2012 Comprehensive Reliability Plan

New York Independent System Operator

FINAL DRAFT REPORT

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Table of Contents

Table of Tables

Table of Figures

EXECUTIVE SUMMARY

The 2012 Comprehensive Reliability Plan (CRP) is the sixth CRP completed by the NYISO. Based upon its updated base case, the 2012 CRP determines that additional resources are needed over the last two years of the Study Period 2013-2022 in order for the New York Control Area (NYCA) to be in compliance with applicable reliability criteria.

Without these additional resources, the Reliability Needs first identified in the 2012 Reliability Needs Assessment (RNA), and subsequently confirmed in the 2012 CRP, would not be mitigated. Transmission security violations were identified starting in year 2013 and Resource Adequacy needs starting in 2021. In order to mitigate these deficiencies, the NYISO requested market-based, regulated backstop, and alternative regulated solutions to the identified Reliability Needs. Market-based solutions are the preferred means to meet the future Reliability Needs, with regulated backstop and alternative regulated solutions available to be triggered, if needed. This CRP reports that market-based, regulated backstop and alternative regulated solutions have been proposed to meet the reliability needs first identified in the 2012 RNA.

The NYISO designated certain Transmission Owners (TOs) responsible for developing regulated backstop solutions to address the Reliability Needs identified in the RNA. As part of their planning responsibilities, the TOs updated their Local Transmission Plans (LTPs) as necessary and also submitted regulated backstop solutions to meet the identified Reliability Needs over the ten-year period (2013-2022). Simultaneously, developers submitted market-based solutions and alternative regulated solutions to the NYISO. Before evaluating these solutions, the NYISO updated its RNA study model for the CRP to reflect the announced intention to mothball the Cayuga Units 1 & 2, and to reflect the rescission of the retirement intention notice for Gowanus 1 & 4. The decision to continue the operation of the Gowanus 1 & 4 units moved the first year of resource adequacy need from 2020 to 2021. The January 3, 2013 notice to the PSC of the "Intent to retire Dynegy Danskammer," after the CRP base case was developed, is not modeled in the CRP base case.

Based upon its evaluation of the market-based solutions and the most recent LTPs from the TOs, the NYISO has concluded that there are sufficient proposed market based resource additions which, if developed, would allow the NYCA to be in compliance with the resource adequacy criteria for the next 10 years. Based upon the TO LTPs and proposed specific operating instructions for certain needs, the NYISO has further concluded that there are sufficient solutions to mitigate the transmission security issues identified as Reliability Needs in 2013. Accordingly, the NYISO has determined that no additional action needs to be taken at this time by the NYISO to implement any regulated backstop solution or any alternative regulated solution to address the resource adequacy needs identified in the 2012 RNA and confirmed in the 2012 CRP. The NYISO will continue to monitor the progress of the market-based solutions and TO LTPs through its quarterly monitoring program. If these solutions fail to make adequate progress, the NYISO may need to trigger a gap or regulated backstop solution to meet system reliability needs.

The 2012 Comprehensive Reliability Plan contains the following recommended actions:

1. Because market-based solutions should be developed rather than calling upon the development of any of the submitted regulated solutions, the NYISO should monitor and track the NRG proposal to repower Astoria, the only market-based solution capable of fully meeting the 2021-2022 resource adequacy needs. The NYISO will continue to monitor, evaluate and report, on a quarterly basis, the viability and timeliness of all submitted market-based solutions and will be prepared to trigger a gap or regulated backstop solution, if necessary, in accordance with established procedures.[1]

2. The in-service dates for the TO LTPs need to be maintained and operational procedures available in order to avoid the transmission security violations which would otherwise occur. The NYISO will continue to monitor and report the status of LTPs associated with the bulk and non-bulk reliability needs identified in the RNA and CRP studies.

3. Other system planning activities, such as those encompassed by the New York Energy Highway Blueprint, will need to be considered within NYISO reliability planning activities. The NYISO will continue to monitor and participate in other planning activities including, but not limited to, NYPSC proceedings considering AC Transmission Upgrades, Indian Point Reliability Contingency Plans, and Repowering of Generation.

4. The NYISO planning processes, including the 2014 RNA, need to actively monitor and address the potential impacts of additional system changes and known risk factors. The monitoring needs to include the projects being developed in response to the Dunkirk and Cayuga mothballing announcements.

Summary of Findings

The CRP findings and risk factors are summarized here and discussed in more detail in Section 5.

Finding One – Transmission Security and Adequacy

The Reliability Needs identified in the RNA for 2013 in the Rochester and Syracuse areas will be resolved with permanent solutions identified in the most recent TO LTPs by 2017. In the interim, mitigating measures, including local operational procedures, as described in Section 3.1.1, will be called upon if required to prevent overloads. The Reliability Need identified for Ramapo 345/138 kV

[1] See NYISO Technical Bulletin 171, Subject: Monitoring Viability of Solutions to Meet Reliability Needs: http://www.nyiso.com/public/webdocs/markets_operations/documents/Technical_Bulletins/Technical_Bulletins/Technical_Bulletins/tb_171.pdf

transformers in 2013 will be mitigated by the installation of new independent protective relaying as described in Section 3.1.1.

Finding Two – Resource Adequacy

The market-based solutions, if they are constructed, are fully sufficient to maintain the LOLE criteria for the second five year period. The 405 MW net increase of generation resources proposed to be added before 2021 in Zone J will need to maintain a schedule for permitting, construction, and entering into service in time to fully meet the identified resource adequacy needs in 2021 and 2022.

Finding Three – Plan Risk Factors

The planned system meets the reliability criteria with the proposed market-based solutions studied. In addition to a number of uncertainties identified in the 2012 RNA related to the base case assumptions, several risk factors exist that could adversely affect the implementation of the plan and hence system reliability over the ten year planning horizon. These factors, which require ongoing review and assessment, include:

1. The New York TOs need to proceed on schedule for completion with their LTPs as planned. If a delay occurs in planned local projects, the NYISO will reevaluate the impact of the delay at that time, considering all other appropriate system changes, to determine whether a reliability need will arise.

2. The viability of market-based generation solution development may depend upon many factors which can influence their timely completion, including but not limited to, interconnection requirements, financing, or future market conditions

3. Retirement of additional generating units beyond those already contemplated in the 2012 RNA for either economic or environmental factors could adversely affect the reliability of the NYCA bulk power system beyond what has been identified in this CRP. The retirement of the Danskammer generating plant, which was announced after the CRP base case was finalized, will advance the year of resource adequacy needs by two years to 2019. The completion of market-based solutions identified in this CRP would address these resource adequacy needs until 2021. The NYISO recognizes that numerous risk factors can contribute to reliability concerns with the need to take swift actions to maintain reliability which, depending on the units in question, may need to be preceded by putting sufficient replacement resources into operation. Emphasis should be placed on identifying generator retirements that could occur from economic or environmental factors.

4. If the Indian Point Power Plant licenses are not renewed, and the plant were to retire by the end of 2015 or thereafter, it would result in immediate violations of transmission security and resource adequacy criteria unless sufficient replacement resources can be put into operation before the retirement. A PSC proceeding, Case

12-E-0503, has been commenced to formulate a Reliability Contingency Plan to address the possible closure of the nuclear generating facilities at the Indian Point Energy Center.

While there are efforts underway to enhance planning and communication between the electric and gas sectors, significant increased reliance on natural gas as the primary fuel for electric generation has raised concerns for maintaining electric reliability. The future adequacy of the natural gas infrastructure to meet the coincidental requirements of gas utilities and electric generators requires careful study.

Conclusion

This 2012 CRP determines that under the conditions studied, and with the market-based solutions submitted and the Responsible TO updated Local Transmission Plans, the proposed system upgrades and local transmission solutions will maintain the reliability of the New York bulk power system. The projects included in the regulated backstop or alternative regulated solutions, if they need to be triggered or they are otherwise put into service, may further improve system reliability. Market-based projects may also further improve system reliability.

1. Introduction

The NYISO's planning process, known as the Comprehensive System Planning Process[2] (CSPP), pursuant to Attachment Y of the NYISO Open Access Transmission Tariff (OATT), is a biennial process which encompasses two distinct assessments: 1) a reliability planning assessment, also known as the Comprehensive Reliability Planning Process (CRPP); and 2) an economic planning assessment, also known as Congestion Assessment and Resource Integration Study (CARIS). 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.

1.1 The CRPP

The Comprehensive Reliability Plan (CRP) is the final step of the CRPP, consisting of four steps outlined below that produce the RNA and the CRP reports:

1. Conduct the Local Transmission Owner Planning Process (LTPP)[3]
2. Develop and prepare the 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. Confirm system needs using the CRP base case and prepare the CRP report setting forth the NYISO's findings and recommendations including whether implementation of a regulated solution is necessary.

1.1.1 The CRP

The CRP sets forth the NYISO's findings and recommendations for the 2012 CRPP cycle with respect to the state of the reliability of the New York State Bulk Power System for both resource adequacy and transmission security. These findings and recommendations must include any determination that implementation of a regulated or Gap Solution is necessary to ensure system reliability during the study period.

The 2012 CRP builds upon the analyses and results contained in the 2012 RNA, as well as the NYISO's prior Comprehensive Reliability Plans (2005, 2007, 2008, 2009, and 2010 as applicable). The first three CRPs addressed the reliability needs identified by their respective RNAs, and included the evaluation of market-based and regulated responses to the Reliability Needs. The

[2] A detailed discussion of the CSPP can be found in the 2012 RNA Appendix B.

[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 LTPs for each Transmission Owner. This process is the first step in the CSPP cycle and results in the latest LTPs submitted by each Transmission Owner becoming an input into the RNA base case.

2009 and 2010 RNAs identified no Reliability Needs, and their respective CRPs did not need to evaluate market-based or regulated solutions.

The development of the 2012 CRP represents the culmination of the most recent CRPP phase of the NYISO's two-year CSPP. The NYISO will use the 2012 CRP as a foundation for the economic planning process, otherwise known as CARIS, which commences again in 2013.

Continued reliability of the bulk power system during the Study Period depends on a combination of additional resources, provided by (i) independent developers that are responding to market signals, regulatory initiatives, and long term contracts, and (ii) electric utility companies which 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.

Substantial uncertainties exist in the next ten years. These uncertainties include, but are not limited to, the economy, state and federal environmental regulations and actions that may lead to the retirement of critical system resources, and the aging transmission and generation infrastructure. Each of these, and various other uncertainties, could create new reliability risks.

This 2012 CRP report describes the 2013-2022 reliability plan for the New York bulk power systems: Section 2 summarizes the 2012 RNA; Section 3 describes the proposed solutions to the identified reliability needs; Section 4 discusses the results of the evaluation of solutions; Section 5 presents the reliability plan and discusses the findings, actions and recommendations along with an analysis of the potential risks and mitigating factors that could affect the plan.

2. 2012 RNA Summary

2.1 Identified Reliability Needs

Based upon the base case assumptions that were applied, the 2012 RNA reported that the forecasted system first exceeds the Loss of Load Expectation (LOLE) criterion in the year 2020, and again in years 2021 and 2022. The Reliability Needs identified in these years are resource adequacy deficiencies in Zones G – K. The need could be resolved by adding capacity resources downstream of the transmission constraints, or by transmission reinforcement. Accordingly, the RNA designated Central Hudson, Consolidated Edison, New York State Electric & Gas, Orange & Rockland, and LIPA as the Responsible TOs required to develop a regulated backstop solution (RBS) to the identified resource adequacy needs. A regulated solution will be called upon by the NYISO should no timely market-based solution be available. Additionally, it was expected that NYPA would work cooperatively with the Responsible TOs to identify the RBS for the resource adequacy needs identified in the RNA.

The 2012 RNA found that transmission security violations could occur on bulk power facilities as early as 2013. Those facilities are owned by National Grid, Orange & Rockland, and Rochester Gas & Electric. Each of those TOs was designated as the responsible TO for presenting solutions to those Reliability Needs. Finally, a transmission security need was identified in 2022 on the Leeds – Pleasant Valley transmission corridor, but the RNA report found that addressing the resource adequacy need before 2022 would solve this transmission security issue.

The 2012 RNA also found that certain N-1 and N-1-1 Bulk Power Transmission Facility (BPTF) contingency outages in Zone A prevented the power flow from solving and other contingencies produced thermal and voltage violations on BPTF and non-BPTF in that zone for each year of the study period if the Dunkirk Plant were to retire.

The short circuit assessment in the 2012 RNA found that fault current levels in the NYCA decreased compared to the 2010 RNA findings, however due to lowered ratings of circuit breakers located at Scriba 345 kV, Porter 115 kV, and Porter 230 kV Substations, breakers at these stations would be overdutied.

More information about the 2012 RNA can be found at: http://www.nyiso.com/public/webdocs/media_room/press_releases/2012/pr_09182012_2012_rna.pdf

2.2 RNA Scenario Analysis

The RNA reported the results of five scenario analyses. Scenarios are variations on the RNA base case to assess the impact of possible changes in key study assumptions which, if they occurred, could change whether there could be Reliability Criteria violations on the NYCA system during the study period. The following five scenarios were evaluated as part of the RNA:

1. High Load (Econometric) Forecast - If the high load forecast were to materialize, the year of need for resource adequacy would be advanced by three years from 2020 in the base case to 2017 in the high load scenario.

2. Low Load (full 15 x 15 achievement) Forecast – The low load scenario shows that the 2022 LOLE would be 0.04, thus avoiding the LOLE violations noted in the base case and avoiding the projected overloads in 2022 on the Leeds/Athens – Pleasant Valley circuits

3. Indian Point Plant Retirement - violations of transmission security and resource adequacy criteria would occur immediately if the Indian Point Plant were to be retired by the end of 2015 (the latter of the current license expiration dates) using the base case load forecast assumptions.

4. Zonal Capacity at Risk – in separate studies for the year 2017, the levels of capacity removed in those zones without violating NYCA LOLE are Zone J up to 750 MW, or Zone K up to 500 MW, or Zones G-I up to 750 MW total. These capacities cannot be removed simultaneously. For super zone A-F, up to 3000 MW of capacity could be removed in 2017 without an LOLE violation.

5. All Coal Generation Retirement - studies show that the NYCA LOLE would exceed 0.1 in 2019, at least one year earlier than in the RNA base case.

2.3 RNA Approval

On September 17, 2012 the NYISO Board of Directors approved the 2012 RNA. Because the OATT calls for the NYISO to encourage Market-Based Solutions to identified reliability needs, the NYISO issued a request for those solutions on September 25, 2012. The NYISO requested that developers submit market-based solutions or alternative regulated solutions and that the Responsible TOs submit regulated backstop solutions to the identified reliability needs by November 15, 2012.

Potomac Economics, the NYISO's Market Monitoring Unit (MMU), reviewed the RNA. Dr. Patton reported that he found the NYISO markets are well-designed and generally provide efficient price signals. He also recommended that a limited number of methodological and market design improvements be considered to better facilitate investment and retirement decisions that will satisfy planning requirements. The full text of the MMU letter can be found on the NYISO web site at:
http://www.nyiso.com/public/webdocs/services/planning/reliability_assessments/MMU_Review_of_2012_RNA__10-5-12_Final.pdf

2.4 Changes to the RNA System Model

Since the RNA analysis was conducted, there have been some announced changes to the electric system that differ from the RNA's base case assumptions. These changes to the system include the modeling of the updated TO LTPs and the notice of intent to mothball the two Cayuga units[4] and the rescission of the notice of intent to retire the Gowanus Barges 1 and 4,[5] which were not modeled in the 2012 RNA. With these recent announcements the NYISO has updated the base case for the CRP to include the continuing operation of the Gowanus Barges and to remove both Cayuga units.

With the inclusion of Gowanus Barges 1 and 4 in the CRP base case, the first year of resource adequacy need moves from 2020 to 2021 and the transmission security need on the Leeds – Pleasant Valley transmission corridor identified in the RNA in 2022 is no longer observed.

As a result of the July 20, 2012 Cayuga mothball notice, DPS staff directed the NYISO and NYSEG to identify whether the mothball notice raised any reliability concerns and to propose solutions in the event the retirement adversely affected reliability by failing to meet applicable reliability criteria. The NYISO worked with the affected TOs (NYSEG and National Grid) to identify and develop a plan to resolve any reliability concerns that arise as a result of the generator retirement or mothball. This process identified 2013 criteria violations on local transmission facilities as well as on some Bulk Power Transmission Facilities. Under summer peak conditions, pre-contingency and post-contingency thermal overloads were identified on non-bulk and bulk transmission facilities in Zone C, as well as voltage collapse conditions following certain contingencies in Zone C.

In response to these reliability violations, the affected TOs identified several near term and longer term measures that mitigate these reliability issues. For the near term, NYSEG and the Cayuga Operating Company, LLC entered into a term sheet which was filed with, and approved by, the Public Service Commission (Case 12-E-0400). NYSEG and Cayuga then entered into a Reliability Support Services agreement (RSS) which keeps both Cayuga units in-service for a one year term, and provides NYSEG a right to request and negotiate in good faith an agreement to extend the operation of the units to address reliability issues. For the long term, both NYSEG and National Grid have developed and refined a plan for a set of permanent transmission infrastructure upgrades and additions that could be fully placed into service in the 2017 timeframe. These possible solutions are all located within Zone C and could include construction of a new 115 kV transmission line, along with reconductoring of up to three 115 kV transmission lines, limited structure replacement on two 115 kV transmission lines, and reconfiguration of two 345 kV substations. It is important to note that some of these permanent solutions will need to be evaluated in the State's regulatory siting processes. In addition to the RSS and the identified set of permanent infrastructure solutions, the

[4] http://www.nyiso.com/public/webdocs/services/planning/planned_gen_retirements/Cayuga_notice_to_PSC.pdf

[5] http://www.nyiso.com/public/webdocs/services/planning/planned_gen_retirements/Withdraw_of_Intent_to_Retire_Notification.pdf

PSC has ordered NYSEG to conduct an RFP process during the first-half of 2013 to determine if there are other, more efficient, solutions available to the reliability issues caused by the announced mothball/retirement of both Cayuga units. The TO solutions may need to be adjusted pending the outcome of the RFP process.

The NYISO has evaluated these preliminary TO permanent solutions as part of the PSC retirement process. The NYISO notes that in the near term the involved parties agreed to an RSS for 2013. The RSS also provides negotiation in good faith for an agreement to extend the operation of the unit(s) to address reliability issues beyond 2013. As such, the CRP assumes that the Cayuga units will remain in service until infrastructure and operational solutions, such as those that the affected TOs have put forward to resolve the reliability concerns and allow Cayuga to mothball or retire, are in place, and these possible solutions were evaluated in the CRP. Because these solutions fully mitigate any reliability violations on Bulk Power Transmission Facilities for the 10 year planning horizon, the NYISO does not at this time find any imminent threat to reliability associated with Cayuga's current intent to mothball its two units. In accordance with its reliability planning procedures, the NYISO will continue to monitor, track, and analyze on a quarterly basis, the status of the RSS, the outcome of the RFP process, and the development of the various infrastructure projects to ensure that these solutions remain available to address the reliability issues.

3. Development of Solutions to Reliability Needs

Following the issuance of the RNA in September 2012, the NYISO requested and evaluated solutions submitted in response to the identified Reliability Needs. The TOs submitted updated local transmission plans for inclusion by the NYISO in the CRP model. This section summarizes the proposed solutions and TO updated plans received by the NYISO. Appendix C lists the solutions, the completion times, and the lead times for the projects.

The NYISO received three market-based solutions totaling a potential of 875 MW of resources and five Alternative Regulated Solutions. Details of the proposals are presented below. The NYISO evaluated the various solutions and updated plans which it received according to the CRPP Manual.

3.1 Responsible Transmission Owner Solutions

The Responsible TOs presented individual plans for solving the identified transmission security needs. The RNA identified Responsible TOs to address resource adequacy needs in Zones G - K jointly submitted proposed regulated backstop solutions for the 2021 – 2022 resource adequacy needs.

3.1.1 TOs' Updates to Local Transmission Plans (LTPs) and Regulated Backstop Solutions to Identified Reliability Needs for 2013

Updates to LTPs were received from Central Hudson, Con Edison, National Grid, and Orange & Rockland. The updated LTPs were presented to a joint meeting of the Electric System Planning

Working Group and the Transmission Planning Advisory Subcommittee. The 2012 RNA base case was updated for the CRP to reflect the following changes in the LTPs.

- RG&E submitted a regulated backstop solution that included the use of special case resources and other operational procedures for 2013 in conjunction with its previously announced LTP. The Rochester Area Reliability Project will include the replacement of two existing 345/115 kV transformers at Station 80 by 2014 and will be followed by a new breaker and a half substation with two 345/115 kV transformers and 115 kV line to Station 23 in the Rochester Area.

- National Grid submitted an updated LTP for the Clay – Teall #10 115 kV circuit reliability issue which includes operational measures at Oswego 345 kV substation, possible reductions in Oswego complex generation, and distribution load switching off line #10 during periods of at-risk loading. The permanent solution will include the reconductoring of 12.8 miles of the #10 circuit with 795 ACSR conductor by December 2016.

- National Grid also submitted updates to their LTP in the Southwest area (Zone A) to address the mothballing of Dunkirk. The two Dunkirk units connected to the 230 kV system were allowed to mothball in September, 2012. National Grid has entered into a short-term contract with the plant owner to keep Dunkirk Units 1 & 2 running through May 2013. By May 2013, National Grid will install capacitor banks and circuit breakers, and modify connections to distribution load, to reduce the dependency on Dunkirk generation from two units to one unit. National Grid has issued an RFP to solicit solutions to address system security concerns that exist without any Dunkirk generation in service between 2013 and 2015. National Grid's plans for 2015 and beyond include a new "Five Mile Road" 345/115 kV substation near Olean, along with additional capacitor banks and circuit breakers, as well as 115 kV line reconductoring and a rebuild of the Gardenville substation. Completion of these upgrades should eliminate dependence on Dunkirk generation. In addition, the PSC has issued an order instituting a proceeding and requiring evaluation of generation repowering alternatives to transmission system upgrades when a facility needed for reliability proposes to retire[6]. The order directs National Grid to solicit a bid from the owners of the Dunkirk plant for the repowering of the facility and to file a report and recommendations at the Commission within 90 days on the relative reliability and other impacts of the options.

- Orange & Rockland is proposing to install a new independent relay protection system for the Ramapo 345 kV Substation by June 2013. This new protection

[6] See NYPSC Case 12-E-0577 – Proceeding on Motion of the Commission to Examine Repowering Alternatives to Utility Transmission Reinforcements, issued January 18, 2013.

system will result in the exclusion of the Ramapo 345/138 kV transformers from the NPCC Bulk Power System.

3.1.2 Responsible TOs' Regulated Backstop Solutions for Resource Adequacy

The identified Responsible TOs which jointly provided regulated backstop solutions to meet the resource adequacy needs for the second five year period of the 2012 RNA are:

- Central Hudson Gas and Electric Corporation (Central Hudson)
- Consolidated Edison Company of New York, Inc. (Con Edison)
- Long Island Power Authority (LIPA)
- New York State Electric & Gas Corporation (NYSEG)
- Orange & Rockland Utilities, Inc. (O&R).

3.1.2.1 Jointly Proposed Regulated Backstop Solutions [7]

- A total of 300 MW of new generation, demand response, or energy efficiency projects or combinations thereof, divided equally in three groups: Zones G,H and I; Zone J; and Zone K by 2021, and 345 kV transmission between Zones F and G that would increase the UPNY-SENY interface emergency transfer limit by 275 MW by 2022; or,
- A total of 275 MW of new generation, demand response, or energy efficiency or combinations thereof, divided equally in three groups: Zones G, H and I; Zone J; and Zone K by 2021, and 345 kV transmission between Zones F and G that would increase the UPNY-SENY interface emergency transfer limit by 300 MW by 2022.

3.2 Market-Based Solutions to Identified Reliability Needs

In addition to the Responsible TOs' joint submittal, the NYISO reviewed other solutions that were submitted in response to its request and concluded that the following would be viable market-based solutions based upon the information received to date. Market-based solutions total over 875 MW, none of which were intended to address the 2013 transmission security needs:

1. A 405 MW net increase from generator repowering in Zone J,

2. A 440 MW installation of repowered generation to replace the existing capacity of the Dunkirk generating facility in Zone A, and

[7] As stated previously, the NYISO does not need to trigger a Regulated Backstop Solution at this time.

3. A 30 MW increase of Special Case Resources in Zone J.

The detailed description of each submitted Market-Based Solutions is outlined below:

3.2.1 NRG Plan for Astoria Repowering

NRG submitted a market-based proposal for repowering generating capacity at Astoria by replacing 595 MW of existing generation with four new CCGT units (four @ 250 MW = 1000 MW) for a net increase of 405 MW in response to resource adequacy needs that arise in 2021. These units would go into service during the 2016 – 2018 period. The developer reports that the project is permitted and approved to be constructed in two phases, with the net increase achievable after the completion of the first two units in 2016.

3.2.2 NRG Plan For Repowering Zone A Resources

NRG submitted a proposal for 440 MW of repowered generating capacity at the Dunkirk site in Zone A which would replace existing generation at the site and could address reliability issues in that zone. The proposed CCGT would be in operation by 2017. The project would utilize existing 115 kV and 230 kV connections at the Dunkirk site.

3.2.3 Plan to increase Demand Response in Zone J

Constellation NewEnergy, Inc. submitted plans to increase special case resources in Zone J by 30 MW in response to resource adequacy needs that arise in 2021. The resources would be added over the years 2014 – 2018.

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3.3 Alternative Regulated Solutions

Five alternative regulated solutions were submitted. One of these solutions consists of new virtual generation, energy storage, spinning reserve and co-generation in Zones J and K. Four different transmission project proposals were submitted. The alternative regulated projects are described based on the developer's submission. Because the market-based solutions are sufficient to resolve the identified resource adequacy need, the NYISO performed a high-level review of the alternative regulated solutions in accordance with tariff requirements.

3.3.1 Poseidon Transmission LLC

This alternative regulated solution was submitted by Poseidon Transmission LLC. It proposes a 500 MW high-voltage direct current connection between the PSEG Deans Substation in central New Jersey and LIPA's Ruland Road Substation in central Long Island. The project is number 363 on the NYISO Interconnection Queue and an interconnection request has been submitted to PJM. The developer plans construction during the 2016 – 2017 time period or sooner if necessary.

3.3.2 Boundless Energy, LLC (Boundless) – Project 1

This alternative regulated solution is the first of three projects submitted by Boundless. The developer calls this their North-South Solution-Leeds Path West and is intended by the developer to address the UPNY-SENY constraint. The developer proposes four transmission components along the paths from New Scotland to Leeds to Roseton to Rock Tavern which the developer believes would better utilize existing North-South facilities into Zone J. The developer proposes to place the project in commercial operation in 2016.

3.3.3 Boundless Energy, LLC - Project 2

This second project by Boundless is called West – East Solution and is intended by the developer to address the Central East Interface constraint, reliability needs in Zone J, and enabling delivery of renewable energy from Western New York. The developer proposes a combination of upgrading of existing circuits, additional 345 kV, and double circuiting and additional capability from New York to New Jersey to increase transmission capability into Zone J. The developer proposes to place the project in commercial operation in 2016.

3.3.4 Boundless Energy, LLC – Project 3

This third project by Boundless is called the New York City Direct Supply Solution and is intended by the developer to address the UPNY - Con Edison Interface constraint. The developer expects that if both Projects 1 and 2 are built, that Project 3 would be required to provide sufficient access to New York City. The developer projects that construction could begin in early 2016.

3.3.5 Innoventive Power

Innoventive Power proposes a total of 510 MW of demand response resources in Zones J and K by 2020 and additional 250 MW in those two zones by 2022 for a total of 760 MW. Virtual generation is their name for demand response resources which behave like a generator in that they respond to a call in a similar manner that a generator responds. Of the 760 MW proposed by 2022, 600 MW would be virtual generation of which two thirds would be in Zone J, one third in Zone K. The remaining 160 MW would consist of a mixture of behind-the-meter energy storage (40 MW), behind-the-meter spinning reserve response (80 MW), and package co-gens (40 MW).

4. Evaluation of Solutions to Reliability Needs

The process for the evaluation of solutions is described in Section 7 of the NYISO Comprehensive Reliability Planning Process Manual. All three categories of solutions (Market-Based Solutions, Regulated Backstop Solutions, and Alternative Regulated Solutions) were evaluated as required to determine whether they will meet the identified reliability needs in a timely manner.

4.1 System Adequacy and Transmission Security

Figure 4-1 displays the majority of the current bulk power transmission facilities for NYCA, which consists primarily of facilities 230 kV and above. The NYCA bulk power transmission facilities include a very small number of 138 kV facilities and 115 kV facilities, but 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. In the CRP, potential transfer limit changes over the planning period were tested to assess the impact, if any, on resource adequacy results.

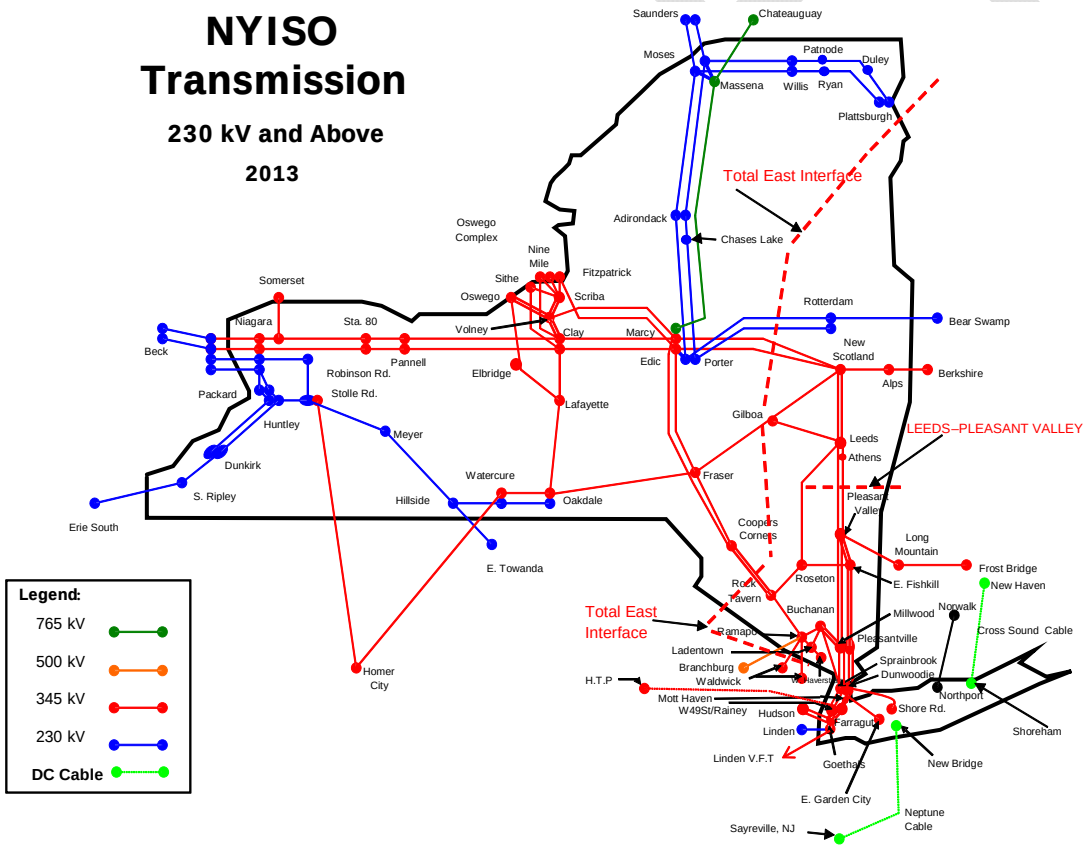

Figure 4-1: NYISO 230 kV and above Transmission Map

4.2 Responsible TOs' Submitted Plans and Regulated Backstop Solutions

From the Responsible TOs' joint submittal, the two alternative RBS solutions were considered in the evaluation of the second five year period. Individually submitted TOs' solutions for the 2013 transmission security needs were also evaluated.

4.2.1 First Five Year Base Case

The 2012 RNA (Section 4.2.1) identified and discussed potential transmission security thermal violations in five locations on the bulk power transmission facilities. Thermal violations were identified in 2013 at four locations on the BPTF: RG&E 345 kV Station 80 (Zone B); RG&E Pannell 345 kV Station (Zone B); National Grid Clay 115 kV (Zone C); and O&R 345/138 kV transformers at Ramapo Substation (Zone G).

As discussed in Section 3.1.1, operational procedures will be utilized by RG&E and National Grid in 2013 to mitigate the overloads in Zones B and C, respectively.

The evaluation of Zone B indicates that upon RG&E's installation of phase shifters in Rochester in 2013 and replacement of transformers T1 and T3 at Station 80 in 2014, the overloads at Station 80 and Pannell will be mitigated until 2017. RG&E's further reinforcement with a new 345/115 kV substation by summer 2017 will mitigate the identified Zone B overloads through the planning horizon.

The evaluation of Zone C indicates that National Grid's reconductoring of the Clay – Teall #10 115 kV circuit by December 2016 will mitigate overloads observed through the remainder of the planning horizon.

As described in Section 3.1.1, O&R's new protection system to be installed by June 2013 will result in the exclusion of the Ramapo 345/138 kV transformers from the NPCC Bulk Power System. As a result, the transformers would be excluded from the Bulk Power Transmission Facilities and the more stringent NPCC and NYSRC criteria and rules would no longer apply to those facilities. The evaluation of Zone G demonstrates that those facilities would meet applicable reliability criteria.

4.2.2 Second Five Years

As discussed in Section 3, the Responsible TOs offered a joint submittal with proposals to satisfy the resource adequacy needs. They consist of a total of 575 MW in combinations of new generation, demand response, and energy efficiency apportioned among Zones G - K and new transmission between Zones F and G increasing the UPNY – SENY interface transfer limits.

The evaluation of the joint Responsible TO submittal of Regulated Backstop Solutions indicates that the system as modeled will meet the identified resource adequacy needs through 2022. Including either of the two submitted TO RBS plans improves resource adequacy from the RNA

and base case CRP findings to an LOLE of no more than 0.1 day per year for 2021 - 2022. Table 4-1 presents the zonal and NYCA LOLE results for the second five years with the Regulated Backstop Solutions in-service.

Table 4-1: NYCA LOLE for the Second Five Years with Regulated Backstop Solutions (probability of occurrences in days per year)

AREA	2021	2022
Zone G	0.01	0.01
Zone H	0.0	0.0
Zone I	0.09	0.09
Zone J (NYC)	0.09	0.09
Zone K (Long Island)	0.05	0.07
NYCA	0.10	0.10

4.3 Assessment of the Market-Based Solutions

The market-based solutions span the years 2014 through 2018 but none of them address the needs identified in the first five years in Zones B, C, and G.

The market-based solutions, if they are constructed, are fully sufficient to maintain the LOLE criteria for the second five year period. The 405 MW net increase of generation resources proposed to be added before 2021 in Zone J will need to maintain a schedule for permitting, construction, and entering into service in time to meet the needs in 2021. These resources will also be sufficient to meet the needs in 2022. The market-based demand response proposal by Constellation NewEnergy, Inc., if implemented, would serve to meet part of the resource adequacy needs in 2021 and 2022. The base case transfer limits were used to evaluate the market-based proposals.

The NYISO has determined that these projects appear viable at this time to meet their projected in-service dates. The NYISO will continue to evaluate the viability of the Market-Based Solutions.

Table 4-2: NYCA LOLE for the Second Five Years with Zone J Market-Based Solutions (probability of occurrences in days per year)

AREA	2021	2022
Zone G	0.01	0.01
Zone H	0.00	0.00
Zone I	0.05	0.08
Zone J (NYC)	0.05	0.08
Zone K (Long Island)	0.04	0.07
NYCA	0.06	0.09

4.4 Alternative Regulated Solutions

The NYISO simultaneously solicited requests for all solutions to meet the identified reliability needs. The alternative regulated solution responses consisted of one demand response proposal and four transmission project proposals. Because the market-based solutions were determined to be sufficient to resolve the identified Reliability Needs for the Study Period, the NYISO was required to perform only a high level review of each of the alternative regulated solution proposals to assess whether the projects may meet part or all of the Reliability Needs identified in the RNA and CRP base case.

4.4.1 Alternative Regulated Demand Response Solution

Innoventive Power proposes a total of 510 MW of demand response resources in Zones J and K by 2020 and additional 250 MW in those two zones by 2022 for a total of 760 MW. Virtual generation is their name for demand response resources which behave like a generator in that they respond to a call in a similar manner that a generator responds. Of the 760 MW proposed by 2022, 600 MW would be virtual generation of which two thirds would be in Zone J, one third in Zone K. The remaining 160 MW would consist of a mixture of behind-the-meter energy storage (40 MW), behind-the-meter spinning reserve response (80 MW), and package co-gens (40 MW). A high level review of this proposal determined that this proposal, if fully implemented as described, would at least partly meet the resource adequacy needs identified in the RNA.

4.4.2 Assessment of Alternative Regulated Transmission Solutions

These Alternative Regulated Solutions were submitted by Poseidon Transmission LLC and Boundless Energy, LLC, and are described in Section 3.3 of this CRP Report.

Based on updated information and modeling of the CRP base case with the market-based solutions, the NYISO determined that there is no need to require a Regulated Backstop Solution at this time for the 2021-2022 resource adequacy needs. As a result, the Alternative Regulated Solutions were not evaluated as a specific alternative to Regulated Backstop Solutions. Rather, the transmission proposals received a high level review as to probable increases to transfer capability. The high level review suggests that the Alternative Regulated Solutions either separately or collectively would partially and possibly fully meet the resource adequacy need in Zones G – K for the years 2021- 2022.

The alternative regulated transmission solutions would increase the flexibility to site additional resources away from load centers, but can only benefit resource adequacy if there is capacity available to be delivered. It is also important to note that these specific transmission projects will have to be studied through the NYISO interconnection study process before proceeding through the formal transmission siting process.

4.5 Summary of Evaluation of Proposed Solutions

In summary, the TO plans will satisfy New York's bulk power system reliability needs for the first five years of the Study Period. If the market responses remain on schedule as proposed, the NYCA would more than comply with the LOLE criterion throughout the 10-year Study Period. Given that the total capacity of the Market-Based Solutions are in excess of resource adequacy requirements, and the planned in-service dates are well in advance of need, reliability needs will still be met if a portion of the Market-Based Solutions come into service later than presently planned. Consequently, neither a Regulated Backstop Solution nor an Alternative Regulated Solution needs to be implemented at this time for meeting the Resource Adequacy requirements in 2021 - 2022. Going forward, the NYISO will monitor the progress of the proposed solutions on a quarterly basis to determine that these planned resources will be available in a timely manner.

The NYISO will evaluate the viability of market-based and alternative regulated solutions as required in Attachment Y (Sections 31.2.4.4 and 31.2.4.6). The depth of analysis will increase according to the time before the trigger date for a regulated backstop solution.

4.6 Transmission System Short Circuit Assessment

The NYISO updated the short circuit assessment in the 2012 RNA to include all the TO solutions that were evaluated for this CRP. The methodology employed was the same as used for the RNA. It is described in Attachment I of the NYISO Transmission Expansion and Interconnection Manual. The fault current levels arising from the implementation of the updated TO plans were assessed, and it was determined that the fault current levels on the NYCA system were within breaker interrupting capabilities for the Study Period. The circuit breakers identified in the 2012 RNA as being over-dutied at Scriba 345 kV, Porter 115 kV, and Porter 230 kV Substations have either been replaced or are on schedule for replacement or remediation.

The market-based solutions were evaluated in aggregate. The exact location of solutions can greatly impact the fault levels calculated. Based on the locations assumed for the market-based solutions, two breakers at Astoria West were identified as over-dutied as described in the NYISO Class Year 2011 Facilities Study[8].

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[8] The two breakers are not part of the New York State Transmission System, hence not categorized as System Upgrade Facilities for the purpose of the Class Year 2011 Facilities Study.

5. 2012 Comprehensive Reliability Plan

The 2012 RNA determined that additional resources would be needed over the 10-year Study Period in order for the NYCA to comply with applicable reliability criteria.[9] As a result, the NYISO requested market-based, regulated backstop, and alternative regulated solutions to the Reliability Needs. The preference is to provide an opportunity for market-based solutions to meet the future needs with regulated backstop and alternative regulated solutions available, if needed.

The NYISO designated the TOs responsible for developing Regulated Backstop Solutions to address the reliability needs identified in the RNA. The individual responsible TOs submitted updated and existing LTPs and other plans which were sufficient to meet the identified reliability needs over the first five year period. The NYISO updated the CRP base case and determined that resource adequacy needs continued to exist for 2021 and 2022. The Responsible TOs submitted two alternative regulated backstop solutions for the resource adequacy needs in 2021 and beyond. In addition, a broad range of solutions, including Market-Based Solutions, and Alternative Regulated Solutions were submitted.

The CRP has also considered the recent notice for retirement of Danskammer and determined that it will advance the year of resource inadequacy (without any of the proposed solutions) by about two years to 2019. The market-based solutions in this CRP would put the year of need back to 2021. In either case this CRP does not find an imminent threat to reliability associated with the Danskammer retirement, and concludes that the announced retirement of Danskammer can be further studied as part of the 2014 RNA.

Based upon its evaluation of the Market-Based Solutions and updated TO plans, the NYISO has concluded that there are sufficient resource additions to the NYCA planned or under development to meet the identified reliability needs for the next 10 years. Accordingly, the NYISO has determined that no action needs to be taken at this time to implement any proposed Regulated Backstop Solution or an Alternative Regulated Solution.

5.1 CRP Findings, Actions and Recommendations

The findings and recommendations of the NYISO in conducting the 2012 RNA and this CRP are outlined below.

5.1.1 Finding One: Transmission Security and Adequacy

The Reliability Needs identified in the RNA for 2013 in the Rochester and Syracuse areas will be resolved with permanent solutions identified in the most recent TO LTPs by 2017. In the interim, mitigating measures and operational procedures, as described in Section 3.1.1, will be called upon if required to prevent overloads. The Reliability Need identified for Ramapo

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

345/138 kV transformers in 2013 will be mitigated by the installation of new independent protective relaying as described in Section 3.1.1.

5.1.2 Finding Two: Resource Adequacy

The market-based solutions, if they are constructed, are fully sufficient to maintain the LOLE criteria for the second five year period. The 405 MW net increase of generation resources proposed to be added before 2021 in Zone J will need to maintain a schedule for permitting, construction, and entering into service in time to fully meet the identified resource adequacy needs in 2021 and 2022.

5.1.3 Finding Three: Plan Risk Factors

The planned system meets reliability criteria with the proposed market-based solutions studied. In addition to a number of uncertainties identified in the 2012 RNA related to the base case assumptions, several risk factors exist that could adversely affect the implementation of the plan and hence system reliability over the ten year planning horizon. These factors, which require ongoing review and assessment, include:

1. The New York TOs need to proceed on schedule for completion with their LTPs as planned. If a delay occurs in planned local projects, the NYISO will reevaluate the impact of the delay at that time, considering all other appropriate system changes, to determine whether an imminent threat to reliability will arise.

2. The viability of market-based generation solution development may depend upon many factors which can influence their timely completion including, but not limited to, interconnection requirements, financing, or future market conditions.

3. Retirement of additional generating units beyond those already contemplated in the 2012 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 CRP. The retirement of the Danskammer generating plant, which was announced after the CRP base case was finalized, will advance the year of resource adequacy needs by two years to 2019. The completion of market-based solutions identified in this CRP would address these resource adequacy needs until 2021. The NYISO recognizes that numerous risk factors can contribute to reliability concerns with the need to take swift actions to maintain reliability which, depending on the units in question, may need to be preceded by putting sufficient replacement resources into operation. Emphasis should be placed on identifying generator retirements that could result from economic and environmental factors.

4. If the Indian Point Power Plant licenses are not renewed, and the plant were to retire by the end of 2015 or thereafter, it would result in immediate violations of transmission security and resource adequacy criteria unless sufficient replacement

resources can be put into operation before the retirement. A PSC proceeding, Case 12-E-0503, has been commenced to formulate a Reliability Contingency Plan to address the possible closure of the nuclear generating facilities at the Indian Point Energy Center.

5. While there are efforts underway to enhance planning and communication between the electric and gas sectors, significant increased reliance on natural gas as the primary fuel for electric generation has raised concerns for maintaining electric reliability. The future adequacy of the natural gas infrastructure to meet the coincidental requirements of gas utilities and electric generators requires careful study.

5.1.4 Recommended Actions

1. Because market-based solutions should be developed rather than calling upon the development of any of the submitted regulated solutions, the NYISO should monitor and track the NRG proposal to repower Astoria, the only market-based solution capable of fully meeting the 2021-2022 resource adequacy needs. The NYISO will continue to monitor, evaluate and report, on a quarterly basis, the viability and timeliness of all submitted market-based solutions and will be prepared to trigger a gap or regulated backstop solution, if necessary, in accordance with established procedures. [10]

2. The in-service dates for the TO LTPs need to be maintained and operational procedures available in order to avoid the transmission security violations which would otherwise occur. The NYISO will continue to monitor and report the status of LTPs associated with the bulk and non-bulk reliability needs identified in the RNA and CRP studies.

3. Other system planning activities, such as those encompassed by the New York Energy Highway Blueprint, will need to be considered within NYISO reliability planning activities. The NYISO will continue to monitor and participate in other planning activities including, but not limited to, NYPSC proceedings considering AC Transmission Upgrades, Indian Point Reliability Contingency Plans, and Repowering of Generation.

4. The NYISO planning processes, including the 2014 RNA, need to actively monitor and address the potential impacts of additional system changes and known risk factors. The monitoring needs to include the projects being developed in response to the Dunkirk and Cayuga mothballing announcements.

[10] See NYISO Technical Bulletin 171, Subject: Monitoring Viability of Solutions to Meet Reliability Needs: http://www.nyiso.com/public/webdocs/markets_operations/documents/Technical_Bulletins/Technical_Bulletins/Technical_Bulletins/tb_171.pdf

5.2 Conclusion

This 2012 CRP determines that, under the conditions studied and with the market-based solutions submitted and the Responsible TO updated LTPs, the proposed system upgrades and local transmission solutions will maintain the reliability of the New York bulk power system. The projects included in the regulated backstop or alternative regulated solutions, if they need to be triggered or they are otherwise put into service, may further improve system reliability. Market-based projects may also further improve system reliability.

A. Appendix A – Glossary

Term	Definition
10-year Study Period:	10-year period starting with the year after the study is dated and projecting forward 10 years. For example, the 2012 RNA covers the 10-year Study Period of 2013 through 2022.
Adequacy:	Encompassing 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.
Alternative Regulated Responses:	Regulated solutions submitted by a TO or other developer in response to a solicitation by the NYISO, if the NYISO determines that it has not received adequate market-based solutions to satisfy the Reliability Need.
Annual Transmission Reliability Assessment (ATRA):	An assessment, conducted by the NYISO staff in cooperation with Market Participants, to determine the System Upgrade Facilities required for each generation and merchant transmission project included in the Assessment to interconnect to the New York State Transmission System in compliance with Applicable Reliability Requirements and the NYISO Minimum Interconnection Standard.
Area Transmission Review (ATR):	The NYISO, in its role as Planning Coordinator, is responsible for providing an annual report to the NPCC Compliance Committee in regard to its Area Transmission Review in accordance with the NPCC Reliability Compliance and Enforcement Program and in conformance with the NPCC Design and Operation of the Bulk Power System (Directory #1).
Best Available Retrofit Technology (BART):	NYS DEC regulation, required for compliance with the federal Clean Air Act, applying to fossil fueled electric generating units built between August 7, 1962 and August 7, 1977. Emissions control of SO_2, NOx and PM may be necessary for compliance. Compliance deadline is January 2014.
Best Technology Available (BTA):	Proposed NYS DEC policy establishing performance goals for new and existing electricity generating plants for Cooling Water Intake Structures. The policy would apply to plants with design intake capacity greater than 20 million gallons/day and prescribes reductions in fish mortality. The performance goals call for the use of wet, closed-cycle cooling systems at existing generating plants.

Term	Definition
Bulk Power Transmission Facility (BPTF):	The facilities identified as the New York State Bulk Power Transmission Facilities in the annual Area Transmission Review submitted to NPCC by the ISO pursuant to NPCC requirements.
Capability Period:	The Summer Capability Period lasts six months, from May 1 through October 31. The Winter Capability Period runs from November 1 through April 30 of the following year.
Capacity:	The capability to generate or transmit electrical power, or the ability to reduce demand at the direction of the NYISO.
Capacity Resource Integration Service (CRIS):	CRIS is the service provided by NYISO to interconnect the Developer's Large Generating Facility or Merchant Transmission Facility to the New York State Transmission System in accordance with the NYISO Deliverability Interconnection Standard, to enable the New York State Transmission System to deliver electric capacity from the Large Generating Facility or Merchant Transmission Facility, pursuant to the terms of the NYISO OATT.
Class Year:	The group of generation and merchant transmission projects included in any particular Annual Transmission Reliability Assessment [ATRA], in accordance with the criteria specified for including such projects in the assessment.
Clean Air Interstate Rule (CAIR):	Rule proposed by the U.S. EPA to reduce Interstate Transport of Fine Particulate Matter (PM) and Ozone. CAIR provides a federal framework to limit the emission of SO_2 and CO_2.
Comprehensive Reliability Planning Process (CRPP):	The biennial process that includes evaluation of resource adequacy and transmission system security of the state's bulk electricity grid over a 10-year period and evaluates solutions to meet those needs. The CRPP consists of two studies: the RNA, which identifies potential problems, and the CRP, which evaluates specific solutions to those problems.

Term	Definition
Comprehensive Reliability Plan (CRP):	A biennial study undertaken by the NYISO that evaluates projects offered to meet New York's future electric power needs, as identified in the Reliability Needs Assessment (RNA). The CRP may trigger electric utilities to pursue regulated solutions to meet Reliability Needs if market-based solutions will not be available by the need date. It is the second step in the Comprehensive Reliability Planning Process (CRPP).
Comprehensive System Planning Process (CSPP):	A transmission system planning process that is comprised of three components: 1) Local transmission planning; 2) Compilation of local plans into the Comprehensive Reliability Planning Process (CRPP), which includes developing a Comprehensive Reliability Plan (CRP); 3) Channeling the CRP data into the Congestion Assessment and Resource Integration Study (CARIS).
Congestion Assessment and Resource Integration Study (CARIS):	The third component of the Comprehensive System Planning Process (CSPP). The CARIS is based on the Comprehensive Reliability Plan (CRP).
Congestion:	Congestion on the transmission system results from physical limits on how much power transmission equipment can carry without exceeding thermal, voltage and/or stability limits determined to maintain system reliability. If a lower cost generator cannot transmit its available power to a customer because of a physical transmission constraint, the cost of dispatching a more expensive generator is the congestion cost.
Contingencies:	Contingencies are individual electrical system events (including disturbances and equipment failures) that are likely to happen.
Dependable Maximum Net Capability (DMNC):	The sustained maximum net output of a generator, as demonstrated by the performance of a test or through actual operation, averaged over a continuous time period as defined in the ISO Procedures. The DMNC test determines the amount of Installed Capacity used to calculate the Unforced Capacity that the Resource is permitted to supply to the NYCA.
Electric System Planning Work Group (ESPWG):	A NYISO governance working group for Market Participants designated to fulfill the planning functions assigned to it. The ESPWG is a working group that provides a forum for stakeholders and Market Participants to provide input into the NYISO's Comprehensive System Planning Process (CSPP), the NYISO's response to FERC reliability-

Term	Definition
	related Orders and other directives, other system planning activities, policies regarding cost allocation and recovery for regulated reliability and/or economic projects, and related matters.
Energy Efficiency Portfolio Standard (EEPS):	A statewide program ordered by the NYSPSC in response to the Governor's call to reduce New Yorkers' electricity usage by 15% of 2007 forecast levels by the year 2015, with comparable results in natural gas conservation.
Federal Energy Regulatory Commission (FERC):	The federal energy regulatory agency within the U.S. Department of Energy that approves the NYISO's tariffs and regulates its operation of the bulk electricity grid, wholesale power markets, and planning and interconnection processes.
FERC 715:	Annual report that is required by transmitting utilities operating grid facilities that are rated at or above 100 kilovolts. The report consists of transmission systems maps, a detailed description of transmission planning Reliability Criteria, detailed descriptions of transmission planning assessment practices, and detailed evaluation of anticipated system performance as measured against Reliability Criteria.
Five Year Base Case:	The model representing the New York State power system over the first five years of the Study Period.
Forced Outage:	An unanticipated loss of capacity, due to the breakdown of a power plant or transmission line. It can also mean the intentional shutdown of a generating unit or transmission line for emergency reasons.
Gap Solution:	A solution to a Reliability Need that is designed to be temporary and to strive to be compatible with permanent market-based proposals. A permanent regulated solution, if appropriate, may proceed in parallel with a Gap Solution.
Gold Book:	Annual NYISO publication of its Load and Capacity Data report.
Installed Capacity (ICAP):	A generator or load facility that complies with the requirements in the Reliability Rules and is capable of supplying and/or reducing the demand for energy in the NYCA for the purpose of ensuring that sufficient energy and capacity are available to meet the Reliability Rules.
Installed Reserve: Margin (IRM):	The amount of installed electric generation capacity above 100% of the forecasted peak electric consumption that is required to meet New York State Reliability Council (NYSRC) resource adequacy criteria. Most studies in recent years have indicated a need for a 15-20% reserve margin for adequate reliability in New York.

Term	Definition
Interconnection Queue:	A queue of transmission and generation projects (greater than 20 MW) that have submitted an Interconnection Request to the NYISO to be interconnected to the state's bulk electricity grid. All projects must undergo three studies – a Feasibility Study (unless parties agree to forgo it), a System Reliability Impact Study (SRIS) and a Facilities Study – before interconnecting to the grid.
Load Pocket:	Areas that have a limited ability to import generation resources from outside their areas in order to meet reliability requirements.
Local Transmission Plan (LTP):	The Local Transmission Owner Plan resulting from the LTPP.
Local Transmission Owner Planning Process (LTPP):	The first step in the Comprehensive System Planning Process (CSPP), under which transmission owners in New York's electricity markets provide their local transmission plans for consideration and comment by interested parties.
Loss of load expectation (LOLE):	LOLE establishes the amount of generation and demand-side resources needed - subject to the level of the availability of those resources, load uncertainty, available transmission system transfer capability and emergency operating procedures - to minimize the probability of an involuntary loss of firm electric load on the bulk electricity grid. The state's bulk electricity grid is designed to meet an LOLE that is not greater than one occurrence of an involuntary load disconnection in 10 years, expressed mathematically as 0.1 days per year.
Lower Hudson Valley:	The southeastern section of New York, comprising New York Control Area Load Zones G (lower portion), H and I. Greene, Ulster, Orange, Dutchess, Putnam, Rockland and Westchester counties are located in those Load Zones.
Market-Based Solutions:	Investor-proposed projects that are driven by market needs to meet future reliability requirements of the bulk electricity grid as outlined in the RNA. Those solutions can include generation, transmission and Demand Response Programs.
Market Monitoring Unit:	A consulting or other professional services firm, or other similar entity, retained by the NYISO Board pursuant to Market Service Tariff Section 30.4, Attachment O - Market Monitoring Plan.

Term	Definition
Market Participant:	An entity, excluding the NYISO, that produces, transmits sells, and/or purchases for resale capacity, energy and ancillary services in the wholesale market. Market Participants include: customers under the NYISO's tariffs, power exchanges, TOs, primary holders, load serving entities, generating companies and other suppliers, and entities buying or selling transmission congestion contracts.
Mercury and Air Toxics Standards (MATS):	In December, 2011 USEPA announced the final rule (previously known as the MACT rule). The rule applies to oil and coal fired generators and establishes limits for HAPs, acid gases, Mercury (Hg), and Particulate Matter (PM). Compliance is required by March 2015.
National Ambient Air Quality Standards (NAAQS):	Limits, set by the EPA, on pollutants considered harmful to public health and the environment.
New York Control Area (NYCA):	The area under the electrical control of the NYISO. It includes the entire state of New York, and is divided into 11 zones.
New York State Department of Environmental Conservation (NYSDEC):	The agency that implements New York State environmental conservation law, with some programs also governed by federal law.
New York Independent System Operator (NYISO):	Formed in 1997 and commencing operations in 1999, the NYISO is a not-for-profit organization that manages New York's bulk electricity grid – an 11,016-mile network of high voltage lines that carry electricity throughout the state. The NYISO also oversees the state's wholesale electricity markets. The organization is governed by an independent Board of Directors and a governance structure made up of committees with Market Participants and stakeholders as members.
New York State Department of Public Service (DPS):	The New York State Department of Public Service, as defined in the New York Public Service Law, which serves as the staff for the New York State Public Service Commission.
New York State Public Service Commission (NYSPSC):	The New York State Public Service Commission, as defined in the New York Public Service Law.
New York State	A corporation created under the New York State Public Authorities

Term	Definition
Energy Research and Development Authority (NYSERDA):	law and funded by the System Benefits Charge (SBC) and other sources. Among other responsibilities, NYSERDA is charged with conducting a multifaceted energy and environmental research and development program to meet New York State's diverse economic needs, and administering state System Benefits Charge, Renewable Portfolio Standard, and Energy Efficiency Portfolio Standard programs.
New York State Reliability Council (NYSRC):	A not-for-profit entity that develops, maintains, and, from time-to-time, updates the Reliability Rules which shall be complied with by the New York Independent System Operator ("NYISO") and all entities engaging in electric transmission, ancillary services, energy and power transactions on the New York State Power System.
North American Electric Reliability Corporation (NERC):	A not-for-profit organization that develops and enforces reliability standards; assesses reliability annually via 10-year and seasonal forecasts; monitors the bulk power system; and educates, trains, and certifies industry personnel. NERC is subject to oversight by the FERC and governmental authorities in Canada.
Northeast Power Coordinating Council (NPCC):	A not-for-profit corporation responsible for promoting and improving the reliability of the international, interconnected bulk power system in Northeastern North America.
Open Access Transmission Tariff (OATT):	Document of Rates, Terms and Conditions, regulated by the FERC, under which the NYISO provides transmission service. The OATT is a dynamic document to which revisions are made on a collaborative basis by the NYISO, New York's Electricity Market Stakeholders, and the FERC.
Order 890:	Adopted by FERC in February 2007, Order 890 is a change to FERC's 1996 transmission open access regulations (established in Orders 888 and 889). Order 890 is intended to provide for more effective competition, transparency and planning in wholesale electricity markets and transmission grid operations, as well as to strengthen the Open Access Transmission Tariff (OATT) with regard to non-discriminatory transmission service. Order 890 requires Transmission Providers – including the NYISO – to have a formal planning process that provides for a coordinated transmission planning process, including reliability and economic planning studies.
Outage:	Removal of generating capacity or transmission line from service either forced or scheduled.

Term	Definition
Peak Demand:	The maximum instantaneous power demand averaged over any designated interval of time, which is measured in megawatts (MW). Peak demand, also known as peak load, is usually measured hourly.
Reasonably Available Control Technology for Oxides of Nitrogen (NOx RACT):	Revised regulations recently promulgated by NYSDEC for the control of emissions of nitrogen oxides (NOx) from fossil fueled power plants. The regulations establish presumptive emission limits for each type of fossil fueled generator and fuel used as an electric generator in NY. The NOx RACT limits are part of the State Implementation Plan for achieving compliance with the National Ambient Air Quality Standard (NAAQS) for ozone.
Reactive Power Resources:	Facilities such as generators, high voltage transmission lines, synchronous condensers, capacitor banks, and static VAr compensators that provide reactive power. Reactive power is the portion of electric power that establishes and sustains the electric and magnetic fields of alternating-current equipment. Reactive power is usually expressed as kilovolt-amperes reactive (kVAr) or megavolt-ampere reactive (MVAr).
Regional Greenhouse Gas Initiative (RGGI):	A cooperative effort by nine Northeast and Mid-Atlantic states (not including New Jersey or Pennsylvania) to limit greenhouse gas emissions using a market-based cap-and-trade approach.
Regulated Backstop Solutions:	Proposals required of certain TOs to meet Reliability Needs as outlined in the RNA. Those solutions can include generation, transmission or Demand Response. Non-Transmission Owner developers may also submit regulated solutions. The NYISO may call for a Gap Solution if neither market-based nor regulated backstop solutions meet Reliability Needs in a timely manner. To the extent possible, the Gap Solution should be temporary and strive to ensure that market-based solutions will not be economically harmed. The NYISO is responsible for evaluating all solutions to determine if they will meet identified Reliability Needs in a timely manner.
Reliability Criteria:	The electric power system planning and operating policies, standards, criteria, guidelines, procedures, and rules promulgated by the North American Electric Reliability Corporation (NERC), Northeast Power Coordinating Council (NPCC), and the New York State Reliability Council (NYSRC), as they may be amended from time to time.
Reliability Need:	A condition identified by the NYISO in the RNA as a violation or potential violation of Reliability Criteria.
Reliability Needs	A bi-annual report that evaluates resource adequacy and transmission system security over a 10-year planning horizon, and

Term	Definition
Assessment (RNA):	identifies future needs of the New York electric grid. It is the first step in the NYISO's CSPP.
Renewable Portfolio Standard (RPS):	Proceeding commenced by order of the NYSPSC in 2004 which established goal to increase renewable energy used in New York State to 25% (or approximately 3,700 MW) by 2013.
Responsible Transmission Owner (Responsible TO):	The Transmission Owner(s) or TOs designated by the NYISO, pursuant to the NYISO CSPP, to prepare a proposal for a regulated solution to a Reliability Need or to proceed with a regulated solution to a Reliability Need. The Responsible TO will normally be the Transmission Owner in whose Transmission District the NYISO identifies a Reliability Need.
Security:	The ability of the power system to withstand the loss of one or more elements without involuntarily disconnecting firm load.
Southeastern New York (SENY):	The portion of the NYCA comprised of the transmission districts of Con Edison and LIPA (Zones H, I, J and K).
Special Case Resources (SCR):	A NYISO Demand Response program designed to reduce power usage by businesses and large power users qualified to participate in the NYISO's ICAP market. Companies that sign up as SCRs are paid in advance for agreeing to cut power upon NYISO request.
State Environmental Quality Review Act (SEQRA)	NYS law requiring the sponsoring or approving governmental body to identify and mitigate the significant environmental impacts of the activity/project it is proposing or permitting.
State Implementation Plan (SIP):	A plan, submitted by each State to the EPA, for meeting specific requirements of the Clean Air Act, including the requirement to attain and maintain the National Ambient Air Quality Standards (NAAQS).
Study Period:	The 10-year time period evaluated in the RNA.
System Reliability Impact Study ("SRIS"):	A study, conducted by the NYISO in accordance with Applicable Reliability Standards, to evaluate the impact of a proposed interconnection on the reliability of the New York State Transmission System.
System Benefits Charge (SBC):	An amount of money, charged to ratepayers on their electric bills, which is administered and allocated by NYSERDA towards energy-efficiency programs, research and development initiatives, low-income energy programs, and environmental disclosure activities.
Transmission Constraints:	Limitations on the ability of a transmission facility to transfer electricity during normal or emergency system conditions.

Term	Definition
Transmission Owner (TO):	A public utility or authority that owns transmission facilities and provides Transmission Service under the NYISO's tariffs.
Transmission Planning Advisory Subcommittee (TPAS):	An identified group of Market Participants that advises the NYISO Operating Committee and provides support to the NYISO Staff in regard to transmission planning matters including transmission system reliability, expansion, and interconnection.
Unforced Capacity Delivery Rights (UDR):	Unforced capacity delivery rights are rights that may be granted to controllable lines to deliver generating capacity from locations outside the NYCA to localities within NYCA.
Upstate New York (UPNY):	The NYCA north of Con Edison's transmission district.
Weather Normalized:	Adjustments made to neutralize the impact of weather when making energy and peak demand forecasts. Using historical weather data, energy analysts can account for the influence of extreme weather conditions and adjust actual energy use and peak demand to estimate what would have happened if the hottest day or the coldest day had been the typical, or "normal," weather conditions. "Normal" is usually calculated by taking the average of the previous 30 years of weather data.
Zone:	One of the eleven regions in the NYCA connected to each other by identified transmission interfaces and designated as Load Zones A-K.

B. Appendix B - Summary of Market-Based Solutions and TOs' Updated Plans

Table B-1: Current Status of Tracked Market-Based Solutions and TOs' Plans from the 2008 CRP

Project Type	NYISO Queue #	Submitted	MW	Zone	Original In-Service Date	Current Status	Included in 2012 RNA Base Case
Resource Proposals							
Gas Turbine NRG Astoria Re-powering	**201 and 224**	CRP 2005, CRP 2007, CRP 2008	520	J	Jun - 2010	New Target June 2018	No
Empire Generation Project	**69**	CRP 2008	635	F	Q1 2010	Placed in Service September 2010	Yes
Transmission Proposals							
Back-to-Back HVDC, AC Line HTP	**206**	CRP 2007, CRP 2008 and was an alternative regulated proposal in CRP 2005	660	PJM - J	Q2 2011 PJM Queue O66	New Target Q2 2013 Article VII approved	Yes
TOs' Plans							
ConEd M29 Project	**153**	CRP 2005	N/A	J	May - 2011	Placed in Service February 2011	Yes

C. Appendix C - 2012 CRP Projects and Timing[11]

1. National Grid LTP projects which address transmission reliability for Dunkirk mothball
    a. Capacitor banks on 115 & 230 kV transmission system in Zone A by May 2013
    b. Additional breakers at 230 kV stations by May 2013
    c. Relocate distribution stations served off 115 kV by May 2013
    d. New "Five Mile Rd" 345/115 kV substation near Olean by June 2015
2. National Grid LTP projects which address RNA 2013 reliability needs for Clay transmission
    a. Reconductor Clay – Teall 115 kV circuit by December 2016
    b. Operational measures, as needed, including opening breaker at Oswego; backing down Oswego generation levels; distribution load switching during periods of at-risk loading (by summer 2013)
3. RG&E LTP projects which address RNA 2013 Pannell and Station 80 transformer overloads
    a. Replace two transformers at Station 80 by summer 2014
    b. Build new 345/115 kV Station 255 by late 2016
    c. Develop operational measures to curtail load including SCRs and specific operating instructions for load reductions by summer 2013
4. O&RU solution to address RNA 2013 Ramapo 345/138 kV transformer thermal violations
    a. Install additional independent relay protection for transformers by summer 2013
    b. Ramapo 345/138 kV transformers to be removed from BPS list (approved by NPCC in November 2012)
5. Market-based solutions to address RNA 2021-2022 Resource Adequacy Needs
    a. Astoria repowering – NRG to build 500 MW new CCGTs by 2016 and 500 MW new CCGTs by 2018 (replacing 595 MW existing generation)
    b. Dunkirk repowering – NRG to replace existing Dunkirk 1-4 with a 440 MW new CCGT + Steam turbine by June 2017
    c. Constellation NewEnergy, Inc. – 30 MW of new SCRs in Zone J (completion over 2014 to 2018 time period)
6. Regulated backstop solutions to address RNA 2021-2022 Resource Adequacy Needs
    a. TO proposal #1 would include 300 MW combination of generation, demand response, or energy efficiency in Zones G-K in 2021 followed by 275 MW increase in transfer limit from F-G by 2022. (two to four year lead time for 2021 projects and up to six year lead time for the transmission project)
    b. TO proposal #2 would include 275 MW combination of generation, demand response, or energy efficiency in Zones G-K in 2021 followed by 300 MW increase in transfer limit from F-G by 2022. (two to four year lead time for 2021 projects and up to six year lead time for the transmission project)

[11] Completion/operation dates are estimates provided in TO LTPs or from developers' proposals submitted to the NYISO. Lead times are NYISO determinations based upon information provided in developers' proposals. They are presented as an aid for the appropriate governmental agency (ies) and/or authority (ies) to determine which regulated solution would be implemented (Attachment Y – Section 31.2.5.7).

7. Alternative regulated solutions to address RNA 2021-2022 Resource Adequacy Needs

    a. Innoventive Power demand response proposal totaling 520 MW in Zone J and 240 MW in Zone K to be deployed in stages beginning in 2016 and completed by 2022. (depending on the specific deployment stage, lead time could range from three to five years)
    b. Poseidon Transmission 500 MW HVDC line from PSEG Dean 500 kV station to LIPA Ruland Road 345 kV station by 2018. (four year lead time beyond ISO/RTO interconnection study completion)
    c. Boundless Energy plan to build an additional North-South transmission path from Zone F to Zone G and continue into New Jersey for completion by 2016. (3-4 year lead time)
    d. Boundless Energy plan to upgrade and make additions to the West - East transmission path from Zone A to Zone G and continue into New Jersey for completion by 2016. (3-4 year lead time)
    e. Boundless Energy plan to build an HVDC transmission path from Zone G to Zone J for completion by 2017 (if both of the previous two projects are built). (4-5 year lead time)