2009 Comprehensive Reliability Plan

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

FIRST DRAFT REPORT

February 11, 2009

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Executive Summary

After the electric industry was restructured in the 1990s to provide transmission open access and to introduce competition into New York's wholesale electricity markets, the reliability of New York's power grid became dependent on a combination of facilities provided by independent commercial developers and by the Transmission Owners who have a statutory obligations to deliver safe and adequate service to retail customers. It can take several years to design and build new facilities needed to maintain reliability. In order to maintain the system's long-term reliability, new facilities must be readily available or under development to meet future needs. The NYISO, in conjunction with stakeholders in the New York market, concluded that a process was required to identify long term bulk power system reliability needs and how those needs can be satisfied with the development of a Comprehensive Reliability Plan (CRP) incorporating proposed solutions to those identified reliability needs.

With this objective in mind, the NYISO and its stakeholders developed and implemented the Comprehensive Reliability Planning Process (CRPP) which was approved by the Federal Energy Regulatory Commission (FERC) in December 2004. The CRPP is a 10-year reliability assessment of both resource adequacy and transmission security of the New York bulk power system. The NYISO undertook its first ten-year planning process in 2005-2006, and with this year's Comprehensive Reliability Plan (CRP) it will complete its fourth cycle. The FERC reaffirmed its approval on October 16, 2008, when it approved the NYISO's Comprehensive System Planning Process (CSPP), which encompasses the existing CRPP as well as the new economic planning process called the Congestion Analysis and Resource Integration Study (CARIS), and extended the annual planning process to a two- year cycle.

The CRP represents the final step in the CRPP process. The CRPP process begins with the identification of needs developed in the Reliability Needs Assessment (RNA). After the approval of the RNA, a request for solutions to identified reliability needs is issued with the expectation that Market-Based Solutions will come forward to meet the identified needs. In the event that Market-Based Solutions are not sufficient, the process provides for the identification of Regulated Backstop Solutions proposed by designated transmission owners, and Alternative Regulated Solutions proposed by any market participant. The NYISO then evaluates all proposed solutions to determine whether they will meet the identified reliability needs. A Comprehensive Reliability Plan is developed, setting forth the facilities and schedule that are expected to be implemented to meet those needs. With FERC's approval of the CSPP, this year's CRP will form the basis for the first CARIS which will begin in the summer of 2009.

A number of other initiatives are active with the state which complements the NYISO's planning process. The New York State Public Service Commission (PSC) has commenced a three-phase Energy Resource Planning (ERP) proceeding to examine long-term energy planning in New York. In the first phase, the PSC examined how to undertake cost allocation and cost recovery of non-transmission regulated solutions to reliability needs, specifically generation and demand response projects.[1] In the second phase (currently under way), the PSC is evaluating the process to determine which regulated solutions should be permitted and built to meet reliability needs if Market-Based Solutions are not sufficient. In the third phase, now on hold pending

[1] Cost allocation and cost recovery of transmission regulated solutions to reliability needs occur under the FERC approved NYISO Tariff.

completion of the new State Energy Plan later this year, the PSC may determine whether and how to establish a state resource planning process that takes public policy considerations into account. . The NYISO has and will participate in every phase of the PSC's ERP proceeding to: (i) maintain an all-resource planning process that provides equal consideration and treatment of transmission, generation and demand response resources; (ii) guide the PSC's selection of regulated solutions consistent with the NYISO's tariffs; and (iii) ensure that planning for New York's bulk power system is consistent with the NYISO's competitive markets In April 2008, the Governor of New York State announced the establishment of a new State Energy Planning Board (SEPB). Because the NYISO is not part of government, its authority is limited to the responsibilities contained in its federally approved tariff and its formation agreements. The New York State energy policy initiatives should complement the planning already being conducted by the NYISO, and are proceeding in concert with the NYISO's existing and developing processes. The NYISO is providing its full technical assistance and support to the SEPB for its deliberations.

The NYISO offers this Comprehensive Reliability Plan in accordance with its tariff planning process to inform the initiatives of the PSC, the New York State Department of Environmental Conservation (DEC), and the SEPB.

The 2009 CRP will be the starting point for the economic planning process called the Congestion Assessment and Resource Integration Study (CARIS). CARIS is an integral part of the NYISO's newly expanded planning process known as Comprehensive System Planning Process (CSPP). CARIS analysis will evaluate transmission constraints and potential solutions to the congestion identified. All three resource types, including generation, transmission and demand side management (DSM) programs, will be considered, on a comparable basis, as potential solutions in alleviating the identified congestion

A. The 2009 Comprehensive Reliability Plan

The 2009 RNA (See Appendix A) determined that there are no reliability needs identified through 2018. This determination is an improvement on the findings of the 2008 RNA due to a reduction in peak load forecast, an increase in generation additions and Special Case Resource (SCR) participation, and fewer planned retirements. As a result, the NYISO did not need to request Market-Based, Regulated Backstop, or Alternative Regulated Solutions for this 10-year planning horizon. Nevertheless, the NYISO is issuing the 2009 CRP setting forth the assumptions and resources on which bulk power system reliability will rely for the 2009 to 2018 Study Period, as discussed below.

While the 2009 CRP indicates that the system will remain reliable for the next ten years, if the implementation of planned resources included in the Base Case does not occur, and/or under certain scenarios analyzed in the RNA, there may be a significant risk to the reliability plan. This fact drives the need for vigilance in monitoring conditions on the bulk power system as well as pending state and federal initiatives.

A1. The 2009 Reliability Plan

This 2009 CRP is based upon the following resources and other key assumptions that were included in the RNA Base Case (See Table 1):

Table 1: 2008 RNA - 2009 RNA Load and Capacity Comparison

	2008 RNA Year 2017	2009 RNA Year 2018	Delta MW
NYCA Load	37,631	35,658	(1,973)
SCR	1,323	2,084	761
Unit Additions	455	2,169	1,714
Unit Retirements	1,428	1,272	(156)

Since the realization of these Base Case assumptions is critical to meeting the reliability of the New York bulk power system, this CRP contains a number of recommendations to assure these assumptions remain viable:

1. Monitoring the accuracy of the load forecast levels as impacted by the Energy Efficiency Portfolio Standard Order (EEPS) initiative and the economic downturn.

An accurate forecast of the electricity demand level over the 10-year Study Period is an essential factor in the development of the CRP. The NYISO shall continue to monitor factors influencing the long range load forecast. A number of potential developments that could greatly increase the level of variation in the electricity demand forecast must be continuously considered and monitored. The NYISO will continue to monitor and actively participate in the EEPS proceeding by providing technical expertise on load forecasting, offering opinions on establishing energy savings goals, and offering evaluation, measurement and verification (EM&V) of energy and related demand savings, as well as identifying upside risk to electricity demand.

Since the completion of the 2009 RNA, the EEPS proceeding has been moving forward. The State's investor-owned utilities under the jurisdiction of the PSC were requested to file 60-day and 90-day plans for developing energy efficiency programs through the year 2011. The impact of these plans has been included in the 2009 RNA, in virtue of the fact that the EEPS goals were accounted for in that plan. Therefore, there is no need to update any additional energy efficiency impacts in the 2009 CRP.

The initial energy forecast for the 2009 RNA was developed in March 2008 using an economic forecast from February 2008 that projected a modest level of growth (0.8% annually) in economic activity, resulting in 35,658 MW of projected peak load level in 2018. This amount represents a reduction of approximately 2, 000 MW over the 2008 RNA projected load level .As of September 2008, the economic outlook had turned 180 degrees. At present, the depth, duration, and recovery of the recession are unknown.

The lower level of energy growth that is now expected further reinforces the fundamental conclusions of the 2009 RNA that reliability will be maintained through 2018. In addition to the Base Case forecast (incorporating the EEPS conservation impacts), the 2009 RNA also included two lower growth conservation scenarios. A lower economic growth scenario would likely fit at an intermediate level between the two higher EEPS penetration scenarios modeled in the RNA.

2. Implementing planned generation additions, retirements and SCR registrations.

Planned generation additions of approximately 2,169 MW that are in the Base Case should move forward on the schedule provided so that they are in service when needed. Retirements of additional generating units beyond those already contemplated (1,272 MW) in the 2009 RNA, for either economic and/or environmental factors, could adversely affect the reliability of the NYCA bulk power system beyond what has been identified in this. An increase of approximately 761 MW in SCR registration over the 2008 RNA level drives the need to track the implementation of these resources as well. Each of these resources will be tracked on a quarterly basis to ensure that actual amounts realized are comparable to the assumed levels included in the 2009 RNA.

3. Implementing the identified TO Updates and other planned projects.

The NYISO shall continue tracking the implementation of the TO Updates identified in the previous CRPs, such as the addition of capacitor banks at the Millwood substation, Con Edison M29 transmission project, Caithness, firm capacity in conjunction with granted UDRs, and planned non-bulk power system projects. The NYISO shall also track the implementation of the new TO Updates identified in this CRP.

4. Monitoring and tracking the viability of the Market-Based Solutions submitted with the 2008 CRP.

While there were no reliability needs identified in the 2009 RNA, the NYISO must be prepared to act should conditions change establishing an immediate reliability need that requires a solution. In addition, the NYISO should continue to assess the viability of market-based solutions that were included in the 2008 CRP on a quarterly basis as a further measure to understand all available options should a reliability need arise.

5. Maintaining voltage performance at the bulk power system level.

The NYISO shall continually monitor the voltage performance of the NYCA System to determine, at a minimum, that voltage based transfer limits are being maintained. The NYISO should continue developing reactive power procedures (such as load modeling and generator performance) to identify additional factors that could enhance or improve reliability through managing the voltage performance of New York's bulk power system.

A2. Reliability Risk and Contingency Assessment

Although the planned system meets the applicable reliability criteria based on the conditions studied, the NYISO has identified several scenarios that could adversely impact the effectiveness of the Plan in meeting future system reliability requirements. These scenarios include:

1. Unexpected retirement of either of the two Indian Point nuclear plants at the expiration of their current operating licenses, could cause immediate resource adequacy violations and the need for new resources in New York. The retirement of one of the two Indian Point nuclear power plant units (1,000 MW each) would cause an immediate violation of the reliability standard in 2014. Retirement of both units would cause a severe shortage in resources needed to maintain bulk power system reliability, resulting in the probability of an involuntary interruption of load that is approximately 40 times higher than the reliability standard in 2018.

2. Forecasted econometric growth without EEPS impacts would result in the need for new resources in 2016. Higher forecasted load combined with extreme weather conditions (total effect of 7.5% higher in the load forecast compared to the Base Case) could cause a resource adequacy violation in 2010.

3. Environmental restrictions.

- HEDD and LFBs - Implementation of new programs to control nitrogen oxides (NOx) emissions from fossil fueled generators on high electric demand days (HEDD) could render some units unavailable and others limited to reduced output at times of peak energy needs. If such limitations curtailed the availability of up to 1,231 MW of high emitting combustion turbines and up to 1,739 MW of load following boilers, it would result in violations of the resource adequacy criterion within the planning horizon.

- RACT - If it is assumed that the implementation of new emission controls, such as Reasonably Available Control Technologies (RACT) would occur, it is reasonable to expect that up to 25 % of affected units would not retrofit to meet the requirements, resulting in up to 3,125 MW of capacity no longer being available to meet peak load conditions. If such circumstances arise, the resource adequacy criterion would be violated for all years from 2009 through 2018. The NYISO urges the development of a broader range of regulatory initiatives in order to achieve compliance with the ozone standard through the reduction of NOx emissions from power plants that will maintain the reliabilty of the NYS bulk power system. The United States Environmental Protection Agency (EPA) recently established a new ambient air quality standard for ozone at 75 ppb, which will significantly increase the magnitude of the challenge ahead.

- RGGI -With respect to Regional Greenhouse Gas Initiative (RGGI) program, higher carbon allowance prices, and certainly prices of $35 to $50/ton, combined with the fuel price spread and other environmental program compliance costs, could cause the availability of high carbon emitting coal fired capacity to be reduced, placing significant strain on these resources

4. An increase in load or a reduction in resources of 750 MW in the lower Hudson Valley or a change of between 500 and 750 MW in New York City in 2018 would cause reliability standard violations and a need for additional solutions. Similarly, removing 500 MW each from Zones G, H, and J would also cause a violation of the resource adequacy criterion and a need for additional solutions in 2018

Figure1 below illustrates the relative impact of the various scenarios evaluated in the 2009 RNA. The retirement of the Indian Point 2 and 3 nuclear power plant units would have the greatest and most immediate impact on the reliability of the NYCA system. In order to mitigate the impact of these retirements, approximately 1,000 MW of capacity would need to be installed in Southeast New York (Zones G-K) for each retired unit (2,000 MW total). The total amount and location of the replacement capacity would depend upon the intra- and inter-area transmission limitations in the vicinity of the capacity additions. For the rest of the scenarios, the addition of 1,500 MW of new capacity installed in Southeast New York would be sufficient to mitigate the adverse reliability impact.

Should the NYISO determine that system conditions have changed significantly to be a potential threat to reliability, it will evaluate those changes to assess whether the effectiveness of the Plan is impacted. If there is a threat to the reliability of the system, the NYISO will address the newly identified reliability need in the subsequent RNA. The NYISO is aware of over 2,300 MW of viable Market Based Solutions from the 2008 CRP and many other projects in the Interconnection Queue in various stages of development. If the NYISO determines that a Reliability Need could arise before the next CRPP cycle, it will first examine whether market-based projects will meet that need. If not and the NYISO determines that the need is imminent, the NYISO will request the TOs to implement a Gap Solution in accordance with Attachment Y.

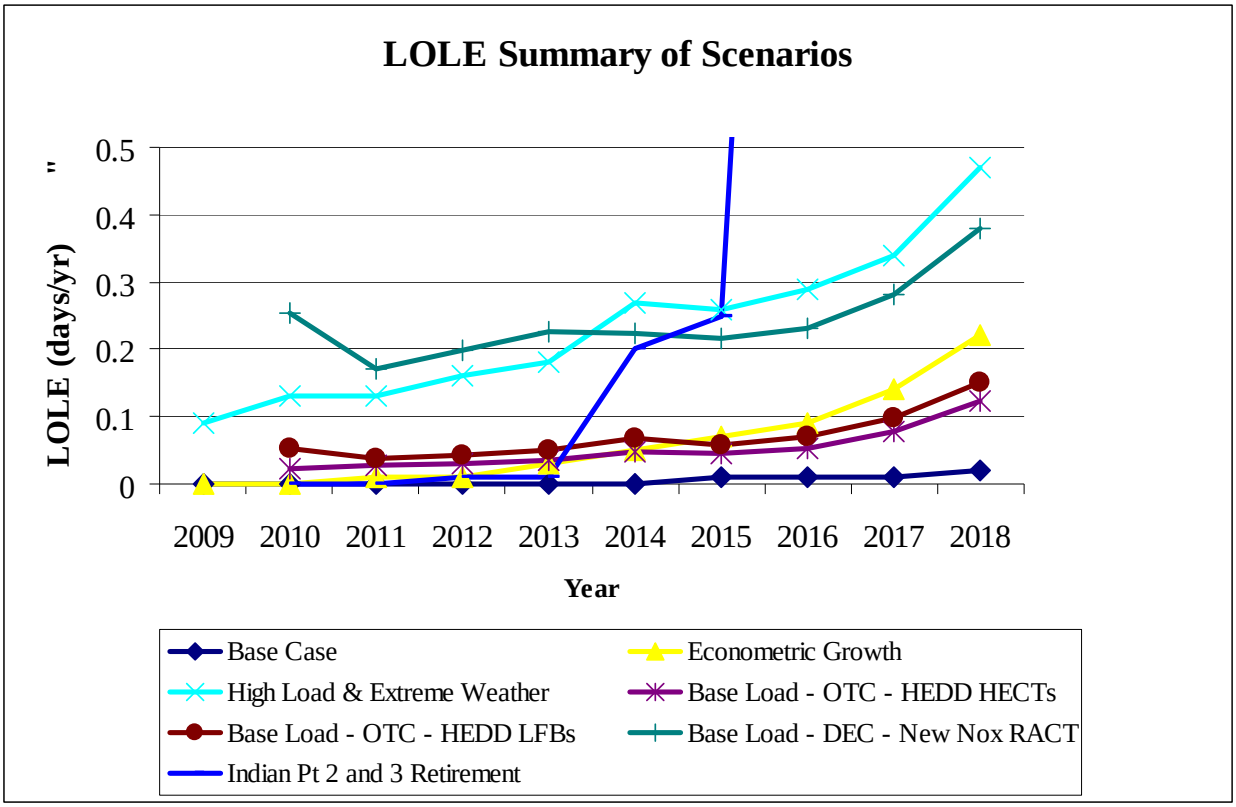


Figure 1: The 2009 RNA Risk Scenarios

1. The 2009 Reliability Needs Assessment Summary

The 2009 RNA (see Appendix A) indicated that the forecasted baseline system meets applicable reliability criteria for the next 10 years, from 2009 through 2018, without any additional resource needs. There are three primary reasons the 2009 RNA does not identify reliability needs for the next 10 years:

1. **Generation additions –** Approximately 1,714 MW above the 2008 RNA resource assumptions, which include approximately 800 MW of new wind capacity, with a lower MW level of scheduled generation retirements than in the 2008 RNA, have been incorporated into the 2009 RNA Base Case. In addition, the construction of capacitor banks at the Millwood Substation incorporated in both 2007 and 2008 CRPs has increased transfer capability from the lower Hudson Valley into New York City.

2. **Energy Efficiency Portfolio Standard Order (EEPS) –** Pursuant to the EEPS, New York State Public Service Commission (NYSPSC) has taken the initial steps to implement its jurisdictional portion of the Governor's initiative to lower energy consumption on the electric system by 15% of the 2007 forecasted levels in 2015. The NYSPSC had authorized in 2005 continued spending of $175 million annually through July 2011 on Systems Benefits Charge Programs, and an additional $160 million annually for energy efficiency programs was authorized in the June 23rd EEPS Order, totaling approximately $335 million per year.

Using conservative assumptions appropriate to a baseline reliability analysis, the NYISO determined that there should be a reduction of approximately five percent of peak load from the previously forecasted levels by 2015 based upon currently authorized spending levels. This equates to approximately 30% of the total energy efficiency goals. The resulting 2,100 MW decrease in the peak load forecast largely contributed to the NYISO's determination that there are no reliability needs in the Base Case[2]. Additional EEPS program spending would delay reliability needs even further.

3. **Increased registration in Special Case Resource (SCR) –** The NYISO has experienced a significant increase in the registration of the SCR programs that have effectively reduced the need for additional capacity resources to the system based on customer pledges to cut energy usage on demand. The NYISO currently has registrations of approximately 2,084 MW of SCRs, an increase of 761 MW of resources over the SCR levels included in the 2008 RNA.

Table 1.1 below summarizes the impact of the lower load forecast level resulting from State public policy programs, increased generator additions, lower scheduled retirements and additional SCR program participation.

[2] Appendix B provides highlights of the complete modeling methodology used for this study and is provided for those who need to understand the robustness of this study without reading the full details of the entire report.

Table 1-1: 2008 RNA - 2009 RNA Load and Capacity Comparison

	2008 RNA Year 2017	2009 RNA Year 2018	Delta MW
NYCA Load	37,631	35,658	(1,973)
SCR	1,323	2,084	761
Unit Additions	455	2,169	1,714
Unit Retirements	1,428	1,272	(156)

Since no reliability needs were identified over the 2009 – 2018 planning horizon, the NYISO conducted analyses of numerous sensitivities and scenarios in order to test the robustness of the bulk power system and to bound the conditions under which resource adequacy or transmission security needs may arise. The sensitivity and scenario analyses have revealed that:

1. Reliability needs would arise in 2017 in the absence of effective implementation of the EEPS programs.

2. The New York bulk power grid could need resources as soon as 2010, even with inclusion of the energy efficiency programs, should extreme weather conditions combined with high load growth (total effect of 7.5% higher in the load forecast compared to the Base Case) occur.

3. Implementation of new programs to control nitrogen oxides (NOx) emissions from fossil fueled generators on high electric demand days could render some units unavailable and others limited to reduced output at times of peak energy needs. If such limitations curtailed the availability of up to 1,231 MW of high emitting combustion turbines and up to 1,739 MW of load following boilers, it would result in violations of the resource adequacy criterion within the planning horizon. Moreover, if it is assumed that the implementation of new emission controls, such as Reasonably Available Control Technologies (RACT) would occur, it is reasonable to expect that up to 25 % of affected units would not retrofit to meet the requirements, resulting in up to 3,125 MW of capacity no longer being available to meet peak load conditions. If such circumstances arise, the resource adequacy criterion would be violated for all years from 2009 through 2018.

4. With respect to the Regional Greenhouse Gas Initiative (RGGI), if the new RGGI allowance market operates as expected by the State, (i.e., allowance prices remain low and a substantial spread persists between natural gas and coal pricing), power grid reliability will not be negatively impacted in the near term. Assuming today's coal and gas fuel price spread and any other environmental program compliance costs, higher carbon allowance prices, and certainly prices of $35 to $50/ton, would cause the availability of high carbon emitting coal fired capacity to be reduced, placing significant strain on these resources. The level of RGGI

allowance cost, fuel price spread, and other environmental program compliance costs have an interrelated and cumulative effect on high carbon emitting units, and thus, reliability.

5. Similarly, the unexpected retirement of certain generation could cause immediate resource adequacy violations and the need for new resources in New York. For example, due to its location in a constrained part of the system, retirement of one of the two Indian Point nuclear power plant units, which are due for relicensing before the Nuclear Regulatory Commission, would cause an immediate violation of the reliability standard in 2014. Retirement of both units would cause a severe shortage in resources needed to maintain bulk power system reliability, resulting in the probability of an involuntary interruption of load that is approximately 40 times higher than the reliability standard in 2018.

6. An increase in load or a reduction in resources of 750 MW in the lower Hudson Valley or a change of between 500 and 750 MW in New York City in 2018 would cause reliability standard violations and a need for additional solutions. Similarly, removing 500 MW each from Zones G, H, and J would also cause a violation of the resource adequacy criterion and a need for additional solutions in 2018.

In summary, the 2009 RNA determined that, while there are no reliability needs identified to maintain system reliability over the next 10 years, it is an imperative that NYISO continues monitoring the progress of the 2008 CRP market-based solutions, State energy efficiency program implementation, SCR program registration, transmission owners' updated plans and other planned projects on the bulk power system to determine that these projects remain on schedule. The RNA stated that if the NYISO determines that system conditions have changed, it will determine whether market-based project or other new capacity resources that are currently progressing are sufficient to meet the resource adequacy and system security needs of the New York power grid. If not, the NYISO will address any newly identified reliability need in the subsequent RNA or, if necessary, issue a request for a Gap Solution.

On January 13, 2009, the NYISO Board of Directors approved the 2009 RNA. Since this year's RNA identified no reliability needs, the NYISO did not issue the request for solutions in this year's CRPP cycle.

2. The Development of Solutions to Reliability Needs

Following the approval and issuance of the RNA, the planning process enters a solutions phase in which the NYISO requests and evaluates solutions submitted in response to the identified reliability needs, and prepares the CRP. Since the 2009 RNA identified no reliability needs through the Study Period, no additional resources to meet applicable reliability criteria. Therefore there was no need for the NYISO to issue any request for solutions in this year's CRPP cycle, and accordingly, no solutions were evaluated. However, the NYISO issued the request for TO Updated plans for inclusion in the 2009 CRP. This section summarizes the TO Updated plans received by the NYISO.

2.1 Responsible Transmission Owner Updated Plans

The following Table 2-1 summarized the updated TO plans.

Table 2-1: Summary of Updated TO Plans

3. Assessment of Baseline System with TO Updated Plans

The baseline system was reevaluated with the TO Updated Plans to confirm that the 2009 RNA conclusion that no additional resources are required for the next ten years is still valid. Table 3-1 below represents the RNA study case load and resources. The table did not change as a result of the TO Updated plans for the 2009 CRP.

Table 3-1: RNA Study Case Load and Resource Table with Updated TO Plans[3]

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Peak Load										
NYCA	**34,059**	**34,269**	**34,462**	**34,586**	**34,725**	**34,905**	**35,029**	**35,258**	**35,430**	**35,658**
Zone J	12,127	12,257	12,361	12,452	12,537	12,627	12,683	12,787	12,879	12,980
Zone K	5,386	5,395	5,403	5,403	5,377	5,370	5,358	5,374	5,354	5,383
Resources										
NYCA										
"Capacity"	39,992	39,657	40,496	40,496	40,502	40,452	40,452	40,452	40,452	40,452
"SCR"	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084	2,084
Total	**42,077**	**41,741**	**42,580**	**42,580**	**42,586**	**42,536**	**42,536**	**42,536**	**42,536**	**42,536**
Res./Load Ratio	123.5%	121.8%	123.6%	123.1%	122.6%	121.9%	121.4%	120.6%	120.1%	119.3%
Zone J										
"Capacity"	10,097	9,206	9,206	9,206	9,206	9,206	9,206	9,206	9,206	9,206
"SCR"	622	622	622	622	622	622	622	622	622	622
Total	**10,719**	**9,828**	**9,828**	**9,828**	**9,828**	**9,828**	**9,828**	**9,828**	**9,828**	**9,828**
Res./Load Ratio	88.4%	80.2%	79.5%	78.9%	78.4%	77.83%	77.49%	76.86%	76.31%	75.71%
Zone K										
"Capacity"	5,938	6,368	6,368	6,368	6,368	6,368	6,368	6,368	6,368	6,368
"SCR"	216	216	216	216	216	216	216	216	216	216
Total	**6,154**	**6,584**	**6,584**	**6,584**	**6,584**	**6,584**	**6,584**	**6,584**	**6,584**	**6,584**
Res./Load Ratio	114.3%	122.0%	121.9%	121.9%	122.4%	122.61%	122.88%	122.52%	122.98%	122.31%

3.1 Adequacy and Transmission Security

Figure 3-1 below displays the bulk power system for NYCA, which is generally facilities 230 kV and above, but does include certain 138 kV facilities and a very small number of 115 kV facilities. The balance of the facilities 138 kV and lower are considered non-bulk or sub-transmission facilities. The figure also displays key transmission interfaces for New York.

[3] New York Control Area (NYCA) "Capacity" values include resources internal to New York, Additions, Reratings, Retirements, Purchases and Sales, and UDRs with firm capacity. Zone K "Capacity" values include UDRs with firm capacity. Wind generation values include full nameplate capacity.

"SCR" values reflect projected August 2009 ICAP capability period values held constant over the 10-year Study Period.

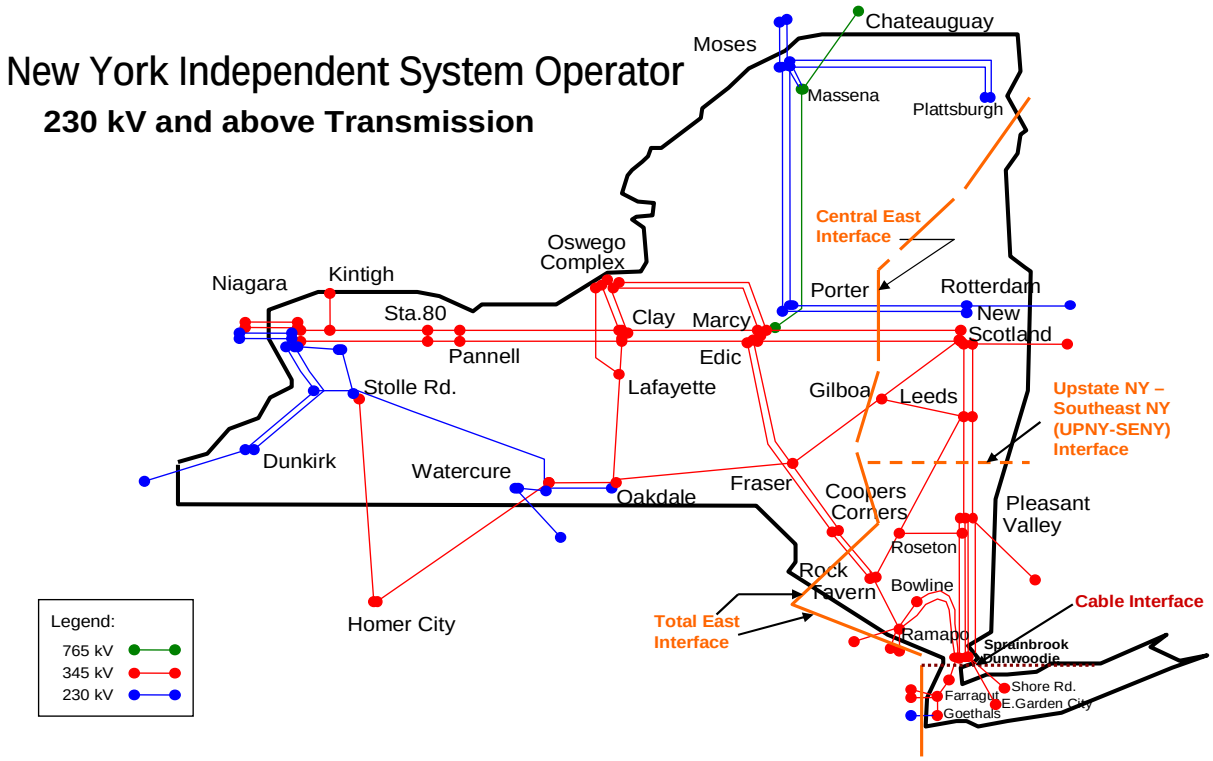


Figure 3.1: NYISO 230 kV and above Transmission Map

In the RNA, transfer limits were assumed to be constant from the end of the first five years throughout the second five year period. The assumed transmission transfer limits were confirmed during the CRP evaluation of the baseline system.

As determined in the three prior CRPs approved by the NYISO Board of Directors, it is necessary to reduce transfer limits for key NYCA transmission interfaces during the 10-year Study Period in order to maintain the security of the transmission system. The lower transfer limits are associated with the UPNY/SENY, Dysinger East and West Central interfaces, together with the persistent Central East voltage/stability interface. They reduce the ability of the New York bulk power system to deliver capacity downstream of the constraints as well as into the local area of the interfaces between the NYCA zones. The result is an increase in the LOLE, which translates into increased resource requirements. The major factor driving the reduction in transfer limits is the voltage performance of the New York bulk power system, which is being adversely impacted by load growth and generator retirements. However, the required transfer limit reductions identified in the 2009 RNA are not as severe as in the prior studies because of system improvements incorporated into the baseline that are designed to improve the voltage performance of the system.

The prior CRPs identified actions required to address transmission security and adequacy concerns. These concerns are still relevant to the 2009 CRP, and are reiterated herein along with a summary of the steps that have already been taken to address the required actions.

3.2 Baseline System Adequacy

Below are the principal findings of the 2009 CRP for the 2009-2018 Study Period.

3.2.1 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 2013 with the latest version of the Class Year 2008 Annual Transmission Baseline Assessment (ATBA), modified to be consistent with the 2009 CRP study conditions. The fault levels were kept 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. The NYISO observed no major changes in fault current from the previous CRPs. Overdutied circuit breakers appear in at least two substations in the analysis, Astoria West and Fitzpatrick. In 2007 an interim operating protocol was developed to limit the number of units connected to the Astoria West bus, thereby preventing the overduty situation. In April 2008 a Memorandum-of-Understanding (MOU) was signed by Con Edison, NRG, and NYPA. The MOU continues certain provisions of the interim operating protocol until the overdutied breakers are replaced, as committed to by Con Edison, by the summer of 2010. Entergy replaced the Fitzpatrick breaker in early 2008.

3.2.2 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. The transfers into and through Southeastern New York (SENY) will continue to be limited by voltage constraints, rather than thermal constraints. As a result of the three prior CRPs, the TOs are upgrading their systems by bypassing series reactors and adding reactive resources where appropriate. These improvements have brought the transmission voltage limit close to the thermal limit for the cable interface into Zone J. For details on these improvements, please refer to Tables 3-2, 3-3 and 3-4 below.

Table 3-2: Transmission System Thermal Transfer Limits for Key Interfaces in MW

	2009 CRP Study					2008 CRP Study				
Interface	**2009**	**2010**	**2011**	**2012**	**2013**	**2009**	**2010**	**2011**	**2012**	**2013**
Central East + FG*	**3075**	**3075**	**3075**	**3075**	**3075**	**3350**	**3175**	**3250**	**3100**	**3100**
F-G	**3450**	**3450**	**3450**	**3450**	**3450**	**3475**	**3475**	**3475**	**3475**	**3475**
UPNY/SENY	**5150**	**5150**	**5150**	**5150**	**5150**	**5150**	**5150**	**5150**	**5150**	**5150**
I-J	**4025**	**4075**	**4400**	**4400**	**4400**	**4000**	**4400**	**4400**	**4400**	**4400**
I-K	**1290**	**1290**	**1290**	**1290**	**1290**	**1290**	**1290**	**1290**	**1290**	**1290**

* F G – Fraser-Gilboa circuit

Table 3-3: Transmission System Voltage Transfer Limits for Key Interfaces in MW

	2009 CRP Study					2008 CRP Study				
Interface	**2009**	**2010**	**2011**	**2012**	**2013**	**2009**	**2010**	**2011**	**2012**	**2013**
Central East + FG*	**3050**	**3050**	**3050**	**3050**	**3050**	**3150**	**3150**	**3150**	**3150**	**3150**
F-G										
UPNY/SENY										
I-J										
I-K										
I-J&K		**5290**	**5365**	**5365**	**5365**		**5515**	**5465**	**5440**	**5440**

Note: Blank entries indicate that the voltage limits are more than 5% above the thermal limits. The I to J and I to K interfaces were combined into one interface grouping since the limit on one interface is sensitive to the flow on the other.

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

	2009 CRP Study					2008 CRP Study				
Interface	**2009**	**2010**	**2011**	**2012**	**2013**	**2009**	**2010**	**2011**	**2012**	**2013**
Central East + FG	**3050^{V}**	**3050^{V}**	**3050^{V}**	**3050^{V}**	**3050^{V}**	**3150^{V}**	**3150^{V}**	**3150^{V}**	**3100^{T}**	**3100^{T}**
F-G	**3450^{T}**	**3450^{T}**	**3450^{T}**	**3450^{T}**	**3450^{T}**	**3475^{T}**	**3475^{T}**	**3475^{T}**	**3475^{T}**	**3475^{T}**
UPNY/SENY	**5150^{T}**	**5150^{T}**	**5150^{T}**	**5150^{T}**	**5150^{T}**	**5150^{T}**	**5150^{T}**	**5150^{T}**	**5150^{T}**	**5150^{T}**
I-J	**4025^{T}**	**4075^{T}**	**4400^{C}**	**4400^{C}**	**4400^{C}**	**4000^{T}**	**4400^{C}**	**4400^{C}**	**4400^{C}**	**4400^{C}**
I-K	**1290^{T}**	**1290^{C}**	**1290^{C}**	**1290^{C}**	**1290^{C}**	**1290^{T}**	**1290^{C}**	**1290^{C}**	**1290^{C}**	**1290^{C}**
I-J&K	**5315^{T}**	**5290^{V}**	**5365^{V}**	**5365^{V}**	**5365^{V}**	**5290^{T}**	**5515^{V}**	**5465^{V}**	**5440^{V}**	**5440^{V}**

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

Resource and transmission adequacy is evaluated for the entire 10-year Study Period. Resource adequacy is evaluated for the second five year period with transfer limits assumed constant. The analysis encompasses the Five Year Base Case and the second five years. The CRP 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 LOLE for the NYCA did not exceed 0.10 days per year in any year through 2018. The LOLE[4] results for the entire 10-year RNA Base Case are summarized in Table 3-5.

[4] 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 3-5: LOLE for the CRP Study Case Transfer Limits

Area/Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AREA-A										
AREA-B										
AREA-C										
AREA-D										
AREA-E										
AREA-F										
AREA-G										
AREA-H										
AREA-I						<0.01	<0.01	0.01	0.01	0.02
AREA-J						<0.01	0.01	0.01	0.01	0.02
AREA-K										
NYCA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	0.01	0.02

4. The 2009 Reliability Plan

The 2009 RNA (See Appendix A) determined that there are no reliability needs anticipated through 2018. This outlook is an improvement from the findings of the 2008 RNA due to an increase in generation additions and SCR participation, and reduction in peak load forecast and expected planned retirements. As a result, the NYISO did not need to request Market-Based, Regulated Backstop, or Alternative Regulated Solutions to meet the reliability needs over the 10 year horizon. Nevertheless, the NYISO is issuing the 2009 CRP setting forth the assumptions and resources on which bulk power system reliability will rely for the 2009 to 2018 Study Period, as discussed below.

While the 2009 CRP indicates that the system will remain reliable for the next ten years, the implementation of planned resources included in the Base Case does not occur, and/or under certain scenarios analyzed in the RNA, may be a significant risk to the reliability plan. This fact drives the need for vigilance in monitoring the conditions on the bulk power system as well as pending state and federal initiatives.

The 2009 CRP Base Case will be a starting point for the economic planning process called the Congestion Assessment and Resource Integration Study (CARIS). CARIS is an integral part of the NYISO newly expanded planning process known as Comprehensive System Planning Process (CSPP). CARIS analysis will evaluate transmission constraints and potential solutions to the congestion identified. All three resource types, including generation, transmission and demand side management (DSM) programs, will be considered, on a comparable basis, as potential solutions in alleviating the identified congestion.

4.1 2009 Comprehensive Reliability Plan

This 2009 CRP is based upon the resources (see Table 2-1), and other key assumptions that were included in the 2009 RNA Base Case:

1. Monitoring the accuracy of the load forecast levels as impacted by the Energy Efficiency Portfolio Standard Order (EEPS) initiative and the economic downturn.

   An accurate forecast of the electricity demand level over the 10-year Study Period is an essential factor in the development of the CRP. The NYISO shall continue to monitor factors influencing the long range load forecast. A number of potential developments that could greatly increase the level of variation in the electricity demand forecast must be continuously considered and monitored. The NYISO will continue to monitor and actively participate in the EEPS proceeding by providing technical expertise on load forecasting, offering opinions on establishing energy savings goals, and offering evaluation, measurement and verification (EM&V) of energy and related demand savings, as well as identifying upside risk to electricity demand.

   Since the completion of the 2009 RNA, the EEPS proceeding has been moving forward. The State's investor-owned utilities under the jurisdiction of the PSC were requested to file 60-day and 90-day plans for developing energy efficiency programs

through the year 2011. The impact of these plans has been included in the 2009 RNA, in virtue of the fact that the EEPS goals were accounted for in that plan. Therefore, there is no need to update any additional energy efficiency impacts in the 2009 CRPP.

The initial energy forecast for the 2009 RNA was developed in March 2008 using an economic forecast from February 2008 that projected a modest level of growth (0.8 % annually) in economic activity, resulting in 35,658 MW of projected peak load level in 2018. This amount represents a reduction of approximately 2, 000 MW over the 2008 RNA projected load level. As of September 2008, the economic outlook had turned 180 degrees. At present, the depth, duration, and recovery of the recession are unknown.

The lower level of energy growth that is now expected further reinforces the fundamental conclusions of the 2009 RNA that reliability will be maintained through 2018. In addition to the Base Case forecast (incorporating the EEPS conservation impacts), the 2009 RNA also included two lower growth conservation scenarios. Neither of the two lower growth scenarios demonstrated any need. A lower economic growth scenario would likely fit at an intermediate level between the two higher EEPS penetration scenarios modeled in the RNA

2. Implementing planned generation additions, retirements and SCR registrations.

   Planned generation additions of approximately 2,169 MW that are in the Base Case should move forward on the schedule provided so that they are in service when needed. Retirements of additional generating units beyond those already contemplated (1,272 MW) in the 2009 RNA, for either economic and/or environmental factors, would adversely affect the reliability of the NYCA bulk power system beyond what has been identified in this CRP. An increase of approximately 761 MW in SCR registration over the 2008 RNA level drives the need to track the implementation of these resources as well. Each of these resources will be tracked on a quarterly basis to ensure that actual amounts realized are comparable to the assumed levels included in the 2009 RNA.

3. Implementing the identified TO Updates and other planned projects.
   The NYISO shall continue tracking the implementation of the TO Updates identified in the previous CRPs, such as the addition of capacitor banks at the Millwood substation, Con Edison M29 transmission project, Caithness, firm capacity in conjunction with granted UDRs, and planned non-bulk power system projects. The NYISO shall also track the implementation of the new TO Updates identified in this CRP.

4. Monitoring and tracking the viability of the Market-Based Solutions submitted with the 2008 CRP.

   While there were no reliability needs identified in the 2009 RNA, the NYISO must be prepared to act should conditions change establishing an immediate reliability need that requires a solution. In addition, the NYISO should continue to assess the viability of market-based solutions that were included in the 2008 CRP on a quarterly basis as a further measure to understand all available options should a reliability need arise.

5. Maintaining voltage performance at the bulk power system level.

   The NYISO shall continually monitor the voltage performance of the NYCA System to determine, at a minimum, that voltage based transfer limits are being maintained. The NYISO should continue developing reactive power procedures related to voltage (such as load modeling and generator performance) to identify additional factors that could enhance or improve reliability through managing the voltage performance of New York's bulk power system.

4.2 Reliability Risk and Contingency Assessment

Although the planned system meets the applicable reliability criteria based on the conditions studied, the NYISO has identified several scenarios that could adversely impact the effectiveness of the Plan in meeting future system reliability requirements. These scenarios include:

1. Unexpected retirement of either of the two Indian Point nuclear plants at the expiration of their current operating license, could cause resource adequacy violations and the need for new resources in New York. The retirement of one of the two Indian Point nuclear power plant units (1,000 MW each) would cause an immediate violation of the reliability standard in 2014. Retirement of both units would cause a severe shortage in resources needed to maintain bulk power system reliability, resulting in the probability of an involuntary interruption of load that is approximately 40 times higher than the reliability standard in 2018.

2. Forecasted econometric growth without EEPS impact would result in a need for new resources in 2016. Higher forecasted load combined with extreme weather conditions (total effect of 7.5% higher in the load forecast compared to the Base Case) could cause a resource adequacy violation in 2010.

3. Environmental restriction.

- HEDD and LFBs - Implementation of new programs to control nitrogen oxides (NOx) emissions from fossil fueled generators on high electric demand days (HEDD) could render some units unavailable and others limited to reduced output at times of peak energy needs. If such limitations curtailed the availability of up to 1,231 MW of high emitting combustion turbines and up to 1,739 MW of load following boilers, it would result in violations of the resource adequacy criterion within the planning horizon.

- RACT - If it is assumed that the implementation of new emission controls, such as Reasonably Available Control Technologies (RACT) would occur, it is reasonable to expect that up to 25 % of affected units would not retrofit to meet the requirements, resulting in up to 3,125 MW of capacity no longer being available to meet peak load conditions. If such circumstances arise, the resource adequacy criterion would be violated for all years from 2009 through 2018. The NYISO urges the development of a broader range of regulatory initiatives in order to achieve compliance with the ozone standard through the reduction of NOx emissions from power plants that will maintain the reliabilty of the NYS bulk power system. The United States Environmental Protection Agency (EPA) recently established a new ambient air quality standard for ozone at 75 ppb, which will significantly increase the magnitude of the challenge ahead.

- RGGI -With respect to Regional Greenhouse Gas Initiative (RGGI) program, higher carbon allowance prices, and certainly prices of $35 to $50/ton, combined with the fuel price spread and other environmental program compliance costs, could cause the availability of high carbon emitting coal fired capacity to be reduced, placing significant strain on these resources

4. An increase in load or a reduction in resources of 750 MW in the lower Hudson Valley or a change of between 500 and 750 MW in New York City in 2018 would cause reliability standard violations and a need for additional solutions. Similarly, removing 500 MW each from Zones G, H, and J would also cause a violation of the resource adequacy criterion and a need for additional solutions in 2018.

Figure 4-1.below illustrates the relative impact of the various scenarios evaluated in the 2009 RNA. The retirement of the Indian Point 2 and 3 nuclear power plant units would have the greatest and most immediate impact on the reliability of the NYCA system. In order to mitigate the impact of these retirements, approximately 1,000 MW of capacity would need to be installed in Southeast New York (Zones G-K) for each retired unit (2,000 MW total). The total amount and location of the replacement capacity would depend upon the intra- and inter-area transmission limitations in the vicinity of the capacity additions. For the rest of the scenarios, the addition of 1,500 MW of new capacity installed in Southeast New York would be sufficient to mitigate the adverse reliability impact of the scenarios.

Should the NYISO determine that system conditions have changed significantly to be a potential threat to reliability, it will evaluate those changes to assess whether the effectiveness of the Plan is impacted. If there is a threat to the reliability of the system, the NYISO will address the newly identified reliability need in the subsequent RNA. The NYISO is aware of over 2,300 MW of viable Market Based Solutions from the 2008 CRP and many other projects in the Interconnection Queue in various stages of development. If the NYISO determines that a Reliability Need could arise before the next CRPP cycle, it will first examine whether market-based projects will meet that need. If not and the NYISO determines that the need is imminent, the NYISO will request the TOs to implement a Gap Solution in accordance with Attachment Y.

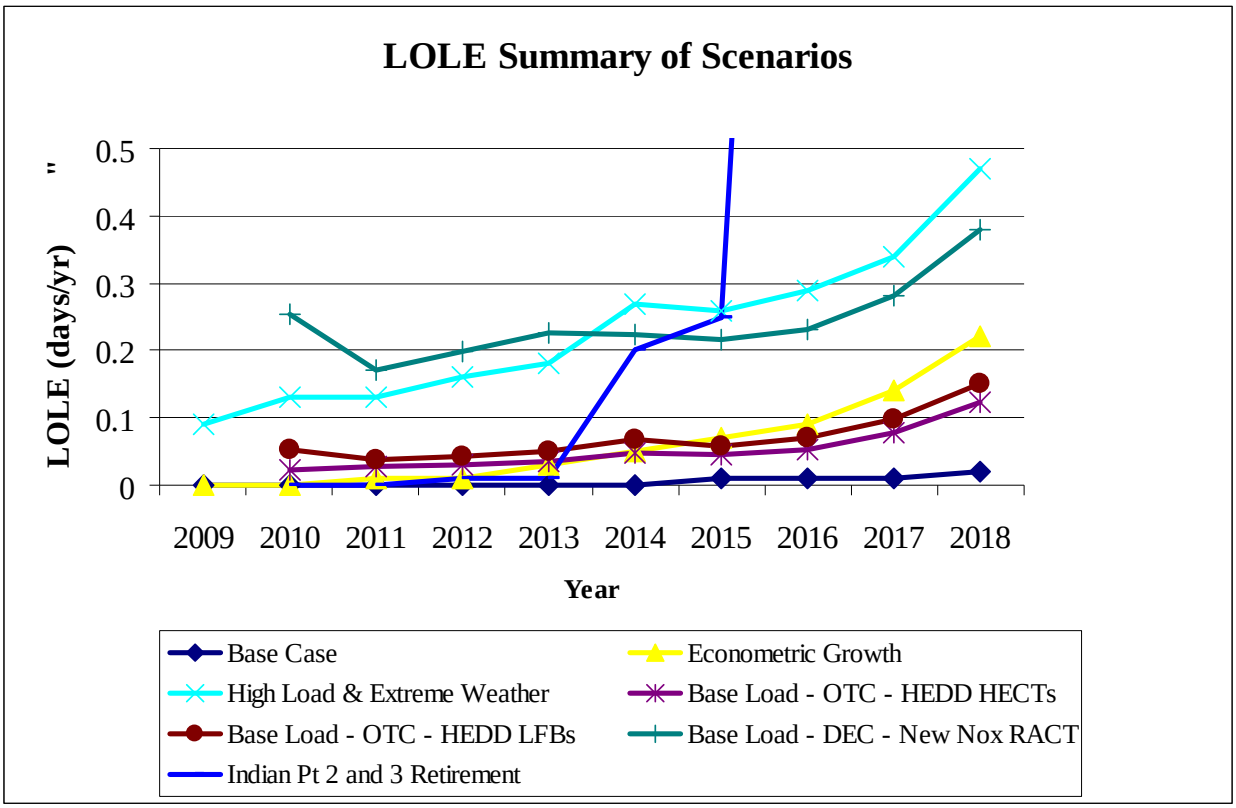


Figure 4-1. The 2009 RNA Scenarios

4.3 Additional Observations and Actions

The prior CRPs identified and recommended additional actions that are needed in order to mitigate other conditions impacting the reliability of the New York bulk power system and/or could adversely affect the implementation of the Plan and future system reliability. These observations and actions are ongoing and are:

4.3.1 Observation 1

For several years, the NYISO has pointed out the need to make progress on a number of NYISO-related initiatives to address issues and concerns with the voltage performance of the bulk power system. These included:

- Continuation of the initiative to complete a comprehensive reliability analysis of reactive power demand and resources in the NYCA.

- Continued progress on 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 the NERC Blackout Recommendation 7a, to the extent applicable.

Last year, the NYISO commented in the New York Public Service Commission's proceeding on establishing an Energy Efficiency Portfolio Standard (EEPS) that significant energy efficiency savings could be realized and reliability could be enhanced by making cost-effective equipment upgrades to the electric transmission and distribution systems. The NYISO suggested the installation of capacitors in strategic locations to reduce line losses as a primary example. The stakeholders, ALJs and the PSC agreed[5], and established a proceeding on reducing electric system losses.[6]

Actions required

To address Observation 1 the NYISO RPWG has several initiatives 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. Include a sensitivity to using a 90/10 load forecast in the determination of the limit.

- 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. Finalize methodology for determining zonal power factor. Develop strawman for testing zonal/area reactive margins.

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 urges the TOs to work with the stakeholders to create a reactive power standard for the bulk power system in the NYCA.

Moreover, in the PSC proceeding, the NYISO is conducting a comprehensive study with the NYTOs and Department of Public Service Staff to identify the locations on the bulk power system and at the interface between the bulk system and local distribution systems where losses are the greatest and where equipment upgrades will be most effective. The results of this study should be available early in 2009.

[5] PSC Case 07-M-0548 – Order Establishing Energy Efficiency Portfolio Standard and Approving Programs (Issued and Effective June 23, 2008), at 62.
[6] PSC Case 08-E-0751 – Proceeding on Motion of the Commission to Identify Sources of Electric System Losses and the Means of Reducing Them, Order Clarifying Scope of Proceeding (Issued and Effective July 17, 2008).

4.3.2 Observation 2

The absence of a "one-stop" siting process could impede the construction and operation of new generating facilities to meet reliability needs should they arise in the future. New York State once had a streamlined siting process for large power plants (Article X of the New York Public Service Law), but that process expired at the end of 2002. The NYISO's evaluation of the viability of project timelines will reflect the absence of an Article X process.

Actions Required

The New York State Legislature should reenact a comprehensive siting process for major electric generating facilities in Article X of the Public Service Law

4.3.3 Observation 3

The conventional generator additions assumed in the Base Case are natural gas fired units with Number 2 fuel oil or kerosene as the back up fuel

Actions 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

4.3.4 Observation 4

The 2009 CRP increasingly relies on the availability of emergency assistance from neighboring control areas.

Actions Required

The NYISO and its neighboring control areas, ISO-New England and PJM, have implemented regional planning to evaluate the provision of emergency assistance among the control areas that are parties to the Northeastern Coordinated System Planning Protocol (NCSPP). The NYISO should continue to participate in this process.

Appendix A – 2009 RNA (link including Appendices)

Appendix B –The Comprehensive System Planning Process (CSPP)

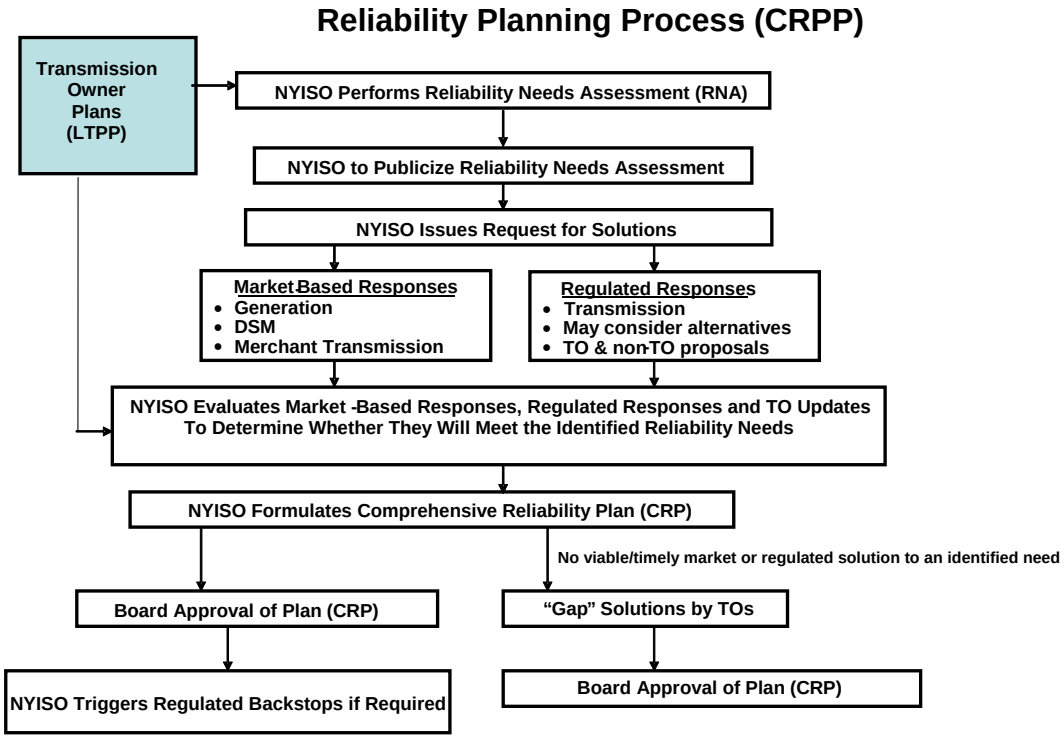
B.1 Comprehensive System Planning Process (CSPP)

The CRPP is part of the NYISO's newly expanded planning process known as the Comprehensive System Planning Process (CSPP). The public policy context underlying the NYISO's Comprehensive Reliability Planning Process (CRPP) changed substantially over the last year, at both the federal and state levels. In Order 890, the FERC determined that the Open Access Transmission Tariffs (OATT) of electric transmission service providers nationwide should be reformed to provide for, among other things, an open, transparent and coordinated planning process at both a regional and a local level. Among other things, Order 890 cited the decline in transmission investment since its landmark open access Order 888 was issued in 1996, and the consequent growth in significant transmission constraints. Order 890 required the NYISO to file an expanded process in conformance with nine planning principals.

On December 7, 2007, the NYISO filed a Comprehensive System Planning Process (CSPP) as an amendment to its OATT Attachment Y that contained three main components; 1) the new Local Transmission Owner Planning Process (LTPP), 2) the existing CRPP process, and 3) the new economic process called the Congestion Assessment and Resource Integration Study (CARIS). The new LTPP process will provide the opportunity for stakeholders to participate in the TOs local planning efforts and will form an input into the CRPP. The NYISO filed only minor changes to the CRPP to make corrections and conform to the FERC planning principles. The CRPP process, in particular the CRP, will form the basis of a new economic planning process, known as CARIS. The CARIS will consist of a series of three studies of future congestion on the New York bulk power system, including an analysis of the costs and benefits of alternatives to alleviate that congestion. The NYISO proposed that economic transmission upgrades could proceed with cost allocation to all beneficiaries if at least 80% of the designated beneficiaries vote in favor. On October 16, 2008, the FERC conditionally approved the NYISO's planning compliance filings, subject to certain conditions. The NYISO made a further compliance filing on January 18, 2009 to clarify certain matters in Attachment Y, including dispute resolution, transparency, the ability to replicate study results, public participation, and the comparable treatment for transmission, generation and demand response resources. FERC has granted the NYISO's request for an additional 120 days, until May 19, 2009, to make a further compliance filing providing further detail on additional metrics to be used in evaluating the costs and benefits of transmission projects that would relieve congestion, and on cost allocation and cost recovery from economic transmission projects.

Figure B-1 below summarizes the newly CSPP process.

NYISO Comprehensive System Planning Process (CSPP)



Economic Planning Process (CARIS)

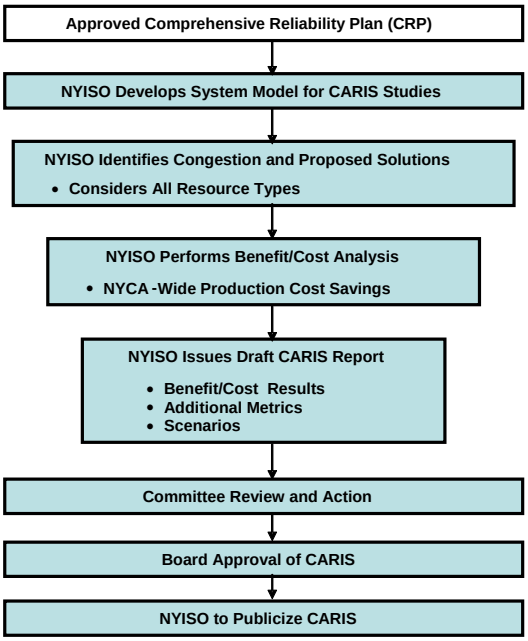


Figure B-1: Comprehensive System Planning Process

B.1.1 NYISO Reliability Planning Process - 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.

As set forth in NYISO OATT, Attachment Y, the five objectives of the CRPP are as follows:

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 an opportunity and 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 for the development of Market-Based Solutions, while maintaining the reliability of the BPTF through Regulated Backstop Solutions as needed.
5. Coordinate the NYISO's reliability assessments with those undertaken by neighboring control areas.

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

The second step in the CRPP process is the development of the Comprehensive Reliability Plan (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 expanded demand response programs.

A detailed description of the CRPP is contained in the CRPP Manual, which is posted on the NYISO's website, http://www.nyiso.com/public/documents/manuals/planning.

B.1.1.1 Summary of Reliability Policies and Criteria Applicable to the NYISO

The foundation of the CRPP is the reliability policies and criteria applicable to the NYISO. The phrase "reliability policy and criteria" is used broadly to include standards, requirements, guidelines, practices, and compliance. The following presents an overview of these policies and criteria in the context of basic reliability concepts and the organizations that develop, promulgate, implement, and enforce the related policies and criteria.

B.1.1.2 Basic Reliability Concepts

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 refers to 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 not 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 bulk power system is planned to meet a LOLE representative of an involuntary load disconnection event not more than once in every 10 years, or 0.1 days per year. This requirement forms the basis of New York's resource adequacy and installed capacity (ICAP) requirements.

Security is an operating and deterministic concept. This means that possible events are identified as having significant adverse reliability consequences and the bulk power 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 minus 1" (N-1), "N minus 1 and minus 1" (N-1-1), or "N minus 2" (N-2). In this definition, "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. 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.

B.1.1.3 Organizational Structure

Reliability policies are developed, promulgated, implemented, and enforced by various organizations at different levels. These include federal and state regulators, industry-created organizations such as the NERC and its member organizations, transmission owners, and energy market participants.

The NERC was formed as a voluntary, not-for-profit organization in 1968 in response to the blackout of 1965. A 10-member Board of Trustees governs the NERC with input from an industry stakeholder committee. The NERC has formulated planning standards and operating policies. Pursuant to the Energy Policy Act of 2005, the FERC approved the NERC as the Electric Reliability Organization for North America in 2006. The FERC has approved many NERC standards as enforceable as of June 18, 2007, and the NERC and the FERC are in the process of approving additional standards that carry the weight of federal law.

Eight regional reliability councils currently comprise the NERC's membership; and members of these councils come from all segments of the industry. New York State is an area within the NPCC, which also includes New England and northeastern Canada. The NPCC implements broad-based, industry-wide reliability standards tailored to its region. The NERC and the NPCC have received the FERC's approval of a delegation agreement by which the NPCC oversees and enforces compliance with NERC and NPCC standards in the northeastern regions of the United States and Canada.

New York State also has its own electric reliability organization, which is the NYSRC. The NYSRC is a not-for-profit organization that promulgates reliability rules and monitors compliance on the New York bulk power system. The NYISO, and all organizations engaging in electric transactions on the state's power system must comply with these rules. Thirteen members from different segments of the electric power industry govern the NYSRC. New York-specific reliability rules may be more detailed or stringent than NERC Standards and Policies and NPCC Criteria. Local reliability rules that apply to certain zones within New York may be even more stringent than statewide reliability rules.

B.1.1.4 Reliability Policies and Criteria

Similar to the national, regional and state levels of reliability organizations, there are national, regional and state levels of documents comprising the reliability standards, policies and criteria that govern the New York bulk power system. Presently, the NERC has two major types of standards: Operating Standards and Planning Standards.

Planning Standards provide the fundamental planning requirements. The interconnected bulk electric system must be planned so that the aggregate electrical demand and energy requirements of customers are satisfied, taking into account scheduled and reasonably expected unscheduled outages of system elements, and capable of withstanding sudden disturbances. Regional Councils may develop planning criteria that are consistent with those of the NERC.

Operating Standards provide the fundamental operating requirements. The interconnected bulk electric system must be operated in secure state such that the aggregate electrical demand and energy requirements of customers are satisfied in real time. Responsibility for reliable operation is vested primarily with the NYISO. The objective of these Operating Standards is to promote reliable interconnection operations within each of the three interconnections in North America without burdening other entities within the interconnection. The NYISO is within the Eastern Interconnection.

NPCC has three basic categories of documents: Criteria, Guidelines, and Procedures, respectively referred to as Type A, B, and C documents. The foundational NPCC document is A-2, Basic Criteria for Design and Operation of Interconnected Power Systems, which establishes the principles of interconnected planning and operations.

The NYSRC Reliability Rules for Planning and Operating the New York bulk power system include the required rules and define the performance that constitutes compliance. These rules include NERC Planning Standards and Operating Policies; NPCC Criteria, Guidelines and Procedures; New York-specific reliability rules; and local transmission owner reliability rules. The NYISO's implementation and compliance with NYSRC Reliability Rules are codified in its Operations, Planning, and Administrative manuals and other written procedures.

The NYSRC establishes the annual statewide installed capacity requirement (ICR) to maintain resource adequacy. The ICR is expressed as an Installed Reserve Margin (IRM), which is the percentage of capacity above 100 percent that is required. Factors that are considered in establishing the ICR include the characteristics of loads, uncertainty in load forecast, outages and deratings of generation units, the effects of interconnections on other control areas, and transfer capabilities of the New York bulk power system. The NYISO determines ICAP requirements for load serving entities (LSEs), including locational ICAP requirements for New York City and Long Island.

B.2 NYISO Economic Planning Process - CARIS

Upon the approval and issuance of the 2009 CRP, the NYISO will start with the implementation of the newly adopted economic planning process called CARIS. The CARIS will align with the reliability planning process and will assume a reliable system for the ten-year study period based on the most recently approved CRP. Each CARIS cycle will consist of a series of three congestion studies developed with market participants' input and any additional studies for which individual market participants wish to pay. In conducting the CARIS, the NYISO will perform the cost/benefit analysis of each potential solution to the congestion identified by using the production cost metric as a primary benefit metric. All resource types, such as generation, transmission and demand respose will be considered on a comparable basis as potential solutions to congestion .

The objectives of the economic planning process are to: 1) project congestion on the New York State BPTFs over the ten-year planning period, 2) identify, through the development of appropriate scenarios, factors that might mitigate or increase congestion, 3) provide information to market participants and interested stakeholders regarding projects to reduce congestion;, 4) provide an opportunity for the development of market-based solutions to reduce the congestion; (5) provide a process for the evaluation and approval of regulated economic transmission projects in order to obtain cost recovery under the NYISO Tariff; , and 5) coordinate the NYISO's congestion assessments and economic planning process with neighboring Control Areas.

Appendix C – Summary of Market-Based Solutions and TOs' Updated Plans

Project Type	Submitted	MW	Zone	Original In-Service Date	Current Status[1]
Resource Proposals					
Gas Turbine NRG Astoria Re-powering[2]	CRP 2005, CRP 2007, CRP 2008	520 MW	J	Jan - 2011	New Target June 2012 NYISO interconnection queue projects # 201 and # 224
Simple Cycle GT Indian Point	CRP 2007, CRP 2008	300	H	May - 2011	Withdrawn
DSM SCR EnerNOC	CRP 2008	125	G, H, J	2012 - 2017	Withdrawn
DSM SCR ECS	CRP 2008	300	F, G, H, I, J	Ramps up from 2008 through 2012	Withdrawn
Empire Generation Project	CRP 2008	635	F	Q1 2010	New Target June 2010 Under Construction NYISO interconnection queue project # 69
Transmission Proposals					
Controllable AC Transmission Linden VFT	CRP 2007, CRP 2008	300 (No specific capacity identified)	PJM - J	Q4 2009 PJM Queue G22	On Target Under Construction NYISO interconnection queue project #125
Back-to-Back HVDC, AC Line HTP	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 Q4 2011 NYISO interconnection queue projects # 206
Back-to-Back HVDC, AC Line Harbor Cable	CRP 2007, CRP 2008 and was an alternative regulated proposal in CRP 2005	550 (550 MW specific capacity identified)	PJM - J	Jun - 2011	Withdrawn NYISO interconnection queue projects # 195 and # 253
Cross Hudson	CRP 2008	550	J	Jun - 2010	Withdrawn NYISO interconnection queue project # 255 Replaced with queue # 295
Cross Hudson II	CRP 2008	800	J	Jun - 2010	New Target June 2012 NYISO interconnect queue project # 295
TOs' Plans					
ConEd M29 Project	CRP 2005	N/A	J	May - 2011	Under construction NYISO interconnection queue projects # 153
Caithness	CRP 2005	310	K	Jan - 2009	Under construction NYISO interconnection queue projects # 107
Millwood Cap Bank	CRP 2007	240 Mvar	H	Q1 2009	New Target May 2009 Under construction

[1] Status as provided by Market Participant as of Dec. 31, 2008

[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.

Appendix D – Detail Technical Data

Power Flow Assessment Output (Subject to Confidential Energy Infrastructure Information (CEII)) - To be provided upon request