2014 Comprehensive Reliability Plan

A report from the New York Independent System Operator

DRAFT REPORT

MARCH ~~3~~20, 2015

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Table of Contents

EXECUTIVE SUMMARY 4

Summary of Findings 5

1. Introduction 11

1.1 The Reliability Planning Process 11

1.2 The 2014 Comprehensive Reliability Plan 12

2. 2014 RNA Summary 14

2.1 Identified Reliability Needs 14

2.2 RNA Scenario Analysis 15

2.3 RNA Approval and Request for Solutions 16

2.4 Changes to the RNA System Model 16

2.5 Withdrawal of Request for Solutions 18

3. Development of Solutions to the Reliability Needs 19

3.1 Responsible Transmission Owner Responses 19

3.1.1 Responsible TOs' Updated Plans 19

3.1.2 Responsible TOs' Regulated Backstop Solutions 19

3.2 Market-Based Solutions to Identified Reliability Needs 19

3.3 Alternative Regulated Solutions 19

4. Evaluation of Solutions to Reliability Needs 20

4.1 Updated TOs Plans and Regulated Backstop Solution 20

4.1.1 Transmission Security 20

4.1.2 Resource Adequacy 24

4.2 Market-Based Solutions 24

4.3 Alternative Regulated Solutions 24

4.4 Summary of Evaluation of Proposed Solutions 24

4.5 Updates of Sensitivity and Scenario Analysis 25

4.5.1 Dunkirk Fuel Conversion Project 25

4.5.2 High (econometric) Load Forecast 26

4.5.3 Transmission Security under 90/10 Forecasted Load 26

4.5.4 Zonal Capacity at Risk Analysis 26

4.5.5 Indian Point Energy Center Plant Retirement Scenario 28

5. 2014 Comprehensive Reliability Plan 31
5.1 CRP Findings 31
5.2 CRP Recommended Actions 35
5.3 Conclusions 36
A. Appendix A – Glossary 1
B. Appendix B - Summary of Market-Based Solutions and TOs' Updated Plans 11
C. Appendix C - 2014 LTP Projects and Timing 12

Table of Tables

Table 1: Reliability Needs identified in 2014 RNA 14
Table 2: Capacity Resource Additions in the 2014 CRP 17
Table 3: Transmission Security Needs and Associated Plans 23
Table 4: LOLE Results for 2014 CRP Base Case 25
Table 5: Zonal Capacity at Risk of 2014 CRP 26
Table 6: Capacity Margins for Zones G-K 27
Table 7: LOLE Results IP Scenario 28
Table 8: RNA vs CRP LOLE IP Scenario 30
Table B1: Current Status of Tracked Solutions & TOs' Plans 11
Table C1: Updated TOs LTPs Addressing Security Violations 12
Table C2: Transmission Security Needs and Associated Plans 15

~~Table of Figures~~

EXECUTIVE SUMMARY

The 2014 Comprehensive Reliability Plan (CRP) ~~constitutes~~completes the ~~final step of the four-step~~2014 Reliability Planning Process (RPP). The NYISO initiated the CRP after the NYISO Board approved the 2014 Reliability Needs Assessment (RNA) in September 2014. The RNA report identified resource adequacy needs in Southeast New York (SENY) beginning in 2019 and bulk transmission security needs in four regions starting in 2015. Subsequent to the RNA approval and prior to the start of the CRP, the New York Transmission Owners (TOs) updated their local transmission owner plans (LTPs), which included many components such as facilities, demand response programs, and operating procedures. ~~Also, in response to new and existing market signals~~Also, certain generation owners provided status changes that included generati~~o~~nrs returning to service, withdrawal of a notice of intent to mothball, and a restoration to full capacity operation. These changes ~~represent~~include approximately 1000 MW of resources returning at critical locations in SENY, in response to new and existing market signals, with an additional 1000 MW located outside of SENY. The NYISO incorporated these updates into the CRP base case.

Based upon its evaluation of the CRP base case given these changes, the NYISO has concluded that there are sufficient ~~resource additions to allow~~resources such that the New York Control Area (NYCA) ~~to comply~~will be in compliance with the resource adequacy criterion for the ten-year study period. With the inclusion of the TOs' local transmission plan updates and the generation status changes, the previously-identified transmission security violations will be ~~mitigated~~resolved from 2018 through 2024. Between 2015 through 2017, certain TOs plan to utilize operating procedures, ~~which include possible local transmission district load shedding, to mitigate the reliability needs until they complete the remainder of the transmission system equipment upgrades contained in their local transmission plans.~~if necessary, to resolve potential transmission security violations.

~~Since the 2014 CRP includes projects yet to return or to be placed in service,~~ While the NYISO ~~must continue to monitor the progress of all components of the TOs' local transmission plans through its quarterly monitoring program and the generation actually returning to service. If these additional facilities fail to make adequate progress, or other existing facilities retire, the NYISO may need to trigger a gap solution to meet system reliability needs until the Reliability Planning Process cycle commencing in 2016 refreshes the identification of Reliability Needs and solutions.~~

~~While this CRP~~ concludes that long-term reliability needs have been ~~mitigated~~satisfied in this CRP report, the margin to maintain reliability ~~throughout~~narrows over the ten-year study period ~~is very narrow. Generator~~. Potential risk factors, such as generator unavailability, or higher load levels, ~~especially~~ in regions of upstate New York (including Rochester, Western and Central New York and the Capital Region), could potentially lead to immediate and severe transmission security violations ~~and potential load shedding. For resource adequacy, the~~ . The projected NYCA's capacity margins are ~~projected to be depleted~~narrow in ~~2024~~the later years of the study; therefore, a small decrease in resource capacity or an increase in loads by ~~the tenth year~~2024 would result in an LOLE violation in that year. ~~If larger amounts of capacity were to become unavailable, or higher load levels occur, in the Lower Hudson Valley or in New York City, there could be a need for resources as soon as~~

~~2020. Moreover, the loss of critical generation in Western New York could severely constrain west to east transfer of energy from the Niagara Project and imports from Ontario.~~

If any of these potential risk factors occur, they may lead to reliability violations. The NYISO must continue to monitor the status of existing and expected generators and the progress of TOs' local transmission plans through its quarterly monitoring program, particularly the firm transmission projects included in the CRP and the generators that have either indicated that they plan to return to service or to full capacity, but that have not yet done so. Moreover, the next RNA cycle will begin in 2016 and will review the status of these risk factors and other reliability issues. These issues may be resolved by new capacity resources coming into service, construction of additional transmission facilities, and/or increased energy efficiency, distributed energy resources, and demand response.

Summary of Findings

The CRP findings and risk factors are summarized ~~here and discussed in Section 5.~~below:

Finding One – Resource Adequacy

~~If the capacity resources identified as changing status become available at their proposed in-service dates, they will be fully~~There are sufficient resources in the CRP base case to meet the resource adequacy criterion for the entire ten year study period~~. However, all existing~~, but the capacity margins diminish as the load grows over the study period such that there is a very small capacity ~~resources modeled must remain available to meet resource adequacy criteria for~~ margin in 2024, the tenth year~~, 2024, as the resource margin is very small~~. However, the needs will be revisited in subsequent Reliability Planning Process cycles between now and 2024.

Finding Two – Transmission Security and Adequacy

When the LTP and generation updates are considered, the New York bulk power system meets applicable reliability criteria throughout the study period, but operating procedures will be necessary to ~~mitigate~~resolve potential overloads for years 2015 through 2017.

In the Rochester and Syracuse areas, the ~~needs~~violations will be resolved with permanent solutions identified in the most recent TO local transmission plans scheduled to be completed by summer 2017 in Rochester and the end of 2017 in the Syracuse area. In the interim, local operating procedures (~~described in Section 3.1.1~~up to and including load shedding) will be implemented, if required, to prevent overloads. ~~At baseline load forecast levels, these operating procedures include load shedding of approximately 100 MW in Rochester and approximately 30 MW to 110 MW in the greater Syracuse area.~~

Finding Three – Plan Risk Factors

In addition to ~~a number of~~base case assumption uncertainties identified in the 2014 RNA ~~related to the base case assumptions, several~~, there are other risk factors ~~exist~~ that could adversely affect the implementation of the plan and hence system reliability over the ten-year planning horizon. If any of these risks occur, the NYISO will evaluate the impact, considering all other appropriate system changes, to determine whether a Gap Solution is needed to address an imminent threat to reliability if it occurs before ~~it can be addressed in~~ the next Reliability Planning Process ~~in 2016.~~can address it. These factors, which require ongoing review and assessment, such as generation additions, include:

1. *Completion of Transmission Owner Local Transmission Plans:* The TOs' local transmission plans are a critical cornerstone of the overall CRP. Delays in the siting of the LTP facilities, such as those experienced by the Rochester Gas and Electric (RG&E) Rochester Area Reliability Project (RARP~~)~~), which was included in the 2012 CRP, introduce uncertainty to the Reliability Planning Process and expose the bulk power system to unnecessary risk, including but not limited to load shedding.

2. *Change to System Performance:* The aging ~~transmission and~~ generation infrastructure may lead to more frequent and longer outages as well as increasing costs, which may drive more aging generation into retirement.

3. *Change to System Load Level:* The high load, or 90/10, forecast for the statewide coincident summer peak is on average approximately 2,400 MW higher than the baseline 50/50 forecast ~~that is~~ modeled in the base case. A higher-than-forecasted load level could expose the system to potential reliability issues, including greater levels of load shedding in the interim operating procedures in some localized areas of the state.

4. *Change to System Resources:* Substantial uncertainties exist in the next ten years that will impact the system resources. These uncertainties include, but are not limited to:

    ~~a) Changes in the economy, state or federal environmental regulations or other actions or events may lead to the retirement or curtailment of critical system resources.~~

    a) ~~Retirement~~If expected capacity resources do not materialize, transmission security violations may arise as early as year 2016, and resource adequacy violations may occur in later years. The 2014 CRP base case includes approximately 2,000 MW of additional resources, of which 950 MW of expected capacity resources are not in-service yet. The resources that are not in-service yet include: i) ConEd's DR/EE/CHP program (expected to fully mature by summer 2016), ii) Taylor Biomass (expected to come into service in Dec. 2015), iii) Bowline 2 (expected to return to full capacity by summer 2015), and iv) Dunkirk Plant (expected to refuel and return to service by summer 2016).

b) Curtailment or retirement of additional generating units beyond those already contemplated in the 2014 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 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.~~resources into operation. Specifically, the loss of critical generation in Western New York could severely constrain west to east transfers of energy and capacity from the Niagara Project and imports from Ontario, potentially leading to higher energy prices and resource adequacy violations.

c) The R.E Ginna Nuclear ~~Generating Station~~Power plant may retire within the ten year study period. In November 2014, the PSC ordered RG&E and ~~Ginna~~R. E. Ginna Nuclear Power Plant, LLC (GNPP) to negotiate a Reliability Support Services Agreement (RSSA) in response to a petition from Ginna indicating ~~their intent to potentially retire.~~that the retirement of this facility was under consideration. On February 13, 2015, RG&E filed at NYPSC an executed RSSA ~~was filed by RG&E~~ that it enters into with GNPP, and ~~Ginna providing for~~GNPP filed the agreement with FERC. The agreement would provide reliability support services from the plant with a term ~~until~~from April 1, 2015 to September 30, 2018, subject to earlier termination as well as possible extension into 2020. The CRP assumes Ginna is in-service for the entire study period. A change in status of the plant could impact transmission security and statewide resource adequacy. The uncertainty associated with Ginna highlights the importance of timely completion of ~~the Rochester Area Reliability Project (RARP).~~a transmission solution.

~~d)~~ Capacity resources could decide to offer into other markets and, therefore, not be available to the NYCA. Accordingly, the NYISO will continue to monitor imports, exports, generation and other infrastructure ~~and assess whether a gap solution is needed to mitigate an imminent threat to reliability before it is addressed in the next Reliability Planning Process beginning in 2016. New market based generation projects under study in the NYISO's interconnection process could mitigate this need if such capacity comes into service during the study period.~~

~~e)~~d) ~~For 2015 and 2016, with resources coming into service, there will be capacity margins in the system that could absorb capacity resource decreases or load increases up to 1,500 MW in critical zones in SENY in year 2016. In 2019, the capacity margins decrease to approximately 900 MW in~~

~~those critical zones. In 2024, the capacity margins are essentially depleted.~~

~~.~~

5. *Natural Gas Coordination:* While there are efforts underway to enhance planning and communication between the electric and gas sectors, ~~significant increased~~New York's reliance on natural gas as the primary fuel for electric generation ~~has raised concerns for maintaining electric reliability.~~justifies continued vigilance about the status of the natural gas system. Presently ongoing studies and efforts ~~to~~focus on: (i) improv~~e~~eing communication and coordination between the sectors; (ii) address~~ed~~ing market structure enhancements, such as the closing time of the natural gas markets; (iii) provid~~e~~eing for back-up fuel (primarily distillate oil) assurance to generation~~,~~; and (iv) ~~to address~~addressing the electric system reliability impact of the sudden catastrophic loss of gas~~, must be completed in a timely manner~~.

6. *Federal and State Environmental Regulations:* Building on the 2014 RNA, which qualitatively reviewed the impacts of federal and state environmental regulations upon operation of the Bulk Power Transmission Facilities; this 2014 CRP highlights the potential risks to system reliability posed by implementation of environmental regulations. The regulatory programs with the largest reliability risk potential are: (i) facility specific operational limitations; (ii) the Cross State Air Pollution Rule (CSAPR) cap and trade program for NOx and SO2; (iii) the Mercury and Air Toxics Standards (MATS) for hazardous air pollutants from new and existing coal and oil-fired units; (iv) Clean Power Plan, which is the proposed ~~federal~~USEPA green house gas standards for new and existing sources; and (v) the revised Ozone National Ambient Air Quality Standard (NAAQS).

The 2014 Comprehensive Reliability Plan contains the following recommended actions:

1. *Monitor and Track Potential New Developments:* The energy industry is in transition. Economic conditions, governmental programs and environmental regulations are changing quickly, resulting in financial stresses that may lead to the loss of resources~~.~~ or, alternatively, could positively affect system conditions. New market-based generation projects under study in the NYISO's interconnection process could increase the reliability margin in the long term, if such capacity comes into service during the study period. The NYISO will monitor and track these issues and consider their potential impacts on future system reliability. If a threat to reliability appears to be imminent, the NYISO can investigate the need to trigger a gap solution, if it occurs, before the next Reliability Planning Process has a chance to address the need, in accordance with established procedures, as set forth in Attachment Y of the NYISO OATT.

2. *Monitor and Track Transmission Owner Plans:* The New York TOs need to complete the projects identified in their LTPs on schedule and as planned. Local transmission ~~plans~~projects that are identified to maintain reliability should be sited and constructed

without further delay to minimize reliance on the interim operating procedures in the Rochester and Syracuse areas. The NYISO will continue to monitor the ~~status~~completion of the identified projects and, more generally, the statuses of those plans associated with the reliability needs initially identified in the RNA and assess the state of the system to determine if violations would occur.

3. *Continue Coordination with the New York State Public Service Commission (PSC):* System planning activities, such as those encompassed by the New York Energy Highway Blueprint, will need to be considered within the NYISO Comprehensive System Planning Process. In addition, the State of New York is presently considering expanding and extending a variety of clean energy programs that may increase deployment of energy efficiency, renewable generation and distributed energy resources. These initiatives could positively affect reliability, but are not explicitly recognized in the 2014 CRP analyses. The NYISO will continue to monitor and participate in other planning activities including, but not limited to, NYPSC proceedings considering Reforming the Energy Vision (REV), ~~AC~~Alternating Current Transmission Upgrades, Clean Energy Fund, Indian Point Reliability Contingency Plan, and individual proceedings on generation retirement and repowering.

4. *Monitor Changes that could Impact Risk Factors*: The NYISO planning processes include steps that actively monitor and address the potential impacts of additional system changes and known risk factors. New market-based generation projects under study in the NYISO's interconnection process could ~~mitigate this need~~increase the long-term capacity margin if such ~~capacity comes~~projects come into service during the study period.

Conclusion

This 2014 CRP sets forth the NYISO findings, that under the conditions studied shown in the table below summarizing the 'Initial Reliability Needs and Plan Components', the planned NYCA system will result in the New York bulk power system meeting all applicable reliability criteria over the 2015 through 2024 study period. These findings confirm that the initially identified Reliability Needs in the 2014 RNA are ~~mitigated~~resolved and no additional solutions are required. This CRP highlights a number of risks to the ten-year reliability plan, which include narrowing capacity margins that make long-term bulk power system reliability vulnerable to reduction in available resources or any failure to timely implement Transmission Owners' Local Transmission Owner Plans.

RNA Identified Initial Reliability Needs and CRP Plan Components

	Reliability Needs	Comprehensive Reliability Plan
2014		Zone G, Danskammer (501 MW) in 12/2014 Zone C, Binghamton CoGen (41 MW) in 12/2014
2015	Transmission security violations (Zones B, C, E, F) No resource adequacy violations	Zone J, USPG Astoria 20 (177 MW) in 3/2015 Zone G, Bowline #2 Repair (405 MW) in 7/2015 Zone G, Taylor Biomass (19 MW) in 9/2015 Zone A, Dunkirk Refueling (435 MW) in 9/2015 Zone A, National Grid Five Mile Rd LTP in 12/2015
2016	No additional transmission security violations No resource adequacy violations	Zone J, ConEd DR/EE/CHP (125 MW) 6/2016 Zones E,G,J, TOTS[1] in 6/2016
2017	Additional transmission security violations (Zones C, E) No resource adequacy violations	Zone B, RG&E Station 255 (RARP) LTP in 5/2017 Zone C, National Grid LTP in 12/2017 Zone C, NYSEG LTP in 12/2017
2018	Additional transmission security violations (Zone A) No resource adequacy violations	No additional solution is needed
2019	No additional transmission security violations Resource adequacy violation (100 MW, Zones G-K)	No additional solution is needed
2020	Additional transmission security violations (Zone C) Resource adequacy violation (300 MW, Zones G-K)	No additional solution is needed
2021	Additional transmission security violations (Zone A) Resource adequacy violation (500 MW, Zones G-K)	No additional solution is needed
2022	Additional transmission security violations (Zones A, F, G) Resource adequacy violation (700 MW, Zones G-K)	No additional solution is needed
2023	No additional transmission security violations Resource adequacy violation (950 MW, Zones G-K)	No additional solution is needed
2024	No additional transmission security violations Resource adequacy violation (1150 MW, Zones G-K)	No additional solution is needed

~~Note:~~

Notes:

(1) Selkirk was modeled out of service in the RNA. Since it did not ever enter mothball status, it is not shown as returned to service.

(2) New York State is divided into eleven geographic zones, referred to as Zones A through K.

[1] The Transmission Owner Transmission Solutions (TOTS) is a group of projects proposed by NYPA, NYSEG, and ConEdison that include three primary projects: Marcy South Series Compensation, a second Rock Tavern-Ramapo 345 kV circuit, and Staten Island Unbottling.

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 ~~that encompasses two distinct assessments: 1) a reliability planning assessment, also known as the~~ comprised of four components:

1. Local Transmission Planning Process (LTPP),
2. Reliability Planning Process (RPP~~); and 2) an economic planning assessment, also known as~~),
3. Congestion Assessment and Resource Integration Study (CARIS~~). ~~), and
4. Public Policy Transmission Planning Process.

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 Reliability Planning Process

~~The Comprehensive Reliability Plan (CRP) is the final step of the four steps comprising the RPP, 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 are satisfied using the updated 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.~~

~~The~~ The RPP consists of two studies:

[2] A detailed discussion of the CSPP can be found in the 2014 RNA Appendix B.

~~[3] The LTPP under OATT Attachment Y was first initiated in October of 2009. While the NYISO does not conduct planning for local transmission systems, 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.~~

1. *The Reliability Needs Assessment (RNA):* The NYISO performs a biennial study in which it evaluates the resource adequacy and transmission system adequacy and security of the New York bulk power system over a ten year Study Period. Through this evaluation, the NYISO identifies Reliability Needs in accordance with applicable Reliability Criteria. This report is reviewed by NYISO stakeholders and approved by the Board of Directors.

2. *The Comprehensive Reliability Plan (CRP).* After the RNA is complete, the NYISO requests the submission of market-based solutions to satisfy the Reliability Need. The NYISO also identifies a Responsible TO and requests that the TO submit a regulated backstop solution and that any interested entities submit alternative regulated solutions to address the identified Reliability Needs. The NYISO evaluates the viability and sufficiency of the proposed solutions to satisfy the identified Reliability Needs and evaluates and selects the more efficient or cost-effective transmission solution to the identified need. In the event that market-based solutions do not materialize to meet a Reliability Need in a timely manner, the NYISO triggers regulated solution(s) to satisfy the need. The NYISO develops the CRP for the ten year Study Period that sets forth its findings regarding the proposed solutions. The CRP is reviewed by NYISO stakeholders and approved by the Board of Directors.

~~1.1.1~~1.2 The 2014 Comprehensive Reliability Plan

This 2014 CRP sets forth the NYISO's findings and recommendations for the 2014 CSPP 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 Gap Solution is necessary to maintain bulk power system reliability during the ten-year study period.

The 2014 CRP builds upon the analyses and results contained in the 2014 RNA, as well as the NYISO's prior Comprehensive Reliability Plans (2005, 2007, 2008, 2009, 2010, and 2012 as applicable). The first three CRPs and the 2012 CRP addressed the reliability needs identified by their respective RNAs, and included the evaluation of market-based and regulated responses to the Reliability Needs. Reliability Needs were not identified in the 2009 and 2010 RNAs, and their respective CRPs did not evaluate market-based nor regulated solutions, as the NYISO was not required to request them.

The development of the 2014 CRP represents the culmination of the most recent RPP phase of the NYISO's two-year CSPP. The NYISO will use the 2014 CRP as a foundation for the economic planning process, otherwise known as CARIS, which commences again in 2015.

Continued reliability of the bulk power system during the Study Period depends on a combination of existing and 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 and to federal and state government policy makers.

Substantial uncertainties exist in the next ten years that will impact the system resources. These uncertainties include, but are not limited to, the economy, narrowing capacity resource margins, state and federal environmental regulations and other actions or events that may lead to the retirement or curtailment of critical system resources. New York's aging transmission and generation infrastructure is becoming more susceptible to these factors that may lead to more frequent and longer outages as well as increasing costs which may drive more infrastructure retirement. Each of these, and various other uncertainties, could create new risks to the continued reliability of the bulk power system.

This 2014 CRP report contains the plan for maintaining the New York bulk power system reliability over the ten year period 2015-2024. The highlights by Section are as follows:

1. Section 2 summarizes the 2014 RNA and the updating of the database ~~for the transition to the evaluation of~~before evaluating proposed solutions to the identified Reliability Needs;
2. Section 3 describes the results of the database updates, updated LTPs, and the determination of whether any Reliability Needs still exist before requesting proposed solutions to the identified reliability needs in the RNA;
3. Section 4 discusses the results of the evaluation of solutions; and
4. Section 5 presents the reliability plan and discusses the findings, actions and recommendations along with an analysis of the potential risks and ~~mitigating~~countervailing factors that could affect the plan.

2. 2014 RNA Summary

2.1 Identified Reliability Needs

Based upon the base case assumptions that were applied, the 2014 RNA ~~reported the identification of~~identified transmission system security violations beginning in 2015 and resource adequacy violations beginning in 2019 and increasing through 2024.

For transmission security, there were four primary regions with reliability needs identified: Rochester, Western & Central New York, Capital Region, and the Lower Hudson Valley and New York City. These reliability needs were generally driven by then-recent and proposed generator retirements or mothballing, combined with load growth. The New York transmission owners have developed plans through their respective local transmission planning processes to construct transmission projects to meet not only the needs identified in the ~~2012 RNA~~prior Reliability Planning Process, but also any additional needs occurring since then ~~and prior to 2014 RNA~~. These transmission projects were included in the 2014 RNA base case. The NYISO identified Reliability Needs in the 2014 RNA were identified even with the inclusion of the transmission projects in the base case, or determined that the needs existed until the in-service date of certain projects. The comparison of the transmission security needs and the associated plans to resolve the violations between 2012 RNA, 2014 RNA, and 2014 CRP are summarized in Appendix C2.

The reliability needs identified in the 2014 RNA are summarized in Table 1 below:

Table 1: Reliability Needs identified in 2014 RNA

Year of Need	Transmission Security Violations (Area/Load Zone/Transmission Owner)	Resource Adequacy (LOLE)
2015	Rochester Area in Genesee (Zone B), owned by RG&E	No violation
	Binghamton Area in Central (Zone C), owned by NYSEG*	
	Syracuse Area in Central (Zone C), owned by N. Grid	
	Utica Area in Mohawk Valley (Zone E), owned by N. Grid	
	Albany Area in Capital (Zone F), owned by N. Grid	
2016	No additional violations	
2017	Rochester Area issues mitigated	
	Additional Syracuse Area in Central (Zone C), owned by N. Grid	
	Additional Utica Area in Mohawk Valley (Zone E), owned by N. Grid*	
	Binghamton Area voltage in Central (Zone C), owned by NYSEG	
2018	Buffalo Area in Dysinger (Zone A), owned by N. Grid*	
2019	No additional violations	Violation (LOLE = 0.11)
2020	Additional Binghamton Area in Central (Zone C), owned by NYSEG*	Violation (LOLE = 0.13)
2021	Additional Buffalo Area in West (Zone A), owned by N. Grid*	Violation (LOLE = 0.15)
2022	Additional Buffalo Area in West (Zone A), owned by N. Grid*	Violation (LOLE = 0.18)
	Transmission between Capital (Zone F) and Hudson Valley (Zone G), owned by N. Grid	
2023	No additional violations	Violation (LOLE = 0.22)
2024	No additional violations	Violation (LOLE = 0.26)

* Some violations were resolved upon the return of the Dunkirk plant to service.

More information about the 2014 RNA can be found at:

http://www.nyiso.com/public/webdocs/markets_operations/services/planning/Planning_Studies/Reliability_Planning_Studies/Reliability_Assessment_Documents/2014%20RNA_final_09162014.pdf

2.2 RNA Scenario Analysis

In addition, the 2014 RNA provided analysis of risks to the Bulk Power Transmission Facilities under certain sensitivities and scenarios to assist developers and stakeholders to propose market-based and regulated reliability solutions as well as to inform policy makers in formulating state policy. The 2014 RNA analysis included a sensitivity of the Dunkirk facility fuel conversion project, and scenarios to address recent experiences in the NYISO operations, which revealed potential future reliability risks caused particularly by generation retirements, fuel unavailability, or other factors that could limit energy production during the extreme winter weather. The findings under the sensitivity and scenario conditions are:

- *Dunkirk Fuel Conversion Project*: The 2014 RNA concluded that the availability of Dunkirk after the fuel conversion project in 2016 would have resolved thermal transmission security violations in the Buffalo and Binghamton areas, but did not resolve the resource adequacy needs identified in 2019 and thereafter.

- *High (econometric) Load Forecast*: ~~Resource~~The 2014 RNA concluded that resource adequacy violations would have occurred as soon as 2017.

- *Indian Point Energy Center Plant Retirement*: ~~Reliability~~The 2014 RNA concluded that reliability violations would have occurred in 2016 if the Indian Point Plant retired at the latter of the two units' current license expiration dates in December 2015.

- *Zonal Capacity at Risk*: ~~For~~The 2014 RNA concluded that for year 2015, removal of up to 2,500 MW in Zones A through F, 650 MW in Zones G through I, 650 MW in Zone J, or 550 MW in Zone K would have resulted in a NYCA resource adequacy violation.

- *Transmission Security under 90/10 Forecasted Load*: The 2014 RNA concluded that the 90/10 forecast for the statewide coincident summer peak is on average approximately 2,400 MW higher than the baseline 50/50 forecast. This higher load would have resulted in the earlier occurrence of the reliability needs identified in the base case as well as the occurrence of new violations in the same four primary regions. In addition, based on the assumptions applied in this analysis, beginning in 2017 there would have been insufficient resources to meet the minimum 10-minute operating reserve requirement of 1,310 MW. Starting in 2020, there would have been insufficient resources to meet the modeled 90/10 peak load under pre-contingency conditions.

- *Stressed Winter Scenario*: The winter of 2013-2014 experienced five major cold snaps, including three polar vortex events that extended across much of the country. The NYISO set a new winter peak load of 25,738 MW, while neighboring ISOs and utilities concurrently set record winter peaks during the month of January. Compounding the impact from high load conditions, extensive generation derates and gas pipeline constraints occurred simultaneously due to the extreme winter weather. In the extreme case that NYCA is assumed to be unable to receive any emergency

assistance from neighboring areas, it would have taken a loss of capacity in excess of 7,250 MW due to energy production constraints in extreme winter conditions to cause a resource adequacy violation in 2015.

In addition to the scenarios, the NYISO also analyzed the risks associated with the cumulative impact of environmental laws and regulations, which may affect the flexibility in plant operation and may make fossil plants energy-limited resources. The RNA discussed pending changes in environmental regulations that affect long term power system planning and highlights the impacts of various environmental drivers on resource availability.

2.3 RNA Approval and Request for Solutions

On September 16, 2014 the NYISO Board of Directors approved the 2014 RNA, after extensive review by the ESPWG, the Operating Committee, and the Management Committee.

On October 1, 2014, the NYISO issued a solicitation letter requesting solutions to the identified Reliability Needs. The full text of this letter can be found on the NYISO web site at:

http://www.nyiso.com/public/webdocs/markets_operations/services/planning/Planning_Studies/Reliability_Planning_Studies/Reliability_Notices/nyiso_solicitation_letter_10012014.pdf

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/markets_operations/services/planning/Planning_Studies/Reliability_Planning_Studies/Reliability_Assessment_Documents/2014%20Reliability%20Needs%20Assessment/MMU%20Review%20of%202014%20RNA_final.pdf

2.4 Changes to the RNA System Model

Since the RNA was approved, NYISO Market Participants announced changes to the electric system that differed from the RNA's base case assumptions. These changes to the system include generators announcing their intent to return to service, generators rescinding their notice of intent to retire, and the updated TO LTPs, that included upgraded facilities and interim operating procedures to ~~mitigate~~satisfy the needs until the facility upgrades become operational after 2017. With these recent announcements the NYISO has updated the base case for the CRP to include these additional resources and operating procedures. These new and returning resources total

approximately 1,986 MW, and are shown in Table 2. Based on initial analysis, the NYISO determined that these facilities, when put in place, would ~~mitigate~~satisfy the Reliability Needs identified in the 2014 RNA.

Table 2: Capacity Resource Additions in the 2014 CRP

Generating plant or unit		
Plant or unit	**MW***	**Note**
Selkirk	348	Notice of Intent to mothball withdrawn
Dunkirk	435	Intent to return to service
Danskammer	495	Intent to return to service
Astoria 20	185	Intent to return to service
Ravenswood 3-3	-33	Notice of intent to mothball filed
Ravenswood 3-4	13	Returned to service
Bowline 2**	557	Intent to return to full capacity
Binghamton BOP	41	Intent to return to service
DR/EE/CHP program		
ConEd	125	Case 12-E-0503, NYPSC order effective Nov. 4, 2013
Total Incremental MW	1986***	

*Rounded values representing the lesser of DMNC and CRIS for generators, and the program total for the DR/EE/CHP program

** currently 180 MW

*** Number reflects the incremental MW only, not the sum of full capacity MW for all resources

Generating plant or unit			
Plant or unit	**MW[(1)]**	**Zone**	**Note**
Selkirk	347.7	F	Notice of Intent to mothball withdrawn
Dunkirk	435.0	A	Coal to gas conversion moving forward
Binghamton BOP	41.3	C	Returned to service
Danskammer	493.6	G	Returned to service
Astoria 20	177.0	J	Returned to service
Ravenswood 3-3	-33.1	J	Notice of intent to mothball filed
Ravenswood 3-4	31.7	J	Returned to service
Bowline 2 [(2)]	557.4	G	Intent to return to full capacity
DR/EE/CHP program			
ConEd	125.0	J	Case 12-E-0503, NYPSC order effective Nov. 4, 2013 [(4)]
Total Incremental MW [(3)]	1995.6***		

(1) MW values representing the lesser of DMNC and CRIS for generators, and ConEd's program total for the DR/EE/CHP program

(2) Derated to 179.9 MW based on 2014 Gold Book

(3) MW number reflects the incremental MW only, not the sum of full capacity MW for all resources

(4) Total expected load reduction in the PSC Order includes another 60 MW of NYSERDA on-going efforts, which is included separately in the load forecast used in the 2014 RNA and CRP.

2.5 Withdrawal of Request for Solutions

Based on the initial analysis of the RNA model updates satisfying the identified reliability needs, the NYISO issued a letter withdrawing its request for solutions on November 14, 2014. The link to the letter is:

http://www.nyiso.com/public/webdocs/markets_operations/services/planning/Planning_Studies/Reliability_Planning_Studies/Reliability_Notices/NYISO%20Letter%20Withdrawing%20Solicitation%20of%20Solutions%20November%2014%202014.pdf

Given that the NYISO determined that there are no remaining reliability needs, the NYISO does not need to determine the viability and sufficiency of any proposed solutions, and it is not required to evaluate and select a more efficient or cost effective transmission solution pursuant to OATT Attachment Y.

3. Development of Solutions to the Reliability Needs

~~Following the NYISO's withdrawal of its request for solutions to the identified Reliability Needs, the TOs submitted and confirmed updated local transmission plans for inclusion by the NYISO in the CRP model.~~

This section summarizes the TO updated plans received by the NYISO. Appendix C lists the completion times, and the lead times for the projects comprising the TO updated plans.

3.1 Responsible Transmission Owner Responses

The Responsible TOs presented updates to their individual ~~local transmission plans~~Local Transmission Owner Plans (LTPs) for resolving the identified transmission security needs ~~by providing Updates to their respective Local Transmission Owner Plans (LTPs).~~.

3.1.1 Responsible TOs' Updated Plans

Updates to LTPs were received from Central Hudson, Con Edison, National Grid, and NYSEG/RG&E, and PSEG Long Island. The updated plans were presented to a joint meeting of the Electric System Planning Working Group and the Transmission Planning Advisory Subcommittee. The NYISO updated the 2014 RNA base case for the CRP to reflect the changes in the LTPs in Appendix C.

3.1.2 Responsible TOs' Regulated Backstop Solutions

As noted above in Section 2.5, the request for solutions was withdrawn.

3.2 Market-Based Solutions to Identified Reliability Needs

As noted above in Section 2.5, the request for solutions was withdrawn.

3.3 Alternative Regulated Solutions

As noted above in Section 2.5, the request for solutions was withdrawn.

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. Since the request for solutions was withdrawn due to the absence of resource adequacy needs for the study period, the NYISO only evaluated the updated TO plans to determine whether they resolved the remaining transmission security needs. The NYISO locked down the CRP base case as of October 1, 2014, and therefore accepted no further updates after that date. Using the CRP base case, the NYISO analyzed whether the initially identified Reliability Needs were fully ~~mitigated~~satisfied in the CRP base case~~. Responsible TOs' Submitted Updated Plans,~~ and ~~Regulated Backstop Solutions~~findings are summarized in this section.

4.1 Updated TOs Plans and Regulated Backstop Solution

As stated above in Section 2.5, given that the NYISO withdrew its request for solutions, only the updated TO plans were evaluated in the 2014 CRP.

4.1.1 Transmission Security

The evaluation of the updates to the base case demonstrates that the New York bulk power system will meet applicable reliability criteria ~~with the addition of~~when these additional facilities are completed, along with the operating procedures that will be used by the TOs to ~~mitigate~~remove overloads for the interim period of years 2015 through 2017. Table 3 provides the list of transmission security violations reported in the RNA and the associated plans to resolve the violations. The comparison of the transmission security violations identified between 2012 RNA, 2014 RNA and 2014 CRP in Appendix C2. The following summaries of LTP updates include descriptions of the interim operating procedures, including possible load shedding[4], provided by RG&E and National Grid to reliably operate the system until the permanent solutions are in-service.

Rochester

RG&E Station 255 (a primary component of the Rochester Area Reliability Project (RARP)), which was provided as a solution to a reliability need in the 2012 CRP, resolves the thermal violations observed on the Pannell 345/115 kV transformers 1TR and 2TR and the Pannell Rd. – Quaker (#914) 115 kV transmission line. Station 255 is expected to be in-service by May 2017 according to the RG&E LTP update.

RG&E will use operating procedures to maintain the security of their system until Station 255 is in-service. These operating procedures include the adjustment of phase-angle regulators, use of special case resources, and possible load shedding of approximately 100 MW~~.~~ under baseline

[4] Load shedding is permissible by NERC, NPCC, and NYSRC operating criteria. The final corrective action plans do not include load shedding, in accordance with NPCC and NYSRC design criteria.

summer peak conditions. The procedures also include manning substations during conditions when load shedding is possible to allow for expedited isolation and restoration of the affected system.

The entire RARP, which includes the construction of Station 255 and new 345 and 115 kV lines in Rochester, was included in the 2014 RNA and is included in this CRP. The RARP will provide another source of power from the 345 kV system and deliver it across the 115 kV system from western Rochester to eastern Rochester which will reduce flows on the Pannell transformers and 115 kV transmission lines. Subsequent to the CRP base case lock down date, RG&E proposed a Ginna Retirement Transmission Alternative (GRTA), which includes replacement of the Pannell 345/115 kV transformers, to address reliability needs associated with the potential future retirement of the Ginna facility. If RG&E moves forward with GRTA, RG&E states that it would result in the delay of the construction of the new Station 255. The NYISO continues to monitor the proposal and the potential impact to reliability of the Rochester area.

Western & Central New York

National Grid identifies in their LTP a plan to reconductor the Clay-Lockheed Martin (#14) 115 kV transmission line in late 2017. Until the reconductoring is completed, National Grid will use operating procedures as an interim measure. The operating procedure includes switching the Wetzel Rd. load to an alternative source (Lighthouse Hill – Clay (#7) 115 kV) and local load shedding (approximately 30 MW), as necessary.

National Grid identifies in their LTP a plan to reconductor the Clay-Teall (#10) 115 kV transmission line in late 2017. Until the reconductoring is completed, National Grid will use operating procedures as an interim measure. The operating procedure includes switching the load at Pine Grove to an alternative source (Clay-Dewitt (#3) 115 kV) and local load shedding (approximately 110 MW), as necessary.

National Grid identifies in their LTP a plan to reconductor the Clay-Dewitt (#3) 115 kV transmission line in late 2017. Until the reconductoring is completed, National Grid will use operating procedures as an interim measure. The operating procedure includes switching the load at Bartell Rd. and Pine Grove to an alternative source (Clay-Teall (#10) 115 kV), Fly Rd. load to an alternative source (Teall-Dewitt (#4) 115 kV), and local load shedding (approximately 85 MW), as necessary.

National Grid identifies in their LTP a plan to install reactors on the Porter-Yahnundasis (#3) transmission line by late 2017. National Grid will use operating procedures as an interim measure until the reactors are installed. The operating procedure includes opening the Oneida-Yahnundasis (#6) 115 kV transmission line, as necessary.

The other Reliability Needs on National Grid facilities at Clay and Porter are resolved by the need date by the installation of a breaker at Porter, the reconfiguration of the Clay 345 kV substation, the elimination of certain conductor clearance issues, and the completion of the Dunkirk plant

fuel conversion project. The Reliability Needs associated with the National Grid Packard-Huntley-Gardenville 230 kV lines are resolved with the completion of the Dunkirk plant fuel conversion project.

With the return of the Binghamton Cogeneration facility and the Dunkirk plant fuel conversion planned to be complete by September 2015, the thermal violations observed on the NYSEG Oakdale 345/115 transformers are resolved through 2024. Also, the low voltage observed in the Binghamton area is resolved in the near-term with the Binghamton Cogeneration facility in-service. The planned reconfiguration of the Oakdale substation, including the addition of a third 345/115 kV transformer, resolves the voltage issue in the long-term.

Capital Region

The thermal violations on the Reynolds 345/115 kV and New Scotland 345/115 transformers are resolved with Selkirk mothball notice having been rescinded.

Lower Hudson Valley & New York City

~~The~~The NYISO projects that the region will have sufficient capacity such that the thermal violations on the Leeds – Pleasant Valley ~~lines~~line identified in the 2014 RNA are resolved ~~with the recent return of generation within the region~~.

Table 3: Transmission Security Needs and Associated Plans

Zone	Owner	Monitored Element	Year of Need	Plan In-Service Prior to Summer of Year	Plan
B	RGE	Pannell 345/115 1TR	2015	2017*	Station 255
B	RGE	Pannell 345/115 2TR	2015	2017*	Station 255
B	RGE	Pannell-Quaker (#914) 115	2015	2017*	Station 255
C	NYSEG	Oakdale 345/115 2TR	2015	2015	Generation returned to service
C	N.Grid	Clay-Lockheed Martin (#14) 115	2015	2018*	Reconductor Transmission Line
C	N.Grid	Clay-Teall (#10) 115 (Clay-Bartell Rd.-Pine Grove)	2015	2018*	Reconductor Transmission Line
C	N.Grid	Clay-Dewitt (#3) 115 (Clay-Bartell Rd.)	2015	2018*	Reconductor Transmission Line
E	N.Grid	Porter-Yahnundasis (#3) 115 (Porter-Kelsey)	2015	2018*	Install Reactors
F	N.Grid	New Scotland 345/115 1TR	2015	2015	Selkirk Rescinded Retirement Notice
F	N.Grid	Reynolds 345/115	2015	2015	Selkirk Rescinded Retirement Notice
C	N.Grid	Clay 345/115 1TR	2017	2017	Reconfigure Clay
C	N.Grid	Clay-Woodard (#17) 115 (Euclid-Woodard)	2017	2016	Remove thermal restrictions due to Conductor Clearance
C	N.Grid	S. Oswego-Clay (#4) 115 (S. Oswego-Whitaker)	2017	2015	Remove thermal restrictions due to Conductor Clearance
E	N.Grid	Porter-Oneida (#7) 115 (Porter-W. Utica)	2017	2016	Generation returned to service
A	N.Grid	Huntley-Gardenville (#80) 230 (Huntley-Sawyer)	2018	2016	Generation returned to service
C	NYSEG	Oakdale 345/115 3TR	2020	2015	Generation returned to service
A	N.Grid	Packard-Huntley (#77) 230 (Packard-Sawyer)	2021	2016	Generation returned to service
A	N.Grid	Packard-Huntley (#78) 230 (Packard-Sawyer)	2021	2016	Generation returned to service
A	N.Grid	Huntley-Gardenville (#79) 230 (Huntley-Sawyer)	2022	2016	Generation returned to service
F-G	N.Grid	Leeds-Pleasant Valley (#92) 345	2022	2015	Generation returned to service
F-G	N.Grid	Athens-Pleasant Valley (#91) 345	2022	2015	Generation returned to service

* Interim operating procedures are necessary when the permanent plan is not in-service prior to the need occurring.

4.1.2 Resource Adequacy

Resources associated with a demand response program were submitted by Con Edison. The evaluation of this program and generation facility status changes demonstrates that there are sufficient resource additions which, if developed, would allow the NYCA to be in compliance with the resource adequacy criterion for the ten year study period.

4.2 Market-Based Solutions

Evaluation was not performed as request was withdrawn.

4.3 Alternative Regulated Solutions

Evaluation was not performed as request was withdrawn.

4.4 Summary of Evaluation of Proposed Solutions

The solutions contained in the updated TO plans, in conjunction with resources included in the base case update, will satisfy New York's bulk power system reliability needs for the ten-year Study Period. The impacts of the updated LTP and the generation status does not change the results of the short-circuit analysis and corrective action plans noted in the RNA.

If the base case facilities remain on schedule as proposed, the NYCA will comply with the LOLE criterion throughout the ten-year Study Period. As can be seen in the table below, for the tenth year, the resource adequacy requirement is only just met. 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. If necessary, the NYISO can determine that a Gap Solution is needed to address an imminent threat to reliability that arises before it can be addressed in the next Reliability Planning Process that begins in 2016.

Table 4: LOLE Results for 2014 CRP Base Case

	Run ID	A	B	C	D	E	F	G	H	I	J	K	NYCA
00-Base_Case	Y2015	0.00	0.01	0	0	0.01	0	0.00	0	0.01	0.01	0.01	0.02
	Y2016	0	0.01	0	0	0.01	0	0.00	0.00	0.01	0.01	0.01	0.02
	Y2017	0	0.01	0	0	0.01	0	0.00	0	0.02	0.02	0.01	0.03
	Y2018	0	0.01	0	0	0.01	0	0.00	0.00	0.02	0.02	0.01	0.04
	Y2019	0	0.02	0	0	0.02	0	0.00	0	0.03	0.03	0.02	0.05
	Y2020	0	0.02	0	0	0.02	0	0.00	0	0.04	0.04	0.02	0.05
	Y2021	0	0.02	0.00	0	0.02	0	0.00	0	0.04	0.04	0.03	0.06
	Y2022	0	0.02	0.00	0	0.03	0	0.01	0.00	0.06	0.06	0.04	0.07
	Y2023	0	0.03	0.00	0	0.03	0	0.01	0.00	0.07	0.07	0.05	0.08
	Y2024	0	0.03	0.00	0	0.03	0	0.01	0.00	0.09	0.09	0.07	0.10

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA
Y2015	0.00	0.01	0	0	0.01	0	0.00	0	0.01	0.01	0.01	0.02
Y2016	0	0.01	0	0	0.01	0	0.00	0.00	0.01	0.01	0.01	0.02
Y2017	0	0.01	0	0	0.01	0	0.00	0	0.02	0.02	0.01	0.03
Y2018	0	0.01	0	0	0.01	0	0.00	0.00	0.02	0.02	0.01	0.04
Y2019	0	0.02	0	0	0.02	0	0.00	0	0.03	0.03	0.02	0.05
Y2020	0	0.02	0	0	0.02	0	0.00	0	0.04	0.04	0.02	0.05
Y2021	0	0.02	0.00	0	0.02	0	0.00	0	0.04	0.04	0.03	0.06
Y2022	0	0.02	0.00	0	0.03	0	0.01	0.00	0.06	0.06	0.04	0.07
Y2023	0	0.03	0.00	0	0.03	0	0.01	0.00	0.07	0.07	0.05	0.08
Y2024	0	0.03	0.00	0	0.03	0	0.01	0.00	0.09	0.09	0.07	0.10

4.5 Updates of Sensitivity and Scenario Analysis

2014 RNA analysis included an analysis of sensitivity and several scenarios. The findings under the sensitivity and scenario conditions were summarized in Section 2.2. With the additional resources included in the 2014 CRP, the sensitivity and scenario analysis were reviewed[5], and the updated findings are summarized in this section.

4.5.1 Dunkirk Fuel Conversion Project

The 2014 RNA concluded that the availability of Dunkirk Plant after the fuel conversion project in 2016 would have resolved thermal transmission security violations in the Buffalo and Binghamton areas, but did not resolve the resource adequacy needs identified in 2019 and thereafter.

With the inclusion of Dunkirk Plant fuel conversion project and updated LTP in the 2014 CRP, the previously identified transmission security violations in the Binghamton and Buffalo areas are fully resolved. With all the additional resources included in the 2014 CRP, resource adequacy needs are also fully resolved.

[5] In light of other NYISO initiatives, such as fuel assurance, the NYISO determined that it was not necessary to update the stressed winter scenario for the 2014 CRP.

4.5.2 High (econometric) Load Forecast

The 2014 RNA concluded that resource adequacy violations would have occurred as soon as 2017. With the additional resources modeled in the 2014 CRP, the year 2017 violation is now postponed to 2020.

4.5.3 Transmission Security under 90/10 Forecasted Load

The 2014 RNA concluded that the 90/10 forecast would have resulted in the earlier occurrence of the reliability needs identified in the base case as well as the occurrence of new violations. In addition, based on the assumptions applied in this analysis, beginning in 2017 there would have been insufficient resources to meet the minimum 10-minute operating reserve requirement of 1,310 MW. Starting in 2020, there would have been insufficient resources to meet the modeled 90/10 peak load under pre-contingency conditions.

With the additional resources modeled in the 2014 CRP, the NYISO projects that the year in which the system would have insufficient resources to meet the minimum operating requirement of 1,310 MW is now postponed to 2023. Also, there would be sufficient resources to meet the projected 90/10 peak load under pre-contingency conditions during the study period. The 90/10 forecast may result in transmission security issues prior to 2024.

~~4.5~~4.5.4 Zonal Capacity at Risk Analysis

~~As can be seen in the Table 4 above, the LOLE criterion is just met~~ The 2014 RNA concluded that for ~~the tenth~~ year~~, 2024.~~ 2015, removal of up to 2,500 MW in Zones A ~~decrease~~through F, 650 MW in Zones G through I, 650 MW in Zone J, or 550 MW in Zone K would have resulted in a NYCA resource adequacy violation.

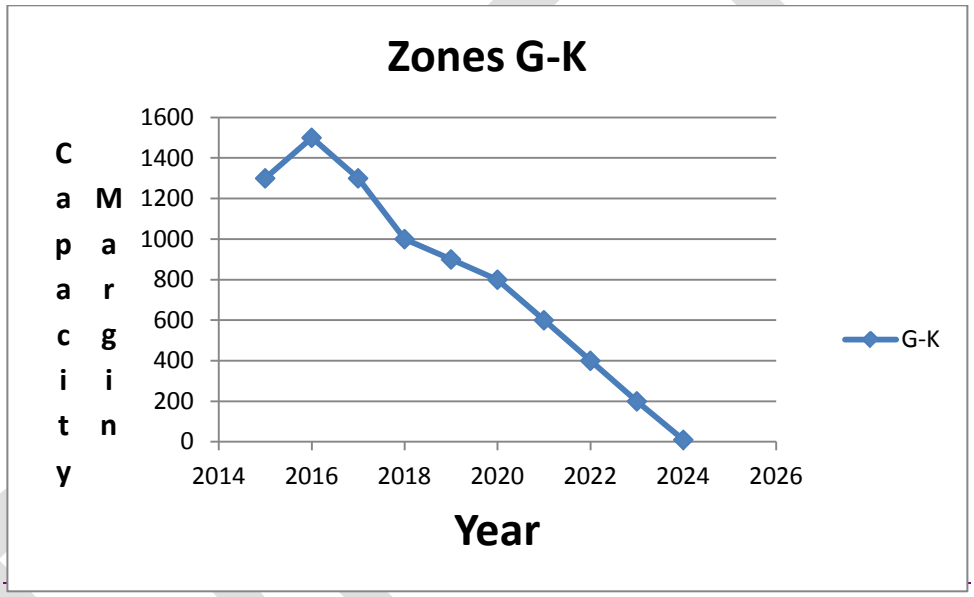
With the additional capacity ~~or an increase in loads in the tenth year of approximately 25 MW would result in an LOLE violation~~resources modeled in ~~that year. For~~the 2014 CRP, for 2015 and 2016, ~~with~~if all proposed resources com~~inge~~ into service, there are significant capacity margins in the system to absorb capacity resource decreases or load increases. For year 2015, removal of up to ~~1~~3,500 MW in Zones A through F, 1,300 MW in critical ~~zones in SENY~~Zones G through J, 1,300 MW in ~~year 2016~~Zone J, or 800 MW in Zone K would resulted in a NYCA resource adequacy violation. In 2019, the capacity margins decrease to approximately 900 MW in those critical zones in the CRP, while LOLE violation was already identified in the 2014 RNA. In 2024, the capacity margins are essentially depleted but the LOLE is still in compliance, compared with 1,150 MW of compensatory MW required to meet the NYCA resource adequacy criteria identified in the 2014 RNA.

Table 5: Zonal Capacity at Risk of 2014 CRP

Year	Zone J	Zone K	Zones A-F	Zones G-J	Zones G-K	Zones A-K	Zones A-E

Y2015	-1300	-800	-3500	-1300	-1300	-2300	-3400
Y2016	-1500	-800	-3200	-1500	-1500	-2400	-3200
Y2017	-1300	-700	-3100	-1300	-1300	-2000	-3200
Y2018	-1100	-600	-3000	-1100	-1000	-1700	-3000
Y2019	-900	-550	-2600	-1000	-900	-1500	-2700
Y2020	-800	-500	-2400	-800	-800	-1300	-2400
Y2021	-600	-400	-2100	-600	-600	-1000	-2100
Y2022	-400	-300	-1500	-400	-400	-700	-1600
Y2023	-200	-100	-900	-200	-200	-300	-900
Y2024	-15	-10	-45	-10	-10	-15	-35

Table 6: Capacity Margins for Zones G-K

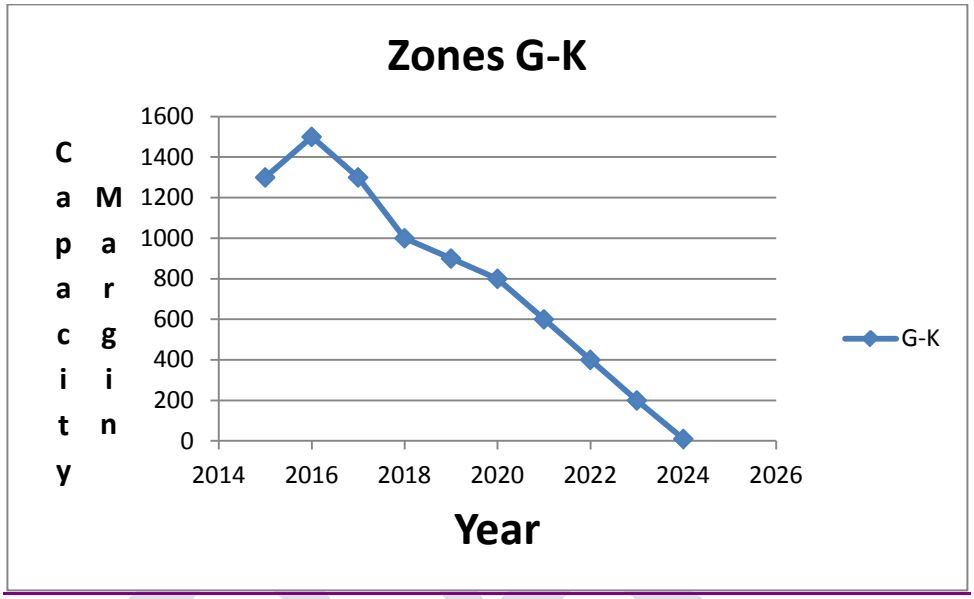


~~4.6 Loss of 1,000 MWs in SENY Analysis~~

~~This analysis indicates that if 1,000 MWs is lost in SENY for each year of the study period, the NYCA will violate LOLE criteria in the year 2020.~~

~~Table 7: Loss of 1,000 MW in SENY~~

07-01_SENY_Reduce	Y2015	0.00	0.02	0	0	0.02	0	0.03	0.00	0.06	0.05	0.02	0.07
	Y2016	0	0.02	0	0	0.02	0	0.02	0.00	0.04	0.04	0.01	0.05
	Y2017	0	0.02	0	0	0.02	0	0.03	0.00	0.05	0.05	0.02	0.07
	Y2018	0	0.02	0	0	0.02	0	0.04	0.00	0.07	0.06	0.03	0.08
	Y2019	0	0.02	0	0	0.03	0	0.05	0.00	0.08	0.08	0.04	0.09
	Y2020	0	0.03	0	0	0.03	0	0.05	0.00	0.10	0.09	0.05	0.11
	Y2021	0	0.03	0.00	0	0.03	0	0.06	0.00	0.12	0.11	0.06	0.13
	Y2022	0	0.03	0.00	0	0.03	0.00	0.08	0.00	0.15	0.14	0.09	0.16
	Y2023	0	0.03	0.00	0	0.04	0	0.09	0.00	0.19	0.17	0.12	0.19
	Y2024	0	0.04	0.00	0	0.04	0.00	0.11	0.00	0.22	0.20	0.15	0.22



~~4.7~~4.5.5 Indian Point Energy Center Plant Retirement Scenario ~~Update~~

If the Indian Point ~~Units 2 and 3 become~~Plant becomes unavailable in 2016, ~~LOLE~~even with the additional resources modeled in the 2014 CRP, reliability violations would still occur immediately~~,~~ in 2016, requiring approximately 500 MW in compensatory MW in SENY to ~~maintain~~satisfy resource adequacy~~.~~ criteria.

Table ~~8~~7: LOLE Results IP Scenario

~~With the additional~~

Year	A	B	C	D	E	F	G	H	I	J	K	NYCA	NYBA
Y2015	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Y2016	0	0.04	0	0	0.04	0	0.02	0.17	0.17	0.15	0.07	0.17	0.17
Y2017	0	0.03	0.00	0	0.03	0	0.02	0.20	0.20	0.19	0.09	0.21	0.21
Y2018	0	0.03	0.00	0	0.03	0	0.03	0.25	0.25	0.23	0.13	0.25	0.25
Y2019	0	0.03	0.00	0	0.04	0.00	0.03	0.30	0.30	0.27	0.17	0.30	0.30
Y2020	0	0.03	0.00	0	0.04	0.00	0.04	0.33	0.33	0.30	0.20	0.33	0.33
Y2021	0	0.04	0.00	0	0.04	0.00	0.04	0.39	0.39	0.36	0.26	0.39	0.39
Y2022	0	0.04	0.00	0	0.04	0.00	0.05	0.46	0.46	0.42	0.33	0.46	0.46
Y2023	0	0.04	0.00	0	0.05	0.00	0.06	0.54	0.54	0.49	0.41	0.54	0.54
Y2024	0.00	0.04	0.00	0	0.05	0.00	0.07	0.62	0.62	0.56	0.49	0.62	0.62

If all proposed resources come into service, the LOLEs would improve for the RNA versus CRP base case, but ~~not enough to change the~~ there would continue to be LOLE violations and need year would remain unchanged.

Table ~~9~~8: RNA vs CRP LOLE IP Scenario

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024
RNA	0.31	0.40	0.50	0.59	0.67	0.76	0.89	1.03	1.17
CRP	0.17	0.21	0.25	0.30	0.33	0.39	0.46	0.54	0.62

This scenario assesses only resource adequacy, and does not include transmission security, voltage or transient stability assessments in the event of the unavailability of the Indian Point Plant.

5. 2014 Comprehensive Reliability Plan

Based upon its evaluation of the updated RNA base case and updated TO plans, the NYISO has concluded that there are sufficient resource additions and effective interim operating procedures in the CRP to meet the Reliability Needs initially identified in the 2014 RNA for the ten-year study period 2015-2024. Accordingly, the NYISO has determined that no action needs to be taken at this time.

5.1 CRP Findings~~, Actions and Recommendations~~

The CRP findings and ~~recommendations of the NYISO in conducting the 2012 RNA and this CRP~~ risk factors are ~~outlined~~summarized below~~.~~:

~~5.1.1~~ Finding One~~:~~ – Resource Adequacy

~~If the capacity resources identified as changing status become available at their proposed in-service dates, they will be fully~~There are sufficient resources in the CRP base case to meet the resource adequacy criterion for the entire ten year study period~~. However, all existing capacity resources modeled must remain available to meet resource adequacy criteria for~~, but the capacity margins diminish as the load grows over the ~~tenth year, 2024, as the resource margin~~ study period such that there is a very small~~.~~ capacity margin in 2024, the tenth year. However, the needs will be revisited in subsequent Reliability Planning Process cycles between now and 2024.

~~5.1.2~~ Finding Two~~:~~ – Transmission Security and Adequacy

When the LTP and generation updates are considered, the New York bulk power system meets applicable reliability criteria throughout the study period, but operating procedures will be necessary to ~~mitigate~~resolve potential overloads for years 2015 through 2017.

In the Rochester and Syracuse areas, the ~~needs~~violations will be resolved with permanent solutions identified in the most recent TO local transmission plans scheduled to be completed by summer 2017 in Rochester and the end of 2017 in the Syracuse area. In the interim, local operating procedures (~~described in Section 3.1.1~~up to and including load shedding) will be implemented, if required, to prevent overloads. ~~At baseline load forecast levels, these operating procedures include load shedding of approximately 100 MW in Rochester and approximately 30 to 110 MW in the greater Syracuse area.~~

~~5.1.3~~ Finding Three~~:~~ – Plan Risk Factors

In addition to ~~a number of~~base case assumption uncertainties identified in the 2014 RNA ~~related to the base case assumptions, several~~, there are other risk factors ~~exist~~ that could adversely affect the implementation of the plan and hence system reliability over the ten-year planning horizon. If any of these risks occur, the NYISO will evaluate the impact, considering all other appropriate system

changes, to determine whether a Gap Solution is needed to address an imminent threat to reliability if it occurs before ~~it can be addressed in~~ the next Reliability Planning Process ~~in 2016.~~can address it. These factors, which require ongoing review and assessment, such as generation additions, include:

1. *Completion of Transmission Owner Local Transmission Plans:* The TOs' local transmission plans are a critical cornerstone of the overall CRP. Delays in the siting of the LTP facilities, such as those experienced by the Rochester Gas and Electric (RG&E) Rochester Area Reliability Project (RARP)[6], which was included in the 2012 CRP, introduce uncertainty to the Reliability Planning Process and expose the bulk power system to unnecessary risk, including but not limited to load shedding.

2. *Change to System Performance:* The aging ~~transmission and~~ generation infrastructure may lead to more frequent and longer outages as well as increasing costs, which may drive more aging generation into retirement.

3. *Change to System Load Level:* The high load, or 90/10, forecast for the statewide coincident summer peak is on average approximately 2,400 MW higher than the baseline 50/50 forecast ~~that is~~ modeled in the base case. A higher-than-forecasted load level could expose the system to potential reliability issues, including greater levels of load shedding in the interim operating procedures~~.~~ in some localized areas of the state.

4. *Change to System Resources:* Substantial uncertainties exist in the next ten years that will impact the system resources. These uncertainties include, but are not limited to:

    ~~a) Changes in the economy, state or federal environmental regulations or other actions or events may lead to the retirement or curtailment of critical system resources.~~

    a) ~~Retirement~~If expected capacity resources do not materialize, transmission security may see reliability violations as early as year 2016, and resource adequacy may see reliability violations in later years. The 2014 CRP base case includes approximately 2,000 MW of additional resources, of which 950 MW of expected capacity resources are not in-service yet. The resources that aren't in-service yet include: i) ConEd's DR/EE/CHP program (expected to fully mature and complete by summer 2016), ii) Taylor Biomass (expected to come into service in Dec. 2015), iii) Bowline 2 (expected to return to full capacity by summer 2015), and iv) Dunkirk Plant (expected to refuel and return to service by summer 2016).

[6] RG&E filed an Article VII petition for RARP with the New York State Public Service Commission on September 29, 2011 (Case 11-T-0534). A certificate was granted on April 23, 2013, but the proceeding was subsequently reopened to reexamine alternatives and continues as of the publishing of this report.

b) Curtailment or retirement of additional generating units beyond those already contemplated in the 2014 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 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.~~resources into operation. Specifically, the loss of critical generation in Western New York could severely constrain west to east transfers of energy and capacity from the Niagara Project and imports from Ontario, potentially leading to higher energy prices and resource adequacy violations.

c) The R.E Ginna Nuclear ~~Generating Station~~Power plant may retire within the ten year study period. In November 2014, the PSC ordered RG&E and ~~Ginna~~R. E. Ginna Nuclear Power Plant, LLC (GNPP) to negotiate a Reliability Support Services Agreement (RSSA) in response to a petition from Ginna indicating ~~their intent to potentially retire.~~that the retirement of this facility was under consideration. On February 13, 2015, RG&E filed at NYPSC an executed RSSA ~~was filed by RG&E~~ that it enters into with GNPP, and ~~Ginna providing for~~GNPP filed the agreement with FERC. The agreement would provide reliability support services from the plant with a term ~~until~~from April 1, 2015 to September 30, 2018, subject to earlier termination as well as possible extension into 2020. The CRP assumes Ginna is in-service for the entire study period~~; a~~. A change in status of the plant could impact transmission security and statewide resource adequacy. The uncertainty associated with Ginna highlights the importance of timely completion of ~~the Rochester Area Reliability Project (RARP).~~a transmission solution.

~~d)~~ Capacity resources could decide to offer into other markets and, therefore, not be available to the NYCA. Accordingly, the NYISO will continue to monitor imports, exports, generation and other infrastructure~~ and assess whether a gap solution is needed to mitigate an imminent threat to reliability before it is addressed in the next Reliability Planning Process beginning in 2016. New market based generation projects under study in the NYISO's interconnection process could mitigate this need if such capacity comes into service during the study period.~~

~~e)~~d)~~For 2015 and 2016, with resources coming into service, there will be capacity margins in the system that could absorb capacity resource decreases or load increases up to 1,500 MW in critical zones in SENY in year 2016. In 2019, the capacity margins decrease to approximately 900 MW in~~

~~those critical zones. In 2024, the capacity margins are essentially depleted.~~

~~.~~

~~6.~~5. *Natural Gas Coordination:* While there are efforts underway to enhance planning and communication between the electric and gas sectors, ~~significant increased~~New York's reliance on natural gas as the primary fuel for electric generation ~~has raised concerns for maintaining electric reliability.~~justifies continued vigilance about the status of of the natural gas system. Presently ongoing studies and efforts ~~to~~focus on: (i) improve~~e~~ing communication and coordination between the sectors; (ii) address~~ing~~ market structure enhancements, such as the closing time of the natural gas markets; (iii) provide~~e~~ing for back-up fuel (primarily distillate oil) assurance to generation~~,~~; and (iv) ~~to address~~addressing the electric system reliability impact of the sudden catastrophic loss of gas~~, must be completed in a timely manner~~.

~~5.~~6. *Federal and State Regulation:*

~~7.~~ Building on the 2014 RNA, which reviewed the impacts of federal and state environmental regulations upon operation of the Bulk Power Transmission Facilities; this 2014 CRP highlights the potential risks to system reliability posed by implementation of emission and operational limits to comply with pending environmental regulations.

a) Recently agencies and generators have begun to examine or implement operational limits as an alternative means of achieving compliance with environmental regulations. Such limits may pose a risk to system reliability if generators exhaust their permitted emission limits and may not be in a position to operate for portions of the year when they are needed to maintain bulk power system reliability.

b) Since the 2014 RNA was released, Phase I of the Cross State Air Pollution Rule (CSAPR) has begun replacing obligations under the Clean Air Interstate Rule (CAIR) for NOx and SO2 emissions. Allocations under Phase 1 to NYCA generators are approximately equivalent with reported emissions for 2014. In 2015, it is expected that the operation of installed control equipment will be optimized to achieve compliance. CSAPR Phase II begins in 2017. In this phase, the SO2 allocations are reduced, intrastate trading limits are imposed, and NYS is seeking to have allowances directed to the State instead of to the generators. The CSAPR Phase II Cap will be binding nationally, which will likely result in increased prices. Nevertheless, under most conditions sufficient allowances should be available to the NYCA generation fleet.

c) Compliance with the federal Mercury and Air Toxics Standards (MATS) is set to begin on April 16, 2015 for new and existing coal and oil-fired units. Some dual fuel units may chose to limit oil use to avoid more challenging emission

requirements. Such operational limits could pose a risk to system reliability, as they have the potential to reduce the effective aggregate dual fuel capacity.

d) The finalization of federal green house gas standards for new and existing sources has been delayed until mid-summer. The draft EPA Clean Power Plan rules would require CO_2 emission reductions beginning in 2020. The NYISO and the State of New York have filed comments on the draft rule seeking changes in the proposal to set appropriate renewable energy targets, to provide for feasible building blocks to achieve planned emission reductions, and to provide for the continued operation of generators that are necessary for reliable system operation. When the proposed rules are finalized, the NYISO plans to undertake a study of the potential bulk power system changes that may be necessary to comply with the rules.

e) The USEPA is currently in the process of revising the National Ambient Air Quality Standard for Ozone. Depending upon the ultimate level selected, the Ozone NAAQS will likely require further NOx and VOC emission reductions from NYCA generators. Such reduction requirements are not anticipated prior to 2022.

~~5.1.4~~5.2 CRP Recommended Actions

~~1.~~ The 2014 Comprehensive Reliability Plan contains the following recommended actions:

1. *Monitor and Track Potential New Developments~~.~~:* The energy industry is in transition. Economic conditions, governmental programs and environmental regulations are changing quickly, resulting in financial stresses that may lead to the loss of resources~~.~~ or, alternatively, could positively affect system conditions. New market-based generation projects under study in the NYISO's interconnection process could increase the narrow long-term reliability margin if such capacity comes into service during the study period. The NYISO will monitor and track these issues and consider their potential impacts on future system reliability. If a threat to reliability appears to be imminent, the NYISO can investigate the need to trigger a gap solution if it occurs before the next Reliability Planning Process has a chance to address the need, in accordance with established procedures, as set forth in Attachment Y of the NYISO OATT.

2. ~~2.~~ *Monitor and Track Transmission Owner Plans~~.~~:* The New York TOs need to complete the projects identified in their LTPs on schedule and as planned. ~~The in-service dates for the TOs' local~~Local transmission ~~plans must~~projects that are identified to maintain reliability should be ~~met~~sited and ~~operational~~constructed without further delay to minimize reliance on the interim operating procedures

~~must remain effective until the TOs bring facilities upgrades into service to avoid the transmission security violations that would otherwise occur.~~in the Rochester and Syracuse areas. The NYISO will continue to monitor the ~~status~~completion of the identified projects and, more generally, the statuses of those plans associated with the ~~bulk and non-bulk~~ reliability needs initially identified in the RNA and assess the state of the system to determine if violations would occur.

3. *Continue Coordination with the New York State Public Service Commission~~.~~ (PSC):* 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 Comprehensive System Planning Process. In addition, the State of New York is presently considering expanding and extending a variety of clean energy programs that may increase deployment of renewable generation and distributed energy resources. These initiatives could positively affect reliability, but are not explicitly recognized in the 2014 CRP analyses. The NYISO will continue to monitor and participate in other planning activities including, but not limited to, NYPSC proceedings considering Reforming the Energy Vision (REV), ~~AC~~Alternating Current Transmission Upgrades, Clean Energy Fund, Indian Point Reliability Contingency Plan, and individual proceedings on generation retirement and repowering.

4. *Monitor Changes that could Impact Risk Factors~~.~~:* The NYISO planning processes~~,~~ ~~including the 2014 RNA, will~~ include steps that actively monitor and address the potential impacts of additional system changes and known risk factors. New market-based generation projects under study in the NYISO's interconnection process could ~~mitigate this need~~increase the long-term capacity margin if such ~~capacity comes~~projects come into service during the study period.

~~5.2~~5.3 Conclusions

This 2014 CRP sets forth the NYISO findings, that under the conditions studied shown in the table below summarizing the 'Initial Reliability Needs and Plan Components', the planned NYCA system will result in the New York bulk power system meeting all applicable reliability criteria over the 2015 through 2024 study period. These findings confirm that the initially ~~-~~identified Reliability Needs in the 2014 RNA are ~~mitigated~~resolved and no additional solutions are required. This CRP highlights a number of risks to the ten-year reliability plan, which include narrowing capacity margins that make long-term bulk power system reliability vulnerable to reduction in available resources or any failure to timely implement Transmission Owners' Local Transmission Owner Plans.

RNA Identified Initial Reliability Needs and CRP Plan Components

	Reliability Needs	Comprehensive Reliability Plan
2014		Zone G, Danskammer (501 MW) in 12/2014

		Zone C, Binghamton CoGen (41 MW) in 12/2014
2015	Transmission security violations (Zones B, C, E, F) No resource adequacy violations	Zone J, USPG Astoria 20 (177 MW) in 3/2015 Zone G, Bowline #2 Repair (405 MW) in 7/2015 Zone G, Taylor Biomass (19 MW) in 9/2015 Zone A, Dunkirk Refueling (435 MW) in 9/2015 Zone A, National Grid Five Mile Rd LTP in 12/2015
2016	No additional transmission security violations No resource adequacy violations	Zone J, ConEd DR/EE/CHP (125 MW) 6/2016 Zones E,G,J, TOTS in 6/2016
2017	Additional transmission security violations (Zones C, E) No resource adequacy violations	Zone B, RG&E Station 255 (RARP) LTP in 5/2017 Zone C, National Grid LTP in 12/2017 Zone C, NYSEG LTP in 12/2017
2018	Additional transmission security violations (Zone A) No resource adequacy violations	No additional solution is needed
2019	No additional transmission security violations Resource adequacy violation (100 MW, Zones G-K)	No additional solution is needed
2020	Additional transmission security violations (Zone C) Resource adequacy violation (300 MW, Zones G-K)	No additional solution is needed
2021	Additional transmission security violations (Zone A) Resource adequacy violation (500 MW, Zones G-K)	No additional solution is needed
2022	Additional transmission security violations (Zones A, F, G) Resource adequacy violation (700 MW, Zones G-K)	No additional solution is needed
2023	No additional transmission security violations Resource adequacy violation (950 MW, Zones G-K)	No additional solution is needed
2024	No additional transmission security violations Resource adequacy violation (1150 MW, Zones G-K)	No additional solution is needed

Notes:
(1) Selkirk was modeled out of service in the RNA. Since it did not ever enter mothball status, it is not shown as returned to service.
(2) New York State is divided into eleven geographic zones, referred to as Zones A through K.

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 SO2, 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 Margin:	The excess effective capacity above the level to achieve LOLE criterion of 0.1 days per year.
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 SO2 and CO2.
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-related Orders and other directives, other system planning activities, policies regarding cost allocation and

Term	Definition
	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

Term	Definition
	adequate reliability in New York.
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 Energy Research and	A corporation created under the New York State Public Authorities law and funded by the System Benefits Charge (SBC) and other sources. Among

Term	Definition
Development Authority (NYSERDA):	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.
Order 1000:	Order No. 1000 is a Final Rule that reforms the FERC electric transmission planning and cost allocation requirements for public utility transmission providers. The rule builds on the reforms of Order No. 890 and also addresses Public Policy Requirements, interregional planning, transmission

Term	Definition
	development by non-incumbent developers, and recovery of transmission upgrade investment costs.
Outage:	Removal of generating capacity or transmission line from service either forced or scheduled.
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

Term	Definition
	(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 Assessment (RNA):	A bi-annual report that evaluates resource adequacy and transmission system security over a 10-year planning horizon, and 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 Zones G, 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

Term	Definition
	programs, and environmental disclosure activities.
Transmission Constraints:	Limitations on the ability of a transmission facility to transfer electricity during normal or emergency system conditions.
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 transmission districts located in Zones A-F.
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 B1: Current Status of Tracked Solutions & TOs' Plans

Queue #	Project	Submitted	Zone	Original In-Service Date	Name Plate (MW)	CRIS (MW)	Summer (MW)	Proposal Type	Current Status	Included in 2014 RNA Base Case?
69	Empire Generation Project	CRP 2008	F	Q1 2010	670	592.4	577.1	Resource Proposal	In-Service	Yes
206	Back-to-Back HVDC, AC Line HTP	CRP 2007, CRP 2008, and was an alternative regulated proposal in CRP 2005	PJM - J	Q2 2011	660	660	660	Transmission Proposal	In-Service	Yes
153	ConEd M29 Project	CRP 2005	J	May 2010	N/A	N/A	N/A	TO's Plans	In-Service	Yes
-	Sta 80 xfmr replacement	CRP 2012	B	2014	N/A	N/A	N/A	TO's Plans	In-Service	Yes
-	Ramapo Protection Addition	CRP2012	G	2013	N/A	N/A	N/A	TO's Plans	In-Service	Yes
-	5 Mile Road Substation	CRP2012	A	-	N/A	N/A	N/A	TO's Plans	Summer 2015	Yes
201, 224	Gas Turbine NRG Astoria re-powering	CRP 2005, CRP 2007, CRP 2008, CRP 2012	J	June 2010	278.9	155	250	Resource Proposal	June 2017	No
339	Station 255	CRP 2012	B	-	N/A	N/A	N/A	TO's Plans	Q4 2016	Yes
-	Clay – Teall #10 115kV	CRP2012	C	2016	N/A	N/A	N/A	TO's Plans	Q4 2017	Yes

Queue #	Project	Submitted	Zone	Original In-Service Date	Name Plate (MW)	CRIS (MW)	Summer (MW)	Proposal Type	Current Status	Included in 2014 RNA/CRP Base Case?
69	Empire Generation Project	CRP 2008	F	Q1 2010	670	592.4	577.1	Resource Proposal	In-Service	Yes
206	Back-to-Back HVDC, AC Line HTP	CRP 2007, CRP 2008, and was an alternative regulated proposal in CRP 2005	PJM - J	Q2 2011	660	660	660	Transmission Proposal	In-Service	Yes
153	ConEd M29 Project	CRP 2005	J	May 2010	N/A	N/A	N/A	TO's Plans	In-Service	Yes
-	Sta 80 xfmr replacement	CRP 2012	B	2014	N/A	N/A	N/A	TO's Plans	In-Service	Yes
-	Ramapo Protection Addition	CRP2012	G	2013	N/A	N/A	N/A	TO's Plans	In-Service	Yes
-	5 Mile Road Substation	CRP2012	A	-	N/A	N/A	N/A	TO's Plans	Decmber 2015	Yes
201, 224	Gas Turbine NRG Astoria re-powering	CRP 2005, CRP 2007, CRP 2008, CRP 2012	J	June 2010	278.9	155	250	Resource Proposal	June 2017	No
339	Station 255	CRP 2012	B	-	N/A	N/A	N/A	TO's Plans	May 2017	Yes
-	Clay – Teall #10 115kV	CRP2012	C	2016	N/A	N/A	N/A	TO's Plans	Q4 2017	Yes

C. Appendix C - 2014 ~~CRP~~LTP Projects and Timing[7]

Table C1: ~~Initial Reliability Needs and Plan Components~~

[7] Completion/operation dates are estimates provided in TO LTPs or from developers' proposals submitted to the NYISO.

~~Note: Selkirk was modeled out of service in the RNA. Since it did not ever enter mothball status, it is not shown as returned to service. New York State is divided into eleven geographic zones, referred to as Zones A through K.~~

~~Table C2: Resource Changes for the CRP~~

Generating plant or unit		
Plant or unit	**MW***	**Note**
Selkirk	348	Notice of Intent to mothball withdrawn
Dunkirk	435	Intent to return to service
Danskammer	495	Intent to return to service
Astoria 20	185	Intent to return to service
Ravenswood 3-3	-33	Notice of intent to mothball filed
Ravenswood 3-4	13	Returned to service
Bowline 2**	557	Intent to return to full capacity
Binghamton BOP	41	Intent to return to service
DR/EE/CHP program		
ConEd	125	Case 12-E-0503, NYPSC order effective Nov. 4, 2013
Total Incremental MW	1986***	

*Rounded values representing the lesser of DMNC and CRIS for generators, and the program total for the DR/EE/CHP program

** currently 180 MW

*** Number reflects the incremental MW only, not the sum of full capacity MW for all resources

~~Table C3:~~ Updated TOs LTPs Addressing Security Violations

Project	Transmission Owner	Expected In-service Time	RNA Need Area Addresses
Dunkirk refueling project	National Grid	Summer 2016	Western & Central New York
Reconfigure Clay 345/115 2TR	National Grid	June 2016	Western & Central New York
Reconductor Clay-GE#14 115kV	National Grid	Dec. 2017	Western & Central New York
Reconductor Dewitt #3 115kV	National Grid	Dec. 2017	Western & Central New York
Reconductor Clay-Teal #10 115kV	National Grid	Dec. 2017	Western & Central New York
Porter 115kV upgrades	National Grid	Completed	Western & Central New York
Install Reactors on Yahnundasis - Porter #3	National Grid	Dec. 2017	Western & Central New York
Remove thermal clearance limit on S.Oswego-Clay#4 115kV	National Grid	Completed	Western & Central New York
Remove thermal clearance on Clay-Woodard #17 115kV	National Grid	Dec. 2015	Western & Central New York
Install Reactors Gereslock-Woodard #4 115kV	National Grid	Jun. 2016	Western & Central New York
Oakdale bus reconfiguration and third transformer	NYSEG	May 2018	Western & Central New York

Table C2: Transmission Security Needs and Associated Plans

Zone	Owner	Monitored Element	2012 RNA Year of Need	2014 RNA Year of Need	Plan In-Service Prior to Summer of Year	Plan
B	RGE	Pannell 345/115 1TR	2013	2015	2017*	Station 255
B	RGE	Pannell 345/115 2TR	2013	2015	2017*	Station 255
B	RGE	Pannell-Quaker (#914) 115	N/A	2015	2017*	Station 255
C	NYSEG	Oakdale 345/115 2TR	N/A	2015	2015	Generation returned to service
C	N.Grid	Clay-Lockheed Martin (#14) 115	N/A	2015	2018*	Reconductor Transmission Line
C	N.Grid	Clay-Teall (#10) 115 (Clay-Bartell Rd.-Pine Grove)	2013	2015	2018*	Reconductor Transmission Line
C	N.Grid	Clay-Dewitt (#3) 115 (Clay-Bartell Rd.)	N/A	2015	2018*	Reconductor Transmission Line
E	N.Grid	Porter-Yahnundasis (#3) 115 (Porter-Kelsey)	N/A	2015	2018*	Install Reactors
F	N.Grid	New Scotland 345/115 1TR	N/A	2015	2015	Selkirk Rescinded Retirement Notice
F	N.Grid	Reynolds 345/115	N/A	2015	2015	Selkirk Rescinded Retirement Notice
C	N.Grid	Clay 345/115 1TR	N/A	2017	2017	Reconfigure Clay
C	N.Grid	Clay-Woodard (#17) 115 (Euclid-Woodard)	N/A	2017	2016	Remove thermal restrictions due to Conductor Clearance
C	N.Grid	S. Oswego-Clay (#4) 115 (S. Oswego-Whitaker)	N/A	2017	2015	Remove thermal restrictions due to Conductor Clearance
E	N.Grid	Porter-Oneida (#7) 115 (Porter-W. Utica)	N/A	2017	2016	Generation returned to service
A	N.Grid	Huntley-Gardenville (#80) 230 (Huntley-Sawyer)	N/A	2018	2016	Generation returned to service
C	NYSEG	Oakdale 345/115 3TR	N/A	2020	2015	Generation returned to service
A	N.Grid	Packard-Huntley (#77) 230 (Packard-Sawyer)	N/A	2021	2016	Generation returned to service
A	N.Grid	Packard-Huntley (#78) 230 (Packard-Sawyer)	N/A	2021	2016	Generation returned to service
A	N.Grid	Huntley-Gardenville (#79) 230 (Huntley-Sawyer)	N/A	2022	2016	Generation returned to service
F-G	N.Grid	Leeds-Pleasant Valley (#92) 345	2022	2022	2015	Generation returned to service
F-G	N.Grid	Athens-Pleasant Valley (#91) 345	2022	2022	2015	Generation returned to service

* Interim operating procedures are necessary when the permanent plan is not in-service prior to the need occurring.