are being limited by voltage constraints rather than thermal constraints. The reduced capability to make power transfers to SENY coupled with continuing load growth in SENY results in resource adequacy criteria violations as early as 2008. Below are the major findings of the Reliability Needs Assessment:

1. Employing the calculated transfer limits from the analysis with the updated transmission topology to determine resource adequacy needs (defined as a loss-of-load-expectation or LOLE that exceeds .1 days per year), the first year of need for the New York Control Area (NYCA) is determined to be 2008, with an LOLE of .463 days per year. The LOLE for the NYCA increases to 2.583 days per year by 2010. Although many of the transfer limits calculated were based on voltage criteria violations, the initial reliability needs were identified based on a MW basis only. The compensatory MW needed to meet the .1 days per year reliability criteria for the NYCA through 2010 would be between 2000 and 2250 MW. The exact locations of the MW additions, whether in Zones G through K or a combination, impacts the level of compensatory MW required.

Utilizing voltage constraint limits to determine resource adequacy needs and the updated transmission topology, resulted in the following LOLE results:

AREA OR POOL	2006	2007	2008	2009	2010
AREA-A	0.000	0.000	0.000	0.000	0.000
AREA-B	0.000	0.000	0.000	0.000	0.000
AREA-C	0.000	0.000	0.000	0.000	0.000
AREA-D	0.000	0.000	0.000	0.000	0.000
AREA-E	0.000	0.000	0.000	0.000	0.000
AREA-F	0.000	0.000	0.000	0.000	0.000
AREA-G	0.000	0.000	0.000	0.000	0.020
AREA-H	0.000	0.000	0.000	0.006	0.008
AREA-I	0.001	0.001	0.021	0.078	0.212
AREA-J	0.001	0.002	0.455	0.794	2.540
AREA-K	0.021	0.001	0.026	0.071	0.184
NYCA	0.022	0.004	0.463	0.818	2.583

2. The ability to transfer power into SENY significantly impacts the compensatory MW required to bring the NYCA into compliance with LOLE criteria. Since the transfer limits of the SENY interfaces are limited by voltage constraints in the Lower Hudson Valley (LHV), an investigation into the need for compensatory MVARS versus compensatory MWs was conducted. The transfer limits through the LHV were reduced by as much as 1000-1500 MW as early as 2008 to meet voltage criteria. This reduction in transfer limits is the result of expected plant retirements, continued load growth in SENY, 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. The voltage criteria violations are both pre- and post- contingency, indicating a need for both static and dynamic compensation. Also impacting the voltage limits are severe tower contingencies that include generation, shunt capacitor, and /or transformer loss.

3. Utilizing thermally constrained transfer limits to determine resource adequacy needs and the updated transmission topology, resulted in the following LOLE results:

AREA OR POOL	2006	2007	2008	2009	2010	2011
AREA-A Thru AREA-E	0.000	0.000	0.000	0.000	0.000	0.000
AREA-F	0.000	0.000	0.000	0.000	0.000	0.001
AREA-G	0.000	0.000	0.000	0.001	0.017	0.021
AREA-H	0.000	0.000	0.001	0.001	0.007	0.009
AREA-I	0.000	0.001	0.038	0.088	0.505	0.757
AREA-J	0.000	0.001	0.055	0.124	0.583	0.837
AREA-K	0.021	0.002	0.029	0.070	0.309	0.460
NYCA	0.021	0.003	0.073	0.160	0.752	1.049

Compensatory MW were added to the following Areas to meet the .1 days per year for NYCA.

AREA OR POOL	2006	2007	2008	2009	2010	2011
AREA-A Thru AREA-F	0	0	0	0	0	0
AREA-G	0	0	0	0	0	0
AREA-H	0	0	0	0	0	0
AREA-I	0	0	0	0	250	500
AREA-J	0	0	0	250	750	750
AREA-K	0	0	0	0	250	250
NYCA	0	0	0	250	~~1000~~1250	1500

4. SENY Transmission Owners will need to develop regulated backstop solutions to address both the reactive compensation as well as the resources needs identified for SENY. They are Central Hudson Gas and Electric Corporation, Consolidated Edison Company, Long Island Power Authority, New York Power Authority, and New York State Electric and Gas Corporation.

Scenarios

The following scenarios were evaluated as part of the RNA.

1. Retirement of Older Coal Plants

    a. The scenario in which all coal units in western NY are retired except for the Somerset and Cayuga units results in a reduction in transfer limits in western NY of approximately 500 MW. However, the impact on LOLE was minimal. Also, contingency analysis for the non-bulk system was not conducted.

2. The Retirement of the Indian Point Units 2 and 3

    a. Preliminary MARS analysis of the 2008 and 2010 system was performed with evaluate the retirement of the Indian Point 2 and 3 nuclear plants. The Baseline system capacity was 37039 for 2008 and 2010 and the following transfer limits:

'F to G'	3425
'UP-ConEd'	5000
'I to J'	3400
'UPNYSENY'	4900

    The NYCA LOLE increases significantly with the retirement of the Indian Point units to well in excess of 3.5 days per year. Accordingly, loss of capacity resulting from the retirement of the Indian Point would need to be replaced in kind. Also, compensatory actions would be required to maintain transfer levels through the Hudson Valley.

3. TO Projects

    a. M29 Transmission Project

    A sensitivity analysis of the impact of the M29 Transmission Project was performed on the 2007 and 2010 system conditions. The emergency thermal transfer indicated that the project would increase the I to J transfer limit by approximately 350 MW. The reactive charging available with the project would increase the I to J voltage limit by approximately 300 MW.

The following table illustrates the impact of M29 transmission project on the Area and NYCA LOLE.

Impact of M29 Transmission Project on LOLE

AREA OR POOL	Without M29		With M29	
	2007	2010	2007	2010
AREA-A				
AREA-B				
AREA-C				
AREA-D				
AREA-E				
AREA-F				
AREA-G		.017		.019
AREA-H		.007	.002	.007
AREA-I	.001	.505	.001	.916
AREA-J	.001	.583	.001	.404
AREA-K	.002	.309	.003	.337
NYCA	.003	.752	.003	.628

4. Load Forecast Uncertainty

a. High Load Forecast

The following table illustrates the impact of the high load forecast on the Area and NYCA LOLE.

Impact of High Load Forecast

AREA OR POOL	2006	2007	2008	2009	2010	2011
AREA-A	0.000	0.000	0.000	0.000	0.000	0.000
AREA-B	0.000	0.000	0.000	0.000	0.000	0.001
AREA-C	0.000	0.000	0.000	0.000	0.000	0.000
AREA-D	0.000	0.000	0.000	0.000	0.000	0.000
AREA-E	0.000	0.000	0.000	0.000	0.000	0.001
AREA-F	0.000	0.000	0.000	0.000	0.000	0.001
AREA-G	0.000	0.000	0.001	0.000	0.024	0.035
AREA-H	0.000	0.000	0.001	0.002	0.007	0.011
AREA-I	0.001	0.0003	0.059	0.141	0.751	1.215
AREA-J	0.001	0.003	0.082	0.177	0.820	1.255
AREA-K	0.043	0.005	0.053	0.130	0.541	0.888
NYCA	0.044	0.008	0.111	0.241	1.079	1.641

Historic Congestion

The graph below presents cumulative historical congestion dollars as determined by the bid-production-cost-savings methodology for the years 2003, 2004 and the first two quarters of 2005. The results through 2005 Q2 are comparable to previous years. The total congestion for 2005 through Q2 is slightly higher than previous years. It is higher than 2004 Q2, similar to 2003 Q2. There were no unusual days in 2005 and the binding constraints are similar to previous years. The detailed congestion information can be found on the NYISO web site under Services Planning.