# 2010 Comprehensive Reliability Plan

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First DRAFT

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# EXECUTIVE SUMMARY

The 2010 Comprehensive Reliability Plan (CRP) is the fifth CRP completed by the NYISO and like its predecessors it presents a plan for the New York State Power System that will result in the reliability of the system being maintained during the planning horizon of 2011 to 2020. This result is predicated on a combination of resources and transmission facility additions and upgrades that are the result of market based projects and Transmission Owner (TO) plans. The plan consists of the following actions:

1. Implementation of the local TO plans, which includes the addition of 10 miles of new 345 kV cable between Sprain Brook in Westchester County and Sherman Creek in the Borough of Manhattan in New York City as well as the addition of numerous transmission facilities and upgrades to transmission facilities ranging from the 115 kV voltage level and up. Table 3-4 of the 2010 RNA contains a detailed list of these facilities.

2. Development of 1728 MW of new thermal generating facilities interconnecting within the NYCA that met the NYISO's base case inclusion criteria. These plants include the following:

    a) The 635 MW Empire Generating Plant in Zone F

    b) The 550 MW Astoria Energy II in Zone J

    c) The 513 MW Bayonne Energy Center connecting from New Jersey to Zone J

    d) Two smaller generating projects totally 30 MW

3. Projected demand response registration in the NYISO's ICAP/SCR market totaling 2,251 MW.

4. Existing generating unit uprates totaling 204 MW that met the NYISO's base case inclusion criteria. These uprates include the following:

    a) The Nine Mile 2 nuclear plant – 168 MW

    b) The Gilboa pumped storage Unit 4 – 30 MW

5. The achievement of the energy efficiency impacts, which are included in the forecast as peak load and energy reductions.

However, the 2010 CRP report has identified a number of uncertainties in the base case assumptions that could adversely affect the reliability of the system over the planning horizon. These are:

1. Higher than expected load growth that results from higher than expected economic growth or less than expected energy efficiency achievements or a combination of both.

2. A decision that fails to relicense the Indian Point Plant beyond their current operating licenses, which expire in 2013 and 2015 for Units 2 and 3, respectively. This 2010 RNA scenario analysis shows that LOLE would exceed the criteria threshold of 0.1 in 2016

with a forecasted LOLE of 0.14 that would rise to 0.38 in 2020. Adverse impacts would include loss of power supply and transmission voltage support affecting the metropolitan New York region.

3. New environmental regulatory programs designed to improve air quality and minimize the impact of a power plant's cooling water on aquatic life were also assessed for the potential impacts on reliability. These regulatory initiatives, which are being promulgated by both the state and federal governments' environmental regulatory bodies, will require considerable investment by the owners of New York's existing thermal power plants in order to comply with these new regulatory requirements if promulgated as currently proposed. The programs assessed were the following:

    a) NOx RACT – Reasonably Available Control Technology

    b) BART – Best Available Technology

    c) MACT – Maximum Achievable Control Technology

    d) BTA – Best Technology Available

The first three are designed to reduce power plant emissions while the last one addresses power plant cooling water. The magnitude of the required investments could lead to unanticipated plant retirements. The NYISO has determined that as much as 23,957 MW in the existing fleet or 64% of existing NYCA capacity will have some level of exposure to the new regulations as detailed in the RNA and further discussed in this 2010 CRP.

While the NYISO's reliability planning processes have had several years of proven success, these uncertainties will require much vigilance on the part of the NYISO and all its stakeholders for electric system planning is an ongoing process of evaluating, monitoring and updating base case assumptions as conditions warrant. The NYISO, through its CSPP, is well positioned to monitor and respond to changing conditions. The NYISO's Board of Directors may require the development of gap solutions to respond to unanticipated changes that pose an imminent threat to system reliability. Otherwise, changes in the base case assumptions will be reflected in the next CSPP cycle. The uncertainties notwithstanding, the NYISO believes its planning processes as in the past will continue to serve the electric consumer's of New York State now and into the future.

The 2005 CRP was the first CRP and since that CRP new thermal generation with a total summer capability of 3,209.4 MW has been added to the power system including 53.3 MW of methane gas fired generation, 1,225.7 MW of renewable nameplate wind generation and demand response has grown from an expected 1,349 MW by the end of the planning horizon to 2,251 MW with a total in excess of 2,000 MW available during the summer of 2010. Major transmission additions and upgrades to the transmission system have been put into service including two HVDC transmission lines connecting Long island with both the New England and PJM power systems. Finally, plant retirements totaling approximately 1,800 MW which includes 832 MW of coal plants have occurred.

Clearly, the reliability of the bulk power system has been maintained by a combination of additional resources, provided by independent developers in response to market forces and by the electric utility

companies who are obligated to provide reliable and adequate service to their customers. In addition, the NYISO interconnection queue has several thousand MW of proposed generation and transmission projects[1] being evaluated for interconnection to the New York power system. These potential new generation and merchant transmission projects also include projects that have been submitted as solutions in prior CRPs and whose development the NYISO continues to monitor and track.

Accordingly, the 2010 CRP based on its planned additions, future uncertainties and findings offers the following recommended actions:

1. The NYISO will monitor and track the implementation of planned generation additions and the level of SCR registrations as well as monitor for, and assess, any unplanned retirements.

2. The NYISO will monitor the development of new environmental regulations that impact the operation of power plants and evaluate their impact on power system reliability.

3. The NYISO will monitor the accuracy of the load forecast levels as impacted by the Energy Efficiency Portfolio Standard (EEPS) initiative and the economy to determine if any adverse trends or findings emerge.

4. Monitor and track the implementation of the TO LTPs and other planned transmission projects.

5. The NYISO will monitor and maintain the voltage performance levels on the bulk power system as established.

[1] Appendix C of this document contains examples of large thermal generating and HVDC transmission projects in the NYISO interconnection list that are currently awaiting development which totals 5967 MW based on summer ratings and includes only projects with a current status update of December 2009 or later.

# 1. Introduction

The NYISO, in collaboration with its stakeholders, is presently undertaking its new biennial Comprehensive System Planning Process[2] (CSPP) process pursuant to Attachment Y of the NYISO Open Access Transmission Tariff (OATT). The CSPP encompasses two primary processes: 1) reliability planning and 2) economic planning. In addition, the CSPP provides for cost allocation and cost recovery in certain circumstances for regulated reliability and economic transmission projects as well as the coordination of interregional planning activities. The Comprehensive Reliability Plan (CRP) is the final step of the CSPP's reliability planning processes, which consists of four steps outlined below that produce two primary reports (the RNA and the CRP):

1. Conduct the new Local Transmission Owner Planning Process (LTPP)[3]
2. Develop and prepare the Reliability Needs Assessment (RNA) for the 10-year study period, which includes the development of reliability scenarios
3. Request and evaluate solutions to identified Reliability Needs as required; and
4. Complete the Comprehensive Reliability Plan (CRP)

The purpose of the CRP is to set forth the NYISO's findings and recommendations with respect to the state of the reliability of the New York State Bulk Power System for both resource adequacy and transmission security. This document reports the CRP findings and recommendations for the Study Period 2011-2020.

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 who 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 by presenting summaries of the key elements from the 2010 Reliability Needs Assessment (RNA) that form the basis for the findings and recommendations contained in the 2010 CRP. These elements include the Transmission Owner's (TO) LTPs, a summary of the 2010 RNA base case analysis, a summary of the 2010 RNA scenario analyses and an update on the status of the resource and

[2] A detailed discussion of the CSPP can be found in the 2010 RNA Appendix B – see appendix A of this document.

[3] The first LTPP process was initiated in October of 2009. While the NYISO does not conduct planning for the local transmission system, the LTPP provides the opportunity for NYISO stakeholders to review and comment on the Local Transmission Plans (LTPs) for each Transmission Owner. This process is the first step in the CSPP cycle and results in the final LTPs submitted by each Transmission Owner becoming an input into the RNA base case.

transmission additions included in the CRP. Finally, this report concludes with the findings and recommendations of the 2010 CRP.

# 2. Development of the 2010 Comprehensive Reliability Plan

The development of the 2010 CRP represents the culmination of the reliability planning process phase of the NYISO's two-year CSPP. The NYISO will use the 2010 CRP as the foundation of the economic planning process, otherwise known as the Congestion Assessment and Resource Integration Studies or CARIS that will commence in 2011 as part of the current CSPP cycle.

The 2010 CRP reports the NYISO's findings and recommendations regarding the overall reliability of the New York State Bulk Power System throughout the ten-year study period (2011-2020). These findings and recommendations are developed from the analysis that was conducted for the 2010 RNA. The purpose of this section is to provide a summary of the LTPs, RNA, including its scenario analyses, and to review the status of the projects which support the findings and recommendations made in the CRP.

## 2.1 Local Transmission Owner Planning Process

The 2010 RNA process began with the Local Transmission Owner Planning Process. As described in Attachment Y of the NYISO OATT, the LTPP provides that each Transmission Owner that plans for their transmission systems, including the BPTFs and other NYS Transmission System facilities, to present to the NYISO's Electric System Planning Working Group their Local Transmission Plans (LTPs) for review and comment. Transmission Owners completed the LTPs and presented them to the NYISO and Stakeholders in October, 2009.

The finalized portions of the LTPs, prepared by the Transmission Owners in response to stakeholder comments, were reviewed by the NYISO and used as inputs to the RNA Base Case. For instance, the 2009 Consolidated Edison LTP identified the need for at least one 500 MW generator to connect to the 345kV system in Zone J. The 2010 LTP noted that the Astoria Energy Unit 2 is now under construction, and scheduled for completion on June 1st, 2011 and will interconnect in the same location as the Poletti unit. This generation project met the NYISO RNA Base Case inclusion rules and was included in the 2010 RNA Base Case.

A list of proposed transmission facilities that have been identified as firm plans by the TOs, and are included in the 2010 RNA Base Case, can be found on page 117 of the NYISO 2010 Gold Book. More information regarding the local transmission owner planning processes and the TOs local transmission plans can be found at the following link.

http://www.nyiso.com/public/markets_operations/services/planning/process/ltpp/index.jsp.

## 2.2 2010 RNA Summary

The 2010 RNA (see Appendix A) indicated that the planned baseline system as studied meets applicable Reliability Criteria for the next 10 years, from 2011 through 2020. As a result, the 2010

RNA, like the 2009 RNA, did not identify any Reliability Need. Therefore, the NYISO has not initiated a request for market-based or regulated solutions. The primary factors for the RNA's finding of no Reliability Need are reduced load growth, an increase in planned resources in the 2010 RNA including special case resources (SCR) when compared to the 2009 RNA, as well as minimal retirements over the ten year planning horizon.

Table 2.1 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.

| | 2009 RNA Horizon Year 2018 | 2010 RNA Year 2018 | Delta Year 2018 | 2010 RNA Horizon Year 2020 |
|---|---|---|---|---|
| NYCA Load | 35,658 | 34,672 | -986 | 35,334 |
| SCRs | 2084 | 2210 | 126 | 2251 |
| Capacity without SCRs | 40,452 | 41,239 | 787 | 41,239 |

**Table 2-1: Comparison of Load Forecast 2009 vs. 2010 RNA**

The RNA load forecast, resource additions, SCRs, generator retirements are summarized below. In addition, a discussion of the transmission security analysis conducted in the 2010 RNA, which forms the basis for the findings and recommendations contained in this CRP, is presented. A more detailed discussion can be found in the RNA Report, which was approved by the NYISO Board-of-Directors on September 21, 2010.

### 2.2.1 Lower Energy Forecast – two primary factors

1. The 2009 Recession: The effect of the 2009 recession was to reduce the peak demand forecast for 2011 by 1400 MW, before subtracting any energy efficiency impacts. This also reduced the projections of peak load in subsequent years.

2. Statewide Energy Efficiency Programs: This refers to the Governor's initiative to lower energy consumption on the electric system by 15% of the 2007 forecasted levels in 2015, which is otherwise known as the 15 by 15 initiative and is inclusive of the Public Service Commission's Energy Efficiency Portfolio Standard (EEPS). After extensive input from market participant, state regulators and other interested parties, the NYISO's projection of the energy savings associated with these energy efficiency programs was based upon several factors, including actual spending levels for PSC-approved programs, commitments to increase spending after 2011, actual implementation rates, expected participation and realization rates, and the energy efficiency plans developed by the New York TOs. The projections show an increase in energy savings of 2,805 GWh when compared to the 2009 RNA. The 2009 RNA included cumulative energy savings of 10,235 GWh by 2018. In the 2010 RNA, this value increased to 13,040 GWh by the year 2018 and to 13,684 GWh by the year 2020.

The 2010 RNA Base Case forecast reflects larger usage reductions due to energy efficiency than the preceding 2009 RNA Base Case forecast. Each of those base case forecasts was created by

subtracting a projected energy efficiency impact from the respective current econometric forecast. For example, in the case of the 2009 RNA Base Case energy forecast for 2015, 8086 GWh in projected energy savings were subtracted from the econometric energy forecast to reach the base case forecast. In the 2010 RNA, for the year 2015, 9914 GWh were subtracted from the current econometric forecast.

### 2.2.2 Generation Additions

Two new proposed generating plants totaling 1063 MW located in Zone J are included in the 2010 RNA Base Case, but were not included in the 2009 RNA base case. These proposed interconnection projects are listed as numbers 232 and 308 on the NYISO interconnection queue. Queue number 232 is the Bayonne Energy Center, a gas-fired, combined cycle plant that has a nameplate capacity of 513 MW and is scheduled to be in service by June 2011. Queue number 308 is the Astoria Energy II gas-fired combined cycle plant that has a nameplate capacity of 550 MW and is also scheduled to be in service by June 2011. Also, the base case now includes the gas-fired 635 MW combined cycle Empire Generating plant, two smaller generating units totaling 30 MW, and uprates to existing generating units totaling 204 MW.

### 2.2.3 Increased Registration in Special Case Resources (SCR)

The NYISO continues to experience increases in the registration of the SCR program that supply capacity resources to the system through the NYISO market. The NYISO has projected registrations of 2251 MW of SCRs, an increase of 167 MW of resources over the SCR levels included in the 2009 RNA Report.

### 2.2.4 Retirements

The 2010 RNA includes the retirement the retirement of two units in Zone C — the 52.2 MW coal fired Greenidge Unit 3 and the 40.2 MW coal fired Westover Unit 7. As result, the net increase in retirements in the 2010 RNA Base Case compared to 2009 RNA is 92.4 MW.

Since the completion of the RNA the NYISO received notification of the protective lay-up of the Greenidge Unit 4 and the Westover Unit 8 in upstate NY pursuant to the NYSPSC's Generator Retirement Notice Order. The Greenidge Unit 4 facility is a 108 MW net, coal and biomass-fired generating facility and the Westover Unit 8 facility is an 80 MW, coal-fired generating facility. These units are not being retired but "mothballed" because of current market conditions. The reliability impacts of these units not being available for dispatch are being evaluated in accordance with NYISO procedures and appropriate mitigation measures to maintain reliability will be developed as needed.

### 2.2.5 Transmission Security

Identifying a Reliability Need requires analysis and assessment of the transmission security of the BPTFs. Assessing transmission security involves the evaluation of the BPTFs from a thermal, voltage, stability and short circuit perspectives. The NYISO performed contingency analysis of

the BPTFs to test for thermal and voltage violations under pre- and post- contingency conditions. Additional analysis was performed for the critical contingencies to determine voltage-constrained power transfer limits. The impact of the status of critical generators on power transfer limits was also quantified. Throughout the study period (2011 – 2020) security for the BPTFs is maintained by limiting power transfers. To assist in its assessment, the NYISO also reviewed several previously completed transmission security assessments.

The NYISO performed the transmission system performance testing required for the RNA Base Case. The results of the AC contingency analysis demonstrated that the bulk power transmission facilities (BPTFs) were within the facilities' thermal and voltage limits. The testing included the ability of the BPTF to withstand the loss of any single facility as specified in the NYSRC Rules.

N-1-1 contingency assessments, which is the loss of a major generation or transmission facility followed by system adjustments and then any additional normal BPTF contingency, is also a part of the security assessment. These assessments were consistent with the NERC, NPCC and NYSRC reliability standards. The impact of the status of critical generators on transfer limits was quantified, primarily by performing VCAP analysis with the critical generator modeled out-of-service. An assessment of whether the planned bulk power system would meet N-1-1 reliability criteria was performed for the 2009 ATR. Since that analysis was performed additional resources in Zone J have met the rules for inclusion in the system model used in the RNA, as well as a reduction in forecast peak load.

TO's performed N-1-1 analysis as part of their LTPs that were reviewed by the NYISO. The NYISO is scheduled to prepare and submit to NPCC for review in 2011 a comprehensive Area Transmission Review (ATR). Areas within NPCC are required to conduct a comprehensive review at least once every five years. Usually, during the intervening years, interim or intermediate updates are provided depending on the degree of system changes that have occurred. As part of that comprehensive ATR review, a more focused and comprehensive N-1-1 analysis is being performed based on the findings of the LTPs. It is scheduled to be completed in early 2011 for delivery to NPCC and the NYSRC.

Short circuit analysis is another important element of performing an assessment of transmission security. It is the calculation of the short circuit currents 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 identified breakers that will need to be replaced because of increasing fault duty. The details of the analysis can be found in the 2010 RNA.

## 2.3 Scenario Summaries

As required by Attachment Y, the NYISO conducted analyses of numerous scenarios in order to test the robustness of the RNA Base Case findings and to identify potential conditions under which resource adequacy or transmission security criterion needs may arise. These scenario analyses revealed that:

1. The 2010 RNA conducted two alternative forecast scenarios. The first being the higher growth scenario that was entitled: "Econometric Forecast Scenario". It excluded any energy efficiency impacts and resulted in a peak load that was higher than the base case by 2,510 MW. This higher forecast resulted in a Reliability Need by 2019. The second was a lower growth scenario entitled: "45 x 15" Scenario. It assumed full achievement of the State's energy efficiency reduction target of 15% plus achievement of approximately 59% of the State's renewable energy portfolio standard This scenario resulted in a peak load that was 3,616 MW lower than the base case. More details regarding these scenarios can be found on page 30 of the 2010 RNA report – see Appendix A.

2. The Environmental Scenario examined the potential cumulative impact of multiple environmental regulations on electric system reliability. Four of evolving environmental initiatives that have sufficient definition of potential requirements, are generally widespread in effect, and are expected to require compliance actions in the earlier portion of the planning period some of which either individually or taken together could require substantial additional capital investment. Therefore, they could lead to premature retirements. The programs are estimated to impact 23,957 MW of capacity or 64% of NYCA's installed generating capacity with 18,609 MW estimated to require a major recapitalization. The draft Best Technology Available policy for cooling water systems is estimated to affect 12,619 MW and has the greatest estimates of compliance costs. In each of the superzones studied the amount of capacity requiring major investment is greater than the amount of capacity, identified in the zones at risk scenario that can be removed while maintaining reliability criteria.

3. The Indian Point Plant Retirement Scenario examined the impact on and risk to the electric system reliability of the unplanned retirement of both units (2060 MW) following the expiration of the plant's operating licenses. The analysis shows that LOLE would exceed the threshold criteria of 0.1 beginning in 2016 with a forecasted LOLE of 0.14 that would rise to 0.38 in 2020. In addition, transmission security analysis was performed which demonstrated thermal violations of applicable Reliability Criteria could occur.

4. The Zones at Risk Scenario determined the quantity of capacity that could be removed from a zone while maintaining an acceptable LOLE of 0.1. In separate studies, the levels of capacity removed in zones for 2020 without violating NYCA LOLE are: Zone J at 1000 MW, or Zone K at 1000 MW, or Zones G-I at 1000 MW total. These capacities cannot be removed simultaneously. For Zones A-F the removal of capacity and its impact on the reliability of the transmission system and the transmission system's transfer capability are highly location dependent. While the individual zone reductions ranged from 250 – 2500 MW, the study did not attempt to assess a comprehensive set of potential scenarios that might arise from specific unit retirements. Therefore, such calculated 250-2500 MW capacity removal from one of these zones should be further studied and verified according to the specific capacity locations in the transmission network.

5. In addition to the above load and resource scenarios, two transmission scenarios also where conducted. The first was entitled: "Existing Transmission for Native Load". It evaluated the impact of 1080 MW of grandfathered import rights of capacity from PJM on NYCA LOLE. The second was entitled: "Wheel Throughs". It evaluated the impact of a

300 MW firm contract through NY from Hydro Quebec to New England. These two scenarios had only a negligible impact on NYCA LOLE.

## 2.4 Status of CRP Market-Based Projects, Transmission Owner's Plans, and Energy Efficiency

A key element of the NYISO's reliability planning processes is the monitoring and tracking[4] of the facilities additions both resource and transmission that are the basis of the findings and recommendation contained in the CRP. In addition, the CRP assumes that State's energy efficiency program will results in a reduction in expected load growth. Below is the status of the major projects that are included in the CRP as well prior CRP solutions that are still under development but not in the Base Case. Also, below is the status of the TO plans and the impact of the various energy efficiency initiatives on the load forecast. The status of the CRP project status is reported by the following three categories:

1. Market Based Resource Proposals Submitted in Prior CRPs as Solutions
2. Market Based Resource Proposals Qualifying for inclusion in the RNA Base Case
3. Market Based Transmission Proposals

### 2.4.1 Market Based Resource Proposals from Prior CRPs as Solutions

Table 2.2 summarizes the status of 2010 CRP tracked Market-Based resource projects submitted as solutions in prior CRPs as of September 1, 2010.

| Project | NYISO Queue # | CRP Study | MW | Zone | Original In-Service Date | Current Status | 2010 Base Case RNA |
|---|---|---|---|---|---|---|---|
| Empire Generation | 69 | 2008 | 635 | F | Q1 2006 | On-line | Yes |
| NRG Astoria Repowering | 204 and 224 | 2005, 2007, and 2008 | 520 | J | June 2010 | June 2012 | No |

**Table 2-2: Status of Prior CRPs Market-Based Proposals**

### 2.4.2 Market Based Resource Proposals Included in the 2010 RNA Base Case

Table 2.3 summarizes the status of 2010 CRP tracked Market-Based resource projects qualifying for Inclusion in the CRP Base Case as of September 1, 2010 but have not been submitted as solution in prior CRPs.

[4] See Tech Bulletin 171 at:
http://www.nyiso.com/public/markets_operations/documents/technical_bulletins/index.jsp.

| Project | NYISO Queue # | MW | Zone | Original In-Service Date | Current Status |
|---|---|---|---|---|---|
| Bayonne Energy Center (Bayonne, NJ) | 232 | 512.5 | NJ - J | November 2008 | Draft IA prepared |
| Astoria Energy II | 308 | 550 | J | Q2 2011 | Construction 65% complete |

**Table 2-3: Status of Market-Based Proposals Qualifying for Inclusion in the Base Case**

### 2.4.3 Market Based Transmission Proposals

Table 2.4 summarizes the status of 2010 CRP tracked market-based transmission projects submitted as solutions in prior CRPs as of September 1, 2010.

| Project | NYISO Queue # | CRP Study | MW | Zone | Original In-Service Date | Current Status | 2010 Base Case RNA |
|---|---|---|---|---|---|---|---|
| Back-to-Back HVDC, AC Line HTP | 206 | 2007 and 2008 | 660(500 MW specific capacity identified) | PJM - J | Q2 2009 | Q2 2012 Article 7 Approved | No |

**Table 2-4: Status of Prior CRPs Market Based Transmission Proposals**

### 2.4.4 Transmission Owner Plans

Transmission owner's plans are now provided to the NYISO through the TOs local transmission planning processes. In addition, the TOs have undertaken a major long term transmission study initiative, which may result in future transmission additions that could be reflected in future LTPs. This initiative is known as "The New York State Transmission Assessment and Reliability Study" or "STARS". Below is the current status of the TOs LTPs and the STARS initiative.

#### *2.4.4.1 Status of Transmission Owner LTPs*

Subsequent to the RNA Base Case assumptions being finalized, National Grid informed NYISO that changes in the area peak loads have caused them to withdraw the Paradise Project from their LTP. It was determined to have no material impact on the RNA and future NYISO studies will adjust the peak loads and transmission configuration. The NYISO reviewed the TOs LTPP websites for announced updates to their LTPs and issued a request to the TOs asking if there were any material changes to their respective LTPs that the NYISO needs recognize.

#### *2.4.4.2 Status of the STARS Initiative*

The New York State Transmission Assessment and Reliability Study (i.e., the STARS initiative) is a major long-term (20-year) review of the transmission system in New York by the Transmission Owners. The objective of the study is to determine the long term reliability and economic upgrades alternatives, including smart grid applications, for the transmission system considering different capacity and transmission expansion and retirement plans. A major focus of the review is analysis of the age of existing transmission facilities and assessment of what their expected useful life is. The Study will propose various strategies for upgrading, refurbishing and/or building new transmission in New York to replace aging infrastructure, support the integration of renewables and improve the economic efficiency of the NY power grid.

The study began in early 2009 and is being conducted in three phases. Phase I, completed in January 2010, identified potential additional transfer capability needs to meet LOLE for various generation expansion scenarios. Phase II will identify the most suitable and cost effective transmission alternatives to replace aging infrastructure and achieve the necessary transfer capability. Phase III will include additional sensitivity analyses and assessments identified throughout Phases I & II. The NYISO is supporting this effort by providing the necessary databases and conducting the needed economic analysis. Phase II of the study is expected to be completed by the end of 2010.

### 2.4.5 Status of the Energy Efficiency Initiatives and Load Forecast

The NYISO continues to review the reported progress to date of the statewide energy efficiency programs for LIPA, NYPA, NYSERDA and EEPS. While the EEPS programs are lagging behind their goals, those of LIPA, NYPA and existing NYSERDA programs are on track.[5] Taken as a whole, the energy impacts of all these programs are consistent with those in the 2010 RNA forecast.

For 2010, the NYISO estimated that the total contribution from all programs would be 976 GWh on a calendar year basis.[6] Given information available through Q2, the NYISO has estimated that the programs will achieve about 900 GWh from the utilities, power authorities & NYSERDA, and perhaps another 60 GWh from codes and standards. This results in an expected total of 960 GWh for the year, compared to 976 GWh in the 2010 RNA forecast. For 2011, the forecast projects 1,646 GWh impact from NYSERDA and the state's utilities and power agencies, plus 238 GWh from codes and standards for a total of 1,884 GWh. The projected impact for just the EEPS

[5] In September 2010, the PSC issued a Notice of Proposed Rulemaking with respect to the EEPS programs and the associated utility financial incentive mechanisms. The PSC is considering whether and how to address changes to the EEPS incentives proposed by a number of the state's electric and gas utilities. Among the factors to be considered by the PSC are the level of financial incentives, the impact on performance due to the 2009 economic recession and subsequent slow recovery, the allocation of funding to various programs based on their effectiveness, and whether financial penalties for poor performance may be mitigated.

[6] Cumulative program impacts are reported on an annualized basis each quarter. The NYISO converts these annualized impacts to the calendar year impacts.

portion of the programs is 1,155 GWh, an increase from the previous year. Based on the 2010 RNA forecast of expected savings, the deviation between what has occurred and is expected to occur is fairly small at this point.

The NYISO continues to monitor the activity and progress of the state's utilities and agencies in their efforts to achieve the state's energy efficiency policy goals. As more experience is gained from observing actual levels of program spending and impacts, the NYISO's future projections of savings impacts will be updated in its planning studies.

The NYISO also monitors the accuracy of its own peak demand forecasts. For the most recent ICAP forecast of 2010, the projected NYCA summer peak demand of 33,025 MW exceeded the weather-adjusted peak of 32,625 MW by a margin of 400 MW (1.2%).[7]

# 3. 2010 Comprehensive Reliability Plan

The 2010 CRP builds upon the analyses and results contained in the 2010 RNA as well as NYISO's prior Comprehensive Reliability Plans in 2005, 2007, 2008 and 2009 respectively. The first three CRPs included the evaluation of market-based and regulated responses to the Reliability Needs identified by their respective RNAs. The 2009 RNA, with the reduced forecast associated with energy efficiency peak load reductions, increased generation and increased demand response, identified no Reliability Need. Therefore, the 2009 CRP indicated that the system was reliable for the 2009 through 2018 study period and contained no evaluation of market-based or regulated solutions.

The 2010 RNA also finds that the planned New York State bulk power system (BPS), as studied in the base case, meets applicable Reliability Criteria consistent with NERC/NPCC requirements. Therefore, the 2010 CRP did not include requests for market based and regulatory solutions were not necessary and no such solutions were evaluated for this plan. The plan, therefore, consists of the following actions that are consistent with the 2010 RNA Base Case assumptions:

1. Implementation of the local TO plans, which includes the addition of 10 miles of new 345 kV cable between Sprainbrook in Westchester County and Sherman Creek in the Borough of Bronx in New York City as well as the addition of numerous transmission facilities and upgrades to transmission facilities ranging from the 115 kV voltage level and up. Table 3-4 of the 2010 RNA contains a detailed list of these facilities.

2. Development of 1728 MW of new thermal generating facilities interconnecting within the NYCA These plants include the following:

    a) Zone F: 635 MW Empire Generating Plant

    b) Zone J: 550 MW Astoria Energy II

    c) Zone J: 513 MW Bayonne Energy Center connecting from New Jersey

[7] The weather-adjusted summer peak demand was reviewed in September 2010 by the Load Forecasting Task Force, as part of the 2011 Installed Reserve Margin study. The weather adjustment will be reviewed again by the LFTF during the development of the 2011 ICAP forecast.

3. Two smaller generating projects totally 30 MW

4. Registration of 2,251 MW of demand response resources in the NYISO's ICAP/SCR program through 2020.

5. Existing generating unit uprates totaling 204 MW that met the NYISO's base case inclusion criteria. These uprates include the following:

   a) Nine Mile 2 nuclear plant – 168 MW

   b) Gilboa pumped storage Unit 4 – 30 MW

6. The retirement of the 890.7 MW Charles A Poletti steam generating plant[8] in Zone J plus the retirement of 92.4 MW of coal capacity in upstate New York.

7. The achievement of the energy efficiency impacts which are included in the forecast as peak load and energy reductions.

8. The CRP also includes the Stephentown 20 MW flywheel project which is designed to provide regulation service.

This 2010 CRP describes a reliable system throughout the 10-year study period without any new resource facility additions beyond those assumed in the 2010 RNA Base Case. As discussed below, however, the NYSIO conducted scenarios to assess the robustness of the base case studies with regard to identified uncertainties in the Base Case assumptions in order to identify conditions under which reliability violations may occur. If there is a change to the Base Case assumptions that is demonstrated by the RNA scenarios to create an imminent threat to system reliability the NYISO Board, in consultation with the NYDPS, may request a gap solution from the appropriate TOs for consideration by the NYISO. In addition, the NYISO interconnection queue has several thousand MW of proposed generation[9] and transmission projects being evaluated for interconnection to the New York power system. Below are the summaries of the findings of the 2010 RNA scenarios.

## 3.1 Findings of the RNA Scenarios

The reliability scenarios conducted in the 2010 RNA, however, have determined that there are potential uncertainties in the Base Case assumptions that could impact the reliability of the bulk power system.

### 3.1.1 Higher Than Expected Load Growth

The higher than expected load growth scenario as described in section 2.3 found the Reliability Need would occur by 2019.

[8] The Poletti retirement was also included in the 2009 RNA Base Case.

[9] Appendix C of this document contains examples of large thermal generating and HVDC transmission projects in the NYISO interconnection list that are currently awaiting development which totals 5967 MW based on summer ratings and includes only projects with a current status update of December 2009 or later.

### 3.1.2 Environmental Initiatives and Zones at Risk

The 2010 Environmental Scenario was conducted to identify the population of generation resources that are likely to require major capital reinvestment decisions to comply with several evolving environmental program initiatives. The premise of this analysis is that the risk of unplanned retirements is directly related to the cumulative capital investment required. This scenario analysis identified when and where these risks may occur on the New York Power System as a result of more stringent environmental requirements.

The State's Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency annually publish their respective regulatory agendas describing the new environmental initiatives that it will focus on during the coming year. Four new regulatory programs were selected for this analysis: Reasonably Available Control Technology for Oxides of Nitrogen (NOx RACT), Best Available Retrofit Technology (BART), Maximum Achievable Control Technology (MACT), and Best Technology Available (BTA). These programs were selected for evaluation because they are generally widespread in effect, are sufficiently defined with proposed compliance requirements, and are expected to require compliance actions in the earlier portion of the planning period. Further, the individual or combined impact is likely to require substantial additional capital investment by existing generators and therefore could lead to premature retirements. The NOx RACT, BART, and MACT are programs designed to lower emissions from fossil fueled power plants. The BTA program is designed to minimize the impact of power plant cooling water systems on aquatic life.

Each of the four programs was examined to determine the category of capital cost potentially required of affected units to comply with each program. Three category levels were used to qualify the expected impacts of each program on the existing generation fleet. The capital cost to achieve compliance by each generator was considered for each of the four programs and then the impact was aggregated for all of the four programs.

The programs are estimated to impact 23,957 MW of capacity in the NYCA or 64% of the installed generating capacity NYISO currently relies on to meet the electricity needs of New York consumers. 18,609 MW of capacity is estimated to require a major recapitalization as a result of the cumulative compliance requirements; and 12,619 MW of capacity is impacted by the draft BTA policy, which has the greatest estimates of compliance costs when compared to the three regulatory air quality programs. The environmental initiatives studied could result in LOLE violations if multiple unit retirements were to occur. All plant retirements will require more focused zonal and specific transmission security analyses.

Subsequent to the completion of this analysis in the 2010 RNA, the USEPA released the proposed Clean Air Transport Rule (CATR), which is intended to replace the Clean Air Interstate Rule (CAIR) that had been vacated by the Courts, for public comment. The new proposal consists of three possible rules of which one variant will ultimately be selected. The proposal allocates an emission budget to New York that is significantly reduced compared to the CAIR budget. The first stage of

reductions is required in 2012 with a greater reduction required in 2014. Additional reductions of NOx will be required once the NAAQS for ozone is finalized.

### 3.1.3 Indian Point Plant Retirement Scenario

The Indian Point Plant has two base-load units (2060 MW) located in Zone H in Southeastern New York, an area of the State that is subject to transmission constraints that limit transfers in that area. The owner of Indian Point Plant has applied to the Nuclear Regulatory Commission to extend the operating permits for both units. This scenario evaluates the impact on and risk to reliability from both a resource adequacy (i.e., LOLE) and transmission security perspectives if these plants do not operate beyond the expiration of the current operating permits. The license for Indian Point Plant unit 2 expires in 2013 while the license for unit 3 expires in 2015. The scenario uses the Base Case load forecast assumptions. The analysis shows that LOLE would exceed the threshold criteria of 0.1 in 2016 with a forecasted LOLE of 0.14 that would rise to 0.38 in 2020.

A transmission security assessment was performed which demonstrated thermal violations of applicable Reliability Criteria. Furthermore, under stress conditions, the voltage performance on the system without the Indian Point Plant would be degraded. In all cases, power flows on the system into Southeast New York after the retirement of the Indian Point generation cause increased reactive power losses in addition to the loss of the reactive output from the plant. It could be necessary at times to take emergency operations measures, including load relief, to eliminate the transmission security violations in Southeastern New York.

## 3.2 CRP Findings and Recommendations

### 3.2.1 Finding One

**Finding:** While there was no Reliability Needs identified in the 2010 RNA, the NYISO must be prepared to act should conditions change establishing an immediate Reliability Need that requires a solution. The Indian Point and environmental scenarios clearly indicate that there is significant risk that generating units that are expected to be in service through 2020 may retire. This could adversely impact system reliability in multiple ways if one or more units were to retire unexpectedly in the study period. Also, proposed generation resources and transmission additions that are included in the RNA Base Case could be significantly delayed or fail to materialize at all. The NYISO must therefore continue to assess the ongoing viability of existing resources as well as planned resource additions. In the event that an unexpected need develops, the NYISO Board of Directors will need to take immediate action. This finding resulted in the following recommended action.

***Recommended Action:*** *The NYISO will continue to monitor and track the implementation of planned generation addition and the level of SCR registrations as well as monitor for, and assess, any unplanned retirements.*

***Recommended Action:*** *The NYISO will monitor the development of new environmental regulations that impact the operation of power plants and evaluate their impact on power system reliability.*

### 3.2.2 Finding Two

**Finding:** The effect of the 2009 recession was to reduce the peak demand forecast for 2011 by 1400 MW, before any energy efficiency adjustments. This also reduced the projections of peak load in subsequent years. The 2010 RNA Base Case forecast also reflected larger energy efficiency usage reductions than the 2009 RNA Base Case forecast. The 2010 RNA cumulative energy savings increased to 13,060 GWh by 2018 and to 13,684 GWh in 2020 as compared to 10,235 GWh by 2018 in the 2009 RNA. Any short fall in achieving these savings or higher load growth than expected could adversely affect the reliability of the BPS. This finding results in the following recommended action.

***Recommended Action:*** *The NYISO will continue to monitor the accuracy of the load forecast levels as impacted by the Energy Efficiency Portfolio Standard (EEPS) initiative and the economy to determine if any adverse trends or findings emerge. Quarterly reports will be presented at the NYISO's ESPWG.*

### 3.2.3 Finding Three

**Finding:** A key element of the reliability of the BPS is the upgrading and addition of bulk power transmission facilities. The 2010 CRP includes the addition of transmission facilities as proposed by the TOs in their Local Transmission Plans. These upgrades and additions need to be monitored and tracked just as the resource additions are. This finding results in the following recommended action.

***Recommended Action:*** *The NYISO will monitor and track the implementation of the TO LTPs and other planned bulk power transmission projects.*

### 3.2.4 Finding Four

**Finding:** As reflected in the NYISO RNA studies, voltage constraints are the limiting factor on some key interfaces in the New York Control Area. The NYISO will continue to monitor the voltage performance of the NYCA system to determine that voltage based transfer limits do not degrade below the levels determined in the 2010 RNA. The NYISO will continue assessing reactive power assumptions such as load power factor, generator reactive performance, resource commitment, and losses. Finally, the NYISO should continue to investigate procedures and/or measurements governing reactive power to identify additional factors that could enhance or improve reliability through managing the voltage performance of New York's bulk power system. The NYISO is also participating in the PSC proceedings on reduction of losses on electric transmission and distribution systems. This finding resulted in the following recommended action.

***Recommended Action:*** *The NYISO will monitor and maintain the voltage performance levels on the bulk power system as established in the 2010 RNA.*

# A. Appendix A – The 2010 RNA

The 2010 RNA can be found on the NYISO website at the following location:

http://www.nyiso.com/public/webdocs/services/planning/reliability_assessments/2010_Reliability_Needs_Assessment_Final_09212010.pdf

## B. Technical Data

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

# C. Examples of Projects Awaiting Development

| Queue Position | Owner/Developer | Project Name | Date of Initial Request | Summer MW | Winter MW | Type/Fuel | Zone |
|---|---|---|---|---|---|---|---|
| Generation Projects | | | | | | | |
| 201 | NRG Energy | Berrians GT | 8/2005 | 200 | 200 | Combined Cycle/Natural Gas | J |
| 224 | NRG Energy | Berrians GT II | 8/2006 | 50 | 90 | Combustion Turbine/Natural Gas | J |
| 251 | CPV Valley, LLC | CPV Valley Energy Center | 7/2007 | 656 | 753 | Combined Cycle/Natural Gas | G |
| 261 | Astoria Generating Company | South Pier Improvement | 10/2007 | 105 | 108 | Combustion Turbine/Natural Gas | J |
| 266 | NRG Energy | Berrians GT III | 11/2007 | 744 | 789 | Combined Cycle/Natural Gas | J |
| 281 | Riverbank Power Corporation | Riverbank Power G | 2/2008 | 1000 | 1000 | Pumped Storage | G |
| 310 | Cricket Valley Energy Center, LLC | AP Duchess | 9/2008 | 1002 | 1115 | Combined Cycle/Natural Gas | G |
| | **MW Totals** | | | **3757** | **4055** | | |
| **Transmission Projects** | | | | | | | |
| 206 | Hudson Transmission Partners | Hudson Transmission | 12/2005 | 660 | 660 | DC/AC | J |
| 306 | Transmission Developers Inc. | Clay HVDC | 7/2008 | 2000 | 2000 | DC Transmission | C, J |
| 307 | New York Wire, LLC | New York Wire – Phase 1 | 7/2008 | 550 | 550 | DC Transmission | J |
| | **Total MWs** | | | **3210** | **3210** | | |

**Table C-1: Examples of Projects Awaiting Development**