



2012 Comprehensive Reliability Plan



New York Independent System Operator

FIRST DRAFT REPORT

JANUARY 4, 2013

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EXECUTIVE SUMMARY

The 2012 Comprehensive Reliability Plan (CRP) is the sixth CRP completed by the NYISO. The 2012 CRP determines that additional resources are needed over the 10-year Study Period 2013-2022 in order for the New York Control Area (NYCA) to comply with applicable reliability criteria. The reliability needs were identified in the 2012 Reliability Needs Assessment (RNA) in years 2013, 2020, 2021 and 2022. As a result, the NYISO requested market-based, regulated backstop, and alternative regulated solutions to the identified Reliability Needs. The NYISO's reliability planning processes prefers market-based solutions to meet the future needs, with regulated backstop and alternative regulated solutions available, if needed. This CRP reports that market-based, regulated backstop and alternative regulated solutions have been proposed to meet the reliability needs 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. Based upon its evaluation of the market-based solutions and updated LTPs from the TOs, the NYISO has concluded that there are sufficient market based resource additions available to the NYCA to meet the resource adequacy needs for the next 10 years and regulated backstop 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 to implement any other regulated backstop solution or any alternative regulated solution to address the resource adequacy needs identified in the 2012 RNA. The NYISO will continue to monitor the progress of the market-based solutions and TO plans through its quarterly monitoring program, and may make a determination that a regulated solution should proceed to seek regulatory approval if future conditions indicate that reliability criteria will be violated.

The 2012 Comprehensive Reliability Plan contains the following _____ actions:

1. _____¹
2. _____.
3. _____.

¹ See NYISO Technical Bulletin 171, Subject: Monitoring Viability of Solutions to Meet Reliability Needs – NYISO Process.

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

Finding Two – Resource Adequacy

Finding Three – Plan Risk Factors

Although the planned system meets the reliability criteria based on the conditions studied, the NYISO has identified several risk factors that could adversely affect the implementation of the plan and hence future system reliability. These risk factors, which require ongoing review and assessment, are:

1.that all projects, LTPs, market-based, proceed as planned.....
2. 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. Until the next RNA is completed in 2014, it is important that the NYISO continue monitoring the status of existing facilities and proposed new resources. Emphasis should be placed on thoroughly identifying and addressing economic and environmental factors that may lead to additional generating unit retirements.
3.Re-licensing of Indian Point Power Plant.....
4.Energy efficiency and load forecast uncertainty.

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 regulated backstop or alternative regulated solutions could further improve system reliability.

1. Introduction

The NYISO's planning process, known as the Comprehensive System Planning Process² (CSPP), pursuant to Attachment Y of the NYISO Open Access Transmission Tariff (OATT), is a biennial process which encompasses two primary processes: 1) reliability planning, also known as the Comprehensive Reliability Planning Process (CRPP); and 2) economic planning, 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 Process

The Comprehensive Reliability Plan (CRP) is the final step of the CRPP process, 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. Prepare the CRP report.

1.1.1 The CRP

The CRP sets forth the NYISO's most recent 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. These findings and recommendations must include any determination that an 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 2009 and 2010 RNAs identified no Reliability Needs, and their respective CRPs did not need to evaluate market-based or regulated solutions.

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 Local Transmission Plans (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.

The development of the 2012 CRP represents the culmination of the most recent reliability planning 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 offered solutions to 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

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 identify a regulated backstop solution (RBS) to the resource adequacy needs. The RBS will be called upon by the NYISO, should no timely market-based solution be available. Additionally, it is expected that NYPA will work cooperatively with the Responsible TOs to identify regulated backstop solutions to the resource adequacy needs identified in the RNA.

The 2012 RNA also 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.

The 2012 RNA also found that certain N-1 and N-1-1 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.

More information about the 2012 RNA can be found at http://www.nyiso.com/public/webdocs/newsroom/press_releases/2012/2012_RNA_Final_Report_9-18-12_PDF.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 in 2016 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 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, 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

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 notice of intent to mothball the two Cayuga units and the rescission of the notice of intent to mothball the Gowanus Barges 1 and 4^{4,5}. With these recent announcements the NYISO has updated the base case for the CRP to include the Gowanus Barges and remove both Cayuga units.

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

With the inclusion of Gowanus Barges 1 and 4 in the CRP base case, the transmission security need on the Leeds – Pleasant Valley transmission corridor identified in the RNA in 2022 no longer is observed.

As a result of the July 20, 2012 Cayuga mothball notice, the DPS initiated its retirement process established by the Public Service Commission Order in Case 05-E-0889 that requires the NYISO and 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. As a result of this process, criteria violations were identified on the 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 have identified several near term and longer term measures that mitigate these reliability issues. In the near term, NYSEG and the Cayuga Operating Company, LLC have entered into a Reliability Support Services agreement (“RSS”), which has been filed with and approved by the Public Service Commission (Case 12-E-0400). The RSS keeps both Cayuga units in-service for a one year term, and provides NYSEG a right to request and negotiate an extension of the agreement if necessary to address reliability issues. In 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 the majority 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 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 have agreed to an RSS for 2013. The RSS also provides for retaining the Cayuga unit or units in service beyond 2013 if necessary to maintain reliability. As such, the CRP assumes that the Cayuga units will remain in service until permanent infrastructure 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 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. TOs' updated plans were submitted for inclusion by the NYISO in the CRP model. This section summarizes the proposed solutions and TO updated plans received by the NYISO.

The NYISO received three market-based solutions totaling a potential of 910 MW of resources and five Alternative Regulated Solutions. The 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 Responsible TOs which were identified for resource adequacy needs in Zones G - K jointly submitted proposed regulated backstop solutions for the 2020 – 2022 resource adequacy needs.

3.1.1 TOs' Updates to Local Transmission Plans (LTPs) and 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 to reflect 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 by 2014 and will be followed by a new 345/115 kV substation in the Rochester Area.
- National Grid submitted an update 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 during periods of at-risk loading. The permanent solution will include the reconductoring of 12.8 miles of the circuit by December 2016.
- Orange & Rockland is proposing to install a new independent relay protection system for the Ramapo 345 kV Substation by June 2013. This new protection 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 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)
- Niagara Mohawk Power Corporation d/b/a National Grid (National Grid)
- Orange & Rockland Utilities, Inc. (O&R).

3.1.2.1 Jointly Proposed Regulated Backstop Solutions ⁶

- A total of 300 MW of new generation/DSM or combinations thereof, divided equally in three groups in zones: G,H and I; zones 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 250 MW by 2022; or,
- A total of 200 MW of new generation/DSM or combinations thereof, divided equally in three groups in zones: G,H and I; zones 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 350 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. They include in total over 900 MW:

1. A 440 MW net increase from generator repowering in Zone J,
2. _____ MW of new or repowered generation in Zone A, and
3. _____ MW of additional special case resources in Zone J.

⁶ As stated previously, the NYISO does not need to trigger a Regulated Backstop Solution at this time.

Table 3-1 below is a summary of the Market-Based Solutions that have been submitted.

Table 3-1: Summary of Proposed Market-Based Solutions

Project Type	Size of Resource(MW)	Zone	In-service Date
Resource Proposals			
Combined Cycle Gas Turbines replacing existing Astoria generation	440 MW net increase	J	6/2018
Combined Cycle Gas Turbine	___ MW	A	6/2017
Special Case Resources	___ MW	J	6/2018

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

3.2.1 NRG Plan for Astoria Re-Powering

___ a proposal for new generating capacity for a net increase of 440 MW at Astoria.

3.2.2 Plan For New Zone A Resources

___ a proposal for ___ MW of new generating capacity in Zone A

3.2.3 Plan to increase Demand Response in Zone J

___ plan to increase special case resources by ___ MW over the years 2014 – 2018.

3.3 Alternative Regulated Solutions (currently under review)

Multiple alternative regulated solutions were submitted. One consists of new virtual generation, energy storage, spinning reserve and co-generation _____. Four different alternative regulated transmission projects were submitted (currently under review). They are:

3.3.1 _____

This alternative regulated solution _____. The developer plans to place the project in commercial operation in _____.

3.3.2 _____

This alternative regulated solution _____. The developer plans to place the project in commercial operation in _____.

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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 system. thermal violations were identified in 2013 at five locations on the BPTF: RG&E Station 80 345 kV (Zone B); RG&E Pannell 345 kV (Zone B); National Grid Clay 115 kV (Zone C); and O&R 345/138 kV transformers at Ramapo 345 kV 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 are excluded from the Bulk Power Transmission Facilities and the more stringent NPCC and NYSRC criteria and rules 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 550 MW in combinations of new generation, demand response, energy efficiency, and new transmission apportioned among Zones G - K.

The evaluation of the joint Responsible TO submittal of Regulated Backstop Solutions indicates that the system as modeled will meet the needs through 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	0.05
NYCA	0.10	0.10

Including either of the submitted TO RBS plans improves resource adequacy from the RNA findings to an LOLE of no more than 0.1 days per year for 2021 - 2022.

4.3 Assessment of the Market-Based Solutions

The market-based solutions proposed for the first five year period would not 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 440 MW net increase of resources proposed to be added by 2021 in Zone J will need to maintain its schedule for permitting, construction, and entering into service to meet the needs in 2021. These resources will also be sufficient to meet the needs in 2022.

The transfer limits used to evaluate the market-based proposals are the same as those used to evaluate the updated TO plans for the second five years. The same transfer limits were used for the evaluation of the backstop solutions.

In evaluating the viability of the Market-Based Solutions, the NYISO noted that the proponents of Market-Based generation Solutions may depend upon entry into long-term contracts for the sale of at least a portion of their output. Accordingly, while the NYISO has determined that these projects appear viable at this time to meet their projected in-service dates, there is at least some level of uncertainty as to whether these projects will proceed.

**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	0.07
Zone K (Long Island)	0.04	0.07
NYCA	0.06	0.09

4.4 Alternative Regulated Solutions

The NYISO simultaneously solicited requests for Alternative Regulated Solutions to meet the identified reliability needs. As discussed previously, five Alternative Regulated Solutions were submitted. The responses consisted of one demand response proposal and four transmission project proposals. Although the market-based solutions were found to be sufficient to resolve the identified Reliability Needs for 2020 and beyond, the NYISO (will) performed a high level review of each of the alternative regulated solution proposals.

4.4.1 Alternative Regulated Demand Response Solution

_____ proposes _____ MW _____.

4.4.2 Alternative Regulated Transmission Solution

These Alternative Regulated Solutions were submitted by _____ and _____, and are described in Section 3.3 of this CRP Report.

To evaluate the benefits of increased transfer capability associated with this transmission proposal, _____.

4.4.3 Assessment of the Alternative Regulated Solutions

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 (in progress) suggests that the Alternative Regulated Solutions (would/would not partially/fully) meet the resource adequacy need in Zones G – K for the years 2021- 2022.

The transmission alternative regulated solutions would benefit resource adequacy only if there is capacity available to be delivered, and they (would/would not) increase the flexibility to site additional resources away from load centers. The impacts of all these specific transmission projects have not been studied in a System Reliability Impact Study (SRIS) and there has not been a definitive conclusion about possible positive and negative impacts to the bulk power system associated with the projects.

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 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.

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 to determine if breakers would become over-dutied. 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 Study⁷.

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⁷ 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.⁸ 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 Responsible TOs submitted two alternative TO plans for the resource adequacy needs in 2020 and beyond _____. The individual responsible TOs also submitted updated and existing LTPs which were sufficient to meet the identified reliability needs over the first five year period. In addition, a broad range of solutions, including Market-Based Solutions, and Alternative Regulated Solutions were submitted. 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

_____.

5.1.1.1 Recommended Action 1

Recommendation: _____

Action: _____

5.1.1.2 Recommended Action 2

Recommendation: _____

Action: _____

⁸ 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.

5.1.2 Finding Two: Plan Risk Factors

Although the planned system meets reliability criteria based on the conditions studied, the NYISO has identified several risk factors that could adversely affect the implementation of the plan and hence future system reliability. These risk factors, which require ongoing review and assessment, follow:

5.1.2.1 Recommended Action 1

Recommendation: _____

Action: _____

5.1.2.2 Recommended Action 2

Recommendation: _____

Action: _____

5.1.2.3 Recommended Action 3

Recommendation: _____

Action: _____

5.2 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. Regulated backstop or alternative regulated solutions could 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 , NO _x 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):	Transmission facilities that are system elements of the bulk power system which is the interconnected electrical system within northeastern North America comprised of system elements on which faults or disturbances can have a significant adverse impact outside of the local area.
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, NYSEDA 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