

Reliability Planning Process Manual

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Revision History

Version	Date	Revisions
3.0	2014	
2.0	06/02/2014	Global <ul style="list-style-type: none"> ➤ Changed the title of the manual from Comprehensive Reliability Planning Process Manual to Reliability Planning Process Manual ➤ Implemented minor stylistic changes ➤ Implemented programmatic linking for internal cross-references to facilitate navigation within the document ➤ Performed a major rewrite and reorganization of content ➤ Technical Bulletins merged: <ul style="list-style-type: none"> • TB-171 Monitoring Viability of Solutions to Meet Reliability Needs - NYISO Process (Revised Section 9.1) • TB-188 Large Facilities Interconnection Status Reporting (Revised Section 9.2)
1.0	11/20/2007	Initial Release

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1. OVERVIEW

1.1 The Comprehensive System Planning Process

This Reliability Planning Process Manual (Manual) describes the NYISO's reliability planning process component of the NYISO Comprehensive System Planning Process (CSPP). The CSPP was approved by the Federal Energy Regulatory Commission (FERC) and its requirements are contained in Attachment Y of the NYISO's Open Access Transmission Tariff (OATT). One of the NYISO's responsibilities is to prepare for the impact of expected changes in supply and demand of power on the reliable operation of the New York transmission system over a ten year period. The analyses, evaluations and forecasts produced by the NYISO's system and resource planning activities assist Market Participants, regulators and policy makers as they plan for the future. One way the NYISO accomplishes this responsibility is through the reliability planning process component of the CSPP.

The CSPP is comprised of four components:

1. Local Transmission Planning Process (LTPP),
2. Reliability Planning Process (RPP),
3. Congestion Assessment and Resource Integration Study (CARIS), and
4. Public Policy Transmission Planning Process.

The first component in the CSPP cycle is the LTPP. Under this process, the local Transmission Owners (TOs) perform transmission studies for their transmission areas according to all applicable criteria. This process produces the Local Transmission Owner Plan (LTP), which feeds into the NYISO's determination of system needs through the CSPP. This manual doesn't get into the details of the TOs processes for developing their LTPs, but rather discusses the communication interface with the NYISO process.

The second component in the CSPP cycle is the RPP, which requirements are described in this Manual and Attachment Y of the OATT. Under this biennial process, the reliability of the New York bulk power system is assessed, Reliability Needs if any are identified, solutions to identified needs are proposed and evaluated for their viability and sufficiency to satisfy the identified needs, and the more efficient or cost-effective transmission solution to the identified needs if any is selected by the NYISO. This process was originally developed and implemented in conjunction with stakeholders, was approved by FERC in December 2004 and was revised in 2014 to conform to FERC Order No. 1000.

The RPP consists of two studies:

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)¹. 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.

The third component of the CSPP is the economic planning process in which the NYISO performs the Congestion Assessment and Resource Integration Study (CARIS). The CARIS study utilizes the results from the viability and sufficiency assessment portion of the CRP process, once they are finalized and become publicly available, as its starting point. CARIS Phase 1 examines congestion on the New York bulk power system, and the costs and benefits of generic alternatives to alleviate that congestion. During CARIS Phase 2, the NYISO evaluates specific transmission project proposals for regulated cost recovery.

The fourth component of the CSPP is the Public Policy Transmission Planning Process. Under this process interested entities propose, and the New York State Public Service Commission (NYPSC) and New York State Department of Public Service (NYDPS) identify, transmission needs driven by Public Policy Requirements. The NYISO then requests that interested entities submit proposed solutions to the identified Public Policy Transmission Need. The NYISO evaluates the viability and sufficiency of the proposed solutions to satisfy the identified Public Policy Transmission Need. The NYISO then evaluates and may select the more efficient or cost-effective transmission solution to the identified need. The NYISO develops the Public Policy Transmission Planning Report that sets forth its findings regarding the proposed solutions. This report is reviewed by NYISO stakeholders and approved by the Board of Directors.

In concert with these four components, interregional planning is conducted with NYISO's neighboring control areas in the United States and Canada under the Northeastern ISO/RTO Planning Coordination Protocol. The NYISO participates in interregional planning and may consider Interregional Transmission Projects in its regional planning processes.

The NYISO CSPP is illustrated in Figure 1-1 Figure 1-1.

¹ Subsequent to the NYISO generator outage states filing further additions or modifications will be made as necessary.

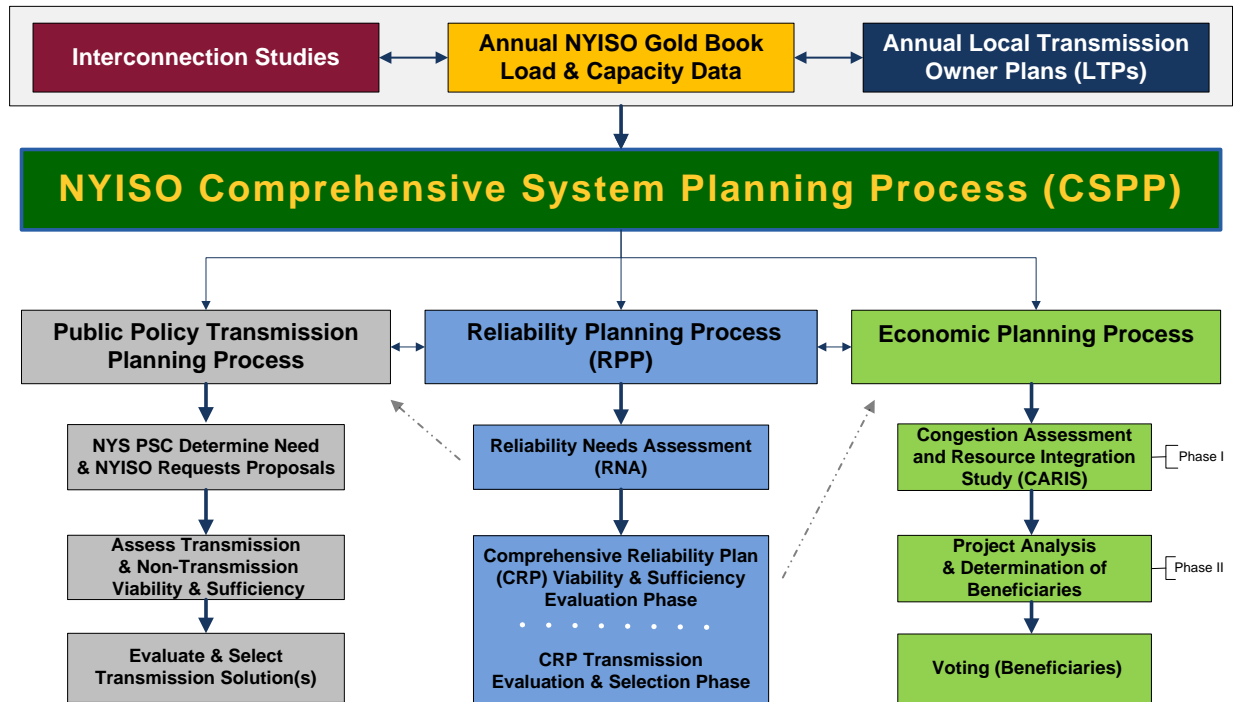


Figure 1-1 NYISO Comprehensive System Planning Process

Definitions

Unless otherwise defined in this document, capitalized terms used herein shall have the meanings ascribed to them in the NYISO OATT.

1.2 The Reliability Planning Process (RPP)

1.2.1 Overview of the RPP

The RPP is a long-range assessment of both resource adequacy and transmission adequacy and security of the New York bulk power system conducted over the ten-year planning Study Period. The reliability of the bulk power system is assessed and solutions to Reliability Needs evaluated in accordance with existing reliability criteria of the North American Electric Reliability Corporation (NERC), Northeast Power Coordination Council (NPCC), and New York State Reliability Council (NYSRC). This process is anchored in the NYISO’s market-based philosophy, which posits that market solutions should be the first choice to meet identified Reliability Needs. However, in the event that market-based solutions do not appear to meet a Reliability Need in a timely manner, the NYISO will designate the Responsible TO to proceed with a regulated backstop solution in order to maintain reliability. Market Participants and interested parties can offer and promote alternative regulated solutions that, if determined by NYISO to help satisfy the identified Reliability Needs and by regulators to be more desirable, may displace some or all of the TOs' regulated backstop solutions. Under the RPP, the NYISO also has an affirmative obligation to report whether the marketplace is responding appropriately to the Reliability

Needs of the bulk power system. If market failure is identified as the reason for the lack of market-based solutions, the NYISO will explore appropriate changes in its market rules with its stakeholders. The RPP does not substitute for the planning that each TO conducts to maintain the reliability of its own bulk and non-bulk power systems.

Each CSPP cycle begins with the LTPP. As part of the LTPP, local Transmission Owners perform transmission studies for the transmission facilities in their Transmission Districts according to all applicable criteria. The LTPP provides inputs for the NYISO's Reliability Planning Process. Local TO facilities are included in the RNA base cases as provided in Section 3.1 of this manual.

The NYISO conducts an RNA to determine whether there would be any violations of existing reliability rules with respect to either resource adequacy or transmission system adequacy and security. The starting point for the ten year study is the system as defined for the FERC Form 715 Base Case. The NYISO sets out the details of the development of the base cases according to the procedures set forth in this manual. Subject to Section 3.1 inclusion rules, the base case models may include firm plans that TOs have made to address the reliability needs of their own bulk and non-bulk power systems. The NYISO analyzes whether the Bulk Power Transmission Facilities (BPTFs) meet all of the Reliability Criteria for both resource adequacy and transmission security in each year of the Study Period, and reports the results of its evaluation in the RNA. Transmission analyses will include thermal, voltage, short circuit, and stability studies. Then, if any Reliability Criteria are not met in any year, the NYISO shall perform additional analyses to quantify the approximate level of additional resources and/or transmission transfer capability increases needed to meet the Reliability Criteria, and to determine the expected first year of need for those additional resources and/or transmission. The study will not seek to identify specific additional facilities to mitigate Reliability Needs. Reliability Needs will be defined in terms of total deficiencies relative to Reliability Criteria and not necessarily in terms of specific facilities. The deficiencies are translated to a level of compensatory MWs or MVARs as discussed in Section 4.11. A short circuit assessment will be performed for the tenth year of the Study Period.

Following the review of the RNA by the NYISO working groups, the Operating Committee, the Management Committee, and final approval by the NYISO Board, the NYISO requests solutions from the marketplace to the Reliability Needs identified in the RNA. The RNA also identifies the Responsible TO or TOs that are obligated to prepare regulated backstop solutions for each identified need. The regulated backstop solutions also will serve as the benchmark to establish the timeframes during which a market-based solution's schedule will be further evaluated. Both market-based and regulated solutions are open to all resource types: generation, transmission, and demand response. Non-transmission owner developers, as well as all TOs, who have not been designated as a Responsible TO, also have the ability to submit proposals for regulated solutions to serve as an alternative to the regulated backstop solutions provided by the Responsible TOs. The NYISO will evaluate all proposed solutions to determine whether they are viable and sufficient to meet the identified Reliability Needs by the need date.

The NYISO prepares its CRP following its evaluation of all proposed solutions. The CRP identifies all proposed solutions that the NYISO has found will meet part or all of the identified Reliability Needs. If there are viable and sufficient market-based solutions that

will meet the identified need in a timely manner, the CRP will so state. If there is no viable and sufficient market-based solution and the NYISO determines that a regulated solution must be implemented to maintain bulk power system reliability, the CRP will so state. If a regulated solution must proceed, the NYISO will request the selected regulated solution to proceed with regulatory approval and development of its regulated solution.

In addition the NYISO Board has the authority to address the sudden appearance of a Reliability Need on an emergency basis whether during or in-between the normal RPP cycle. In the event that there is an imminent threat to reliability, the NYISO will request the Responsible TO to develop a Gap Solution and will alert the NYDPS. A Gap Solution is designed to be a temporary solution and strives to be compatible (to the extent possible) with permanent market-based proposals and regulated projects.

Developers of market-based solutions are expected to recover their costs from the NYISO's Energy, Capacity, and Ancillary Services markets. Market-based solutions may also obtain revenues from other private contracting arrangements. The costs of implementing regulated transmission solutions, including regulated backstop solutions, Gap Solutions, and a Developer's alternative regulated transmission solution, if evaluated and selected by the NYISO as the more efficient or cost effective transmission solution to meet the Reliability Need, are recovered through the NYISO's tariffs. The costs of such solutions must be filed with the FERC for approval. For regulated generation and demand response solutions, cost recovery for entities subject to the jurisdiction of the NYPSC for cost recovery purposes will occur in accordance with the New York Public Service Law and cost allocation and cost recovery rules established by the NYPSC. Cost recovery for non-transmission regulated projects by the Long Island Power Authority and the New York Power Authority will occur under the New York Public Authorities Law. TO LTPs and updated plans do not constitute regulated backstop solutions or alternative regulated solutions, and LTP project costs are not recoverable under the NYISO tariff.

The NYISO does not itself build projects to respond to Reliability Needs, and the ultimate approval of those projects lies with regulatory agencies such as the FERC, NYPSC, environmental permitting agencies, and local governments. The NYISO monitors the progress and continued viability of proposed market-based and regulated projects to meet identified needs, and reports its findings in annual plans. Figure 2 shows a summary of the CRP process.

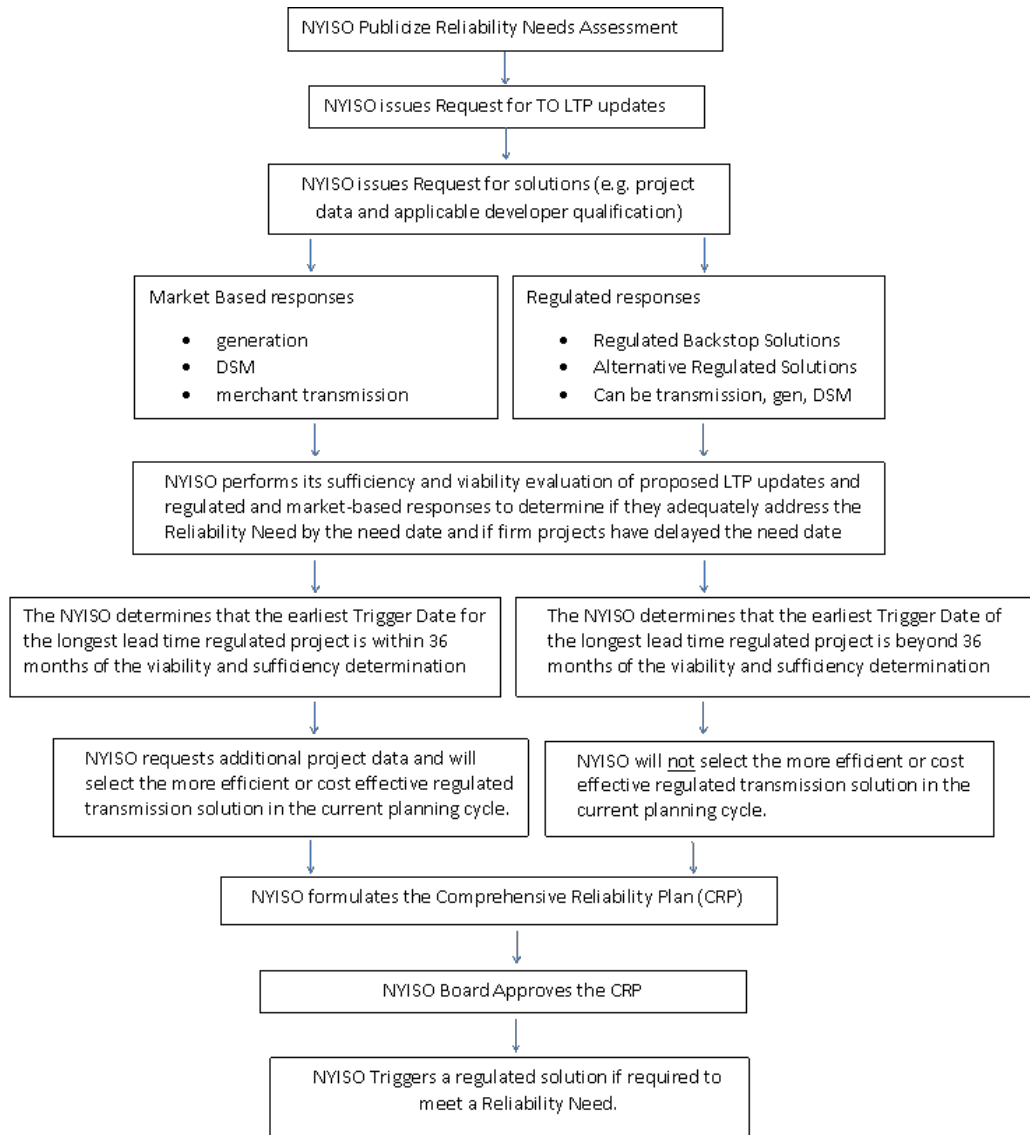


Figure 1-2 NYISO Comprehensive Reliability Plan Process

1.2.2 Overview of Reliability Criteria

The standard industry definition of bulk power system reliability is the degree to which the performance of the elements of that system (i.e., generation and transmission) results in power being delivered to consumers within accepted standards and in the amount desired. It may be measured by the frequency, duration, and magnitude of adverse effects on continuity of service.

Reliability consists of adequacy and security. Adequacy, which encompasses both generation and transmission adequacy, refers to the ability of the bulk power system to supply the aggregate requirements of consumers at all times, accounting for scheduled and unscheduled outages of system components. Security is the ability of the bulk power system to withstand disturbances such as electric short circuits or unanticipated loss of system components.

There are two different approaches to analyzing a bulk power system's adequacy and security. Adequacy is a planning concept that involves an analysis of the probability of future conditions and events. A system is adequate if the probability of having insufficient transmission and generation to meet expected demand is equal to or less than the system's standard, which is expressed as a loss of load expectation (LOLE). The New York State Power System is planned to meet an LOLE that is less than or equal to an involuntary load disconnection that is not more frequent than once in every ten years or 0.1 days per year. This requirement forms the basis of New York's installed capacity or resource adequacy requirement.

Security is an operating and deterministic concept which refers to the ability of the electric systems to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements. These events, or contingencies, are sometimes referred to as N-1, N-1-1, or N-2; where N corresponds to a system in normal condition. N-1 refers to the loss of a single element. N-1-1 refers to the loss of two independent elements with a time delay between the events, which allows for adjustments to the system. N-2 is the simultaneous loss of two independent elements. An N-1 requirement means that the system can withstand the loss of system components arising from one event without adversely affecting the continuity of service. Contingencies and their response requirements are further detailed in applicable standards, criteria and rules of the NERC, NPCC, NYSRC, as well as the planning guidelines of the TOs.

1.2.3 Overview of the RPP Analysis Methodology

The RPP is performed in three steps: an input step, an analysis step, and a review step. During the input step, information is gathered from various stakeholder groups including New York TOs, neighboring control areas, existing reliability assessments, and existing NYISO publications and reports. The analysis and review steps are conducted by performing a transmission screening consisting of transmission security and adequacy analyses followed by a resource adequacy assessment. These steps are conducted in a sequential and iterative process to maintain internal consistency between the two steps. Section 4.7 of this Manual provides additional information about Transmission Screening.

The primary tools for conducting the transmission assessment studies are commercial software products for power flow, stability, and short circuit analyses.

Currently the primary tool used by the NYISO for conducting the resource adequacy assessment is GE's Multi-Area Reliability Simulation program (MARS). MARS uses a Monte Carlo simulation to compute the reliability of a generation system comprised of any number of interconnected areas or zones. MARS is able to reflect in its reliability calculations each of the factors listed in NYSRC Reliability Rule AR-1 including the impacts of the transfer capability of the transmission system.

The result of combining these tools is a planning process that simultaneously addresses the "physics" or electrical properties of the grid and how changes in power system transfer capability interacts with a probabilistic resource adequacy assessment. Figure 1-3 summarizes the RPP analysis process.

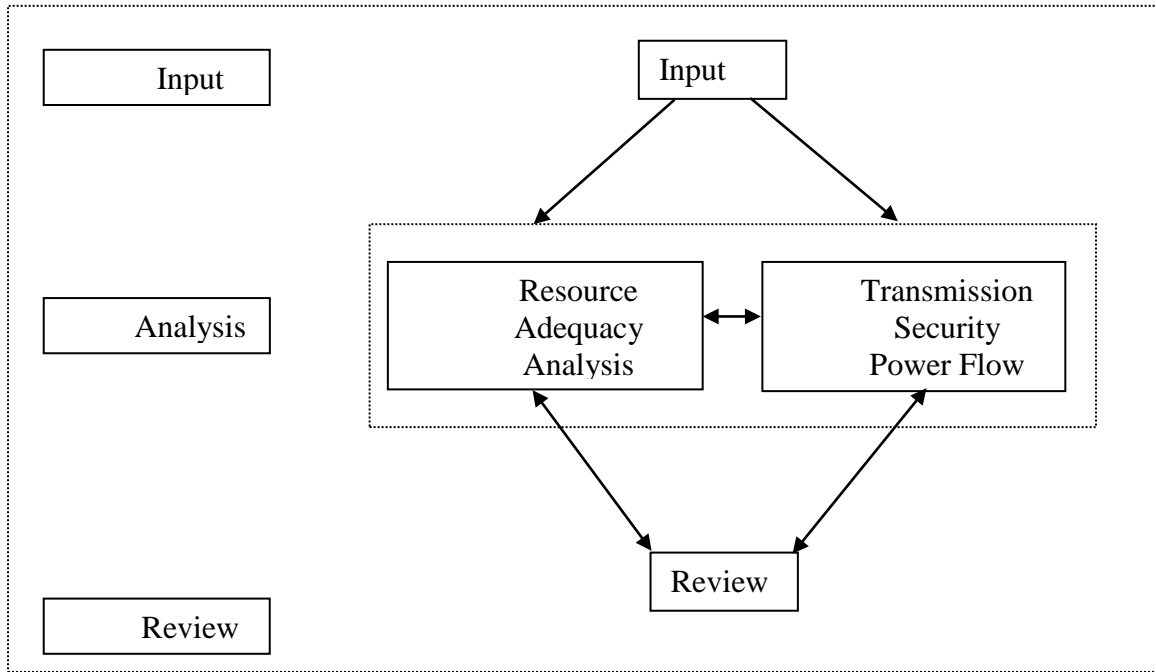


Figure 1-3 Flow Diagram for the RPP

2. DATA INPUTS

2.1 Data Collection and Coordination

2.1.1 New York Control Area (NYCA)

The data and information to be collected encompasses all the load zones within NYCA. This effort is internal to the NYCA, and obtains data and information from the Market Participants through existing NYISO communication channels.

The Transmission Planning Advisory Subcommittee (TPAS) has primary responsibility for the reliability analyses, while the Electric System Planning Working Group (ESPWG) has primary responsibility for providing commercial input and assumptions utilized in the development of reliability assessment scenarios and in the reporting and analysis of historic congestion costs. The NYISO coordinates between these two groups during the initial stage of the planning process, and seeks consensus at both TPAS and the ESPWG. The NYISO also obtains and shares information regarding the relationship between the natural gas system (interstate pipelines and local distribution company systems) and generators connected to the gas system, through the NYISO's Electric-Gas Coordination Working Group (EGCWG). Data gathered from NYISO working groups and subcommittees may be relevant to defining sensitivity and scenario analyses in the electric system RPP. While no formal voting process is established for NYISO working groups, an opportunity for reporting majority and minority views is provided in the absence of a consensus.

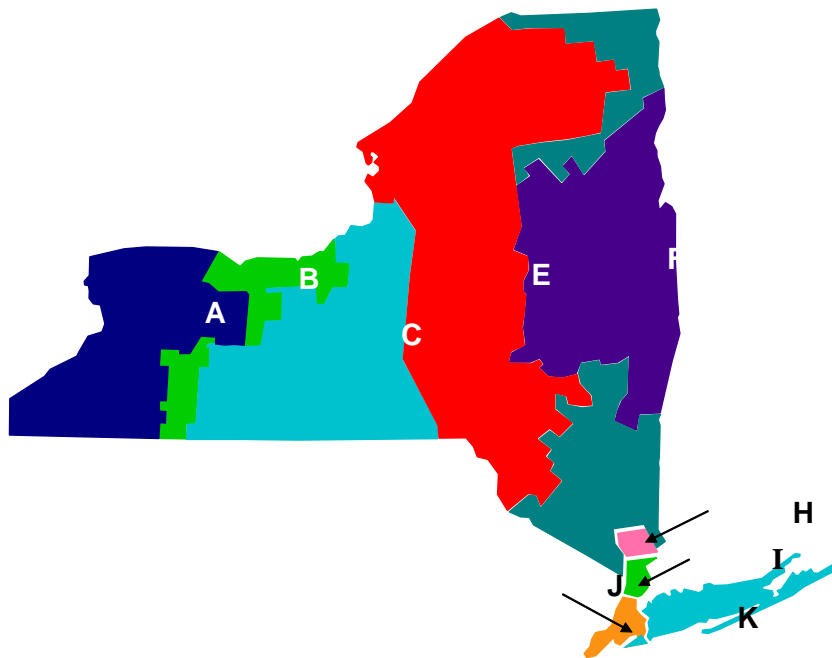


Figure 2-1 NYCA Load Zones

2.2 Transmission Owners and Municipal Electric Utilities

TOs each have their own LTPP. The NYISO will incorporate proposed projects from each TO's Local Transmission Owner Plan (LTP) and each Municipal Electric Utility update to the system representation used for the RPP as appropriate for the NYISO models and the stage of development of the individual projects (see Section 3.1 for details). By early in the fourth quarter preceding the start of the next RNA, each TO will present its latest LTP. Stakeholder comments can be submitted within the next 30 days.

To facilitate the modeling process, the NYISO will annually solicit TO input regarding plans, and may meet with TOs individually or collectively to discuss their input. As a first step, by quarter four of each year, information from individual TOs will be requested for receipt by early quarter one of each following year for updating the Load and Capacity Data report (Gold Book), the databank base cases, and the FERC 715 base case filing. Those updates will include information concerning existing and planned additions to the NYS Transmission System for the Study Period, as necessary for the development of the RNA as required by Attachment Y Section 31.2.2.4.1.² The TOs will supply that information when requested by the NYISO for both their bulk power system and non-bulk power system facilities.

The TOs will supply data and information regarding their specific plans, including: (i) generation and/or transmission facility additions, retirements, or reconfigurations, for any parts of the system that could have a local reliability need over the Study Period or could lead to a different distribution of zonal resources (e.g., generation bottling or load pockets) that is not identified through the present locational minimum Installed Capacity requirements applicable to the "In City" (Zone J), "Long Island" (Zone K) and the G-J Locality, (ii) any transmission system modifications or upgrades planned for the Study Period that are not included in the most recent Load and Capacity Data Report, (iii) facilities including generation, transmission, and sub-transmission that the TO plans to retire, (iv) any long term firm transmission requests, and (v) network changes that will impact short circuit duties for the next ten years.

2.3 Stakeholder Input

To implement the RPP in an open and transparent manner, the NYISO will solicit input from all the interested stakeholders including merchant transmission developers, generation plant owners and Developers, and demand response providers. The data and information requested will include:

- Any proposals outside of those identified in the TO LTPs;
- Any other generation additions, upgrades, mothballing or retirements planned during the Study Period;
- Any new contracts or permits or expirations of contracts or permits associated with generation plants during the Study Period;

² All references to sections of Attachment Y are to the October 15, 2013 Compliance Filing.

- Any new contracts or permits or expirations of contracts or permits associated with transmission facilities during the Study Period;
- Any changes in the electrical characteristics of any other facilities, including all transmission facilities, both bulk and non-bulk;
- Any plans that will impact the level of demand response programs, including Special Case Resources (SCR) and Emergency Demand Response Program (EDRP) programs, for the Study Period.

2.4 Neighboring Control Areas

Geographically, the NYCA is situated in the center of the Northeast electrical grid, which includes the Mid-Atlantic and New England States in the United States and the Canadian Provinces of Ontario, Quebec, and Maritimes.

The interconnections among these control areas play an important role in maintaining the reliability of the transmission network. The need for proper representation of these neighboring control areas is well understood by all control areas. As each of these control areas perform their own reliability and congestion assessments, substantial, accurate and updated data and information are obtained from those assessments.

Interregional planning is conducted with NYISO's neighboring control areas in the United States and Canada under the Northeastern ISO/RTO Planning Coordination Protocol. The NYISO participates in interregional planning and may consider Interregional Transmission Projects that meet transmission needs identified in its regional planning processes.

The NYISO will conduct and coordinate its planning activities in compliance with NERC, NPCC, and NYSRC standards, criteria, and rules.

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3. DEVELOPMENT OF BASE CASES & SCENARIOS

3.1 Develop Base Cases for Ten Years

The base cases should be the best possible representation of the network and resources for the period under study.

The NYISO will utilize RNA Base Case inclusion rules to screen the projects and plans for inclusion or exclusion from the RNA Study Period base cases. The base case inclusion rules are:

1. TO LTPs for non-bulk transmission facilities and NYPA transmission plans for non-bulk power facilities which are reported to the NYISO as firm transmission plans will be included,
2. TO bulk power system projects not in service or under construction will be included if:
 - a. the project is the regulated solution identified in the prior CRP Report or triggered in a prior year, or
 - b. the project is required in connection with any projects and plans that are included in the Study Period base case, or
 - c. the project is part of a TO LTP or the NYPA transmission plan, and reported to the NYISO as a firm transmission plan(s), and has an approved System Reliability Impact Study ("SRIS") or an approved System Impact Study ("SIS") (as applicable), and a NYPSC certificate or other major regulatory approvals, if required, and is expected to be in service within 3 years or other reasonable time frame based on the nature of the project, or
 - d. the project is the subject of a regulatory order authorizing the TO to proceed with the development of the project and obtain the necessary approvals and it has an approved System Reliability Impact Study ("SRIS") or an approved System Impact Study ("SIS") (as applicable).
3. Other projects that are in-service or under construction will be included.
4. Other projects not already in-service or under construction will be included and modeled at the contracted-for capacity if:
 - a. the project is the regulated solution triggered in a prior year, or
 - b. the project has an approved System Reliability Impact Study ("SRIS") or an approved System Impact Study ("SIS") (as applicable), and a NYPSC certificate, or other major regulatory approvals, if required, and an executed contract with a credit worthy entity for at least half of the project capacity

The NYISO will evaluate the expected performance (reliability) of the system using the base cases. Because the system may be reliably operated in different allowable ways, the NYISO will develop and utilize multiple base cases where appropriate. The NYISO

evaluates the performance from four perspectives, namely, (i) resource adequacy, (ii) power flow, (iii) dynamics, and (iv) short circuit. Each perspective utilizes a different type of computer modeling tool for the respective analysis.

3.1.1 Applying Inclusion Rules to Develop Base Cases

The NYISO will use the base case from the most recent FERC Form 715 filing to create a “baseline” for the relevant system models. The NYISO will review the plans and other information collected as part of the input phase of the RPP (described in section 2 of this Manual) and subject them to the RNA inclusion rules described above. The projects and associated details that pass the inclusion screening process will be included in the system models for the RNA.

Generator retirements and mothballed units will be removed from the base case subject to, and in accordance with, the effective dates in notices provided to the NYDPS and the NYISO and subject to results of reliability studies performed by the NYISO and the local TO and presented to the NYDPS. Units requesting mothball status, but remaining in service based upon existing or executed agreements financially supporting their continued operations, will be modeled in service for the duration of that agreement.

Depending upon the extent of changes included in the base case, there may be violations of criteria (including local TO criteria) on both the non-bulk and bulk power systems, even under normal base case conditions prior to contingency assessments. If these violations are clearly on the non-bulk power system (a local problem or “load pocket”), certain generic facilities (representative and practical size and type of generators, lines, transformers, voltage control devices, demand response, and energy efficiency, etc.) are added to the system model in consultation with the local TO to complete the base case. These additions are for study and analytical purposes only, and they are of a minimal nature. However, generation dispatch may be adjusted, to the extent possible, to resolve the criteria violations and base case convergence requirements. These generic additions may be removed, modified, or separately identified at the conclusion of the RNA, as possible requirement(s). It is important to note that some of these additions may be essential to obtaining a minimum solvable power flow base case. Further additions of facilities may be required after the initial transmission security assessment performed per Section 4.6.

3.2 Develop Scenarios

The preparation of long term plan(s) for the future Study Period is based on forecasts of future economic, societal, technological and power market conditions. These forecasts involve a great deal of uncertainty. Thus, developing a “plan” based on only one set of forecasted future system conditions may not meet the future reliability requirements. Such an approach would also fail to provide the flexibility necessary to adapt to the changing conditions. This type of situation is best addressed by taking a scenario approach to planning. The NYISO will use scenarios to model the bulk power system where multiple and well-reasoned future conditions are postulated. An appropriate sub-set of system conditions will be selected to define possible scenarios for determining the Reliability Needs of the system for the ten year study period.

The NYISO will consider the following issues, among others, for defining scenarios for further analysis in the RNA; load forecast uncertainty, new resources, new technology, fuel supply contingencies, facility retirements and mothballs, and regulatory requirements, including limitations established by environmental programs.

3.3 Develop Study Cases for Scenarios

The NYISO will create separate study cases to properly model each of the scenarios. For the MARS model, the resources have to be grouped appropriately for each scenario, including the changes to be modeled for all zones. The NYISO will then prepare the transmission network model, which is comprised of a converged power flow base case for each scenario covering the ten-year Study Period.

As is the case with the RNA Base Case, the NYISO will develop an RNA study case system for scenario analyses that models the existing system, including the generation and transmission system additions and upgrades and unit retirements that are projected to occur throughout the Study Period. Because emergency assistance from neighboring systems contributes to the reliability of the NYCA system, the load and generation of the neighboring systems will also be modeled. The NYISO will use data on the existing system from the MARS database maintained by NYISO staff in determining the annual installed reserve requirements. Load and generation data will be updated through the Study Period based on data from the most recent Gold Book. The NYISO will use similar reports from neighboring systems to update the data representing those regions.

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4. RELIABILITY NEEDS ASSESSMENT APPROACH

4.1 Basic Reliability Concepts as Applied to Power Systems

The standard industry definition of bulk power system reliability is the degree to which the performance of the elements of that system (i.e., generation and transmission) results in power being delivered to consumers within accepted standards and in the amount desired. It may be measured by the frequency, duration, and magnitude of potential service interruptions.

Reliability consists of two related concepts; adequacy and security. Adequacy, which encompasses both generation and transmission adequacy, refers to the ability of the bulk power system to supply the aggregate requirements of consumers, accounting for scheduled and unscheduled outages of system components. Security is the ability of the bulk power system to withstand disturbances such as electric short circuits or unanticipated loss of system components. The adequacy and security of a bulk power system are analyzed in two different approaches.

Adequacy is a planning and probability concept. A system is adequate if the probability of having sufficient transmission and generation to meet expected demand is equal to or less than the resource adequacy reliability threshold. Having defined adequacy as a probabilistic concept, the methodology used for adequacy evaluation also involves probabilistic calculations. Traditionally, this analysis has been called resource planning.

Transmission security is addressed and analyzed in the electric utility industry by a deterministic approach. All possible contingency events are identified, and the system is planned and operated so that the system meets all applicable Reliability Criteria. The events that are less likely, but that have the potential to cause major impacts on the system may also be included in security assessments. Having defined security as a deterministic concept, the methodology used for adequacy evaluation also involves deterministic (“what-if?”) calculations. Traditionally, this analysis has been called transmission planning.

The above descriptions assign probabilistic and deterministic approaches to resource and transmission planning, respectively. In a strictly technical sense, the probabilistic and deterministic approaches can be applied to both types of planning. The bifurcation, however, reflects widely-adopted practice in the electric industry.

4.2 Reliability Organizations

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

NERC was formed as a voluntary, not-for-profit organization in 1968 in response to the blackout of 1965. A ten-member Board of Trustees governs NERC with input from a Member Representatives Committee. NERC has formulated Planning and Operating Standards. Pursuant to the Energy Policy Act of 2005, the FERC approved NERC as the Electric Reliability Organization for North America in 2006. FERC has also approved the governance structure and funding of NERC, as well as mandatory electric reliability standards that will be enforced by NERC.

Ten Regional Reliability Councils currently comprise NERC's membership. Members of these councils come from all segments of the industry. The council in the northeastern United States is the NPCC. New York State is an Area within the NPCC, which also encompasses New England and Eastern Canada. NPCC implements broad-based, industry-wide reliability standards tailored to its region. NERC and NPCC have received FERC's approval of a delegation agreement by which NPCC will oversee and enforce compliance with NERC and NPCC standards in the NPCC regions of the United States and Canada.

New York State also has its own electric reliability organization, which is the NYSRC. The NYSRC is a not-for-profit organization that promulgates reliability rules and monitors compliance with those rules on the New York State Power System. The NYPSC formally adopts the NYSRC Rules as regulations enforceable by the State. The NYISO and all organizations engaging in electric transactions on the state's power system must comply with these rules. Thirteen members, including representatives from different segments of the electric power industry, govern the NYSRC.

The reliability criteria and assessment methodology used for the RNA must comply with the rules, regulations and standards specified by the above-mentioned reliability standards organizations. In this context, New York-specific reliability rules may be more detailed or stringent than NERC Standards and Policies and NPCC Criteria. Local reliability rules that apply to certain zones within New York may be even more stringent than statewide reliability rules.

4.3 Applicable Reliability Documents

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

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

NERC's Operating Standards set forth fundamental bulk power system operating requirements. The interconnected bulk electric system must be operated in a secure state such that the aggregate electrical demand and energy requirements of customers are satisfied in real time. Primary responsibility for reliable operation is vested with the control

area operators; for New York State, this is the NYISO. A “control area” is the basic operating unit of an exclusive portion of the interconnected power system. The Operating Standards promote reliable operations within each of the three synchronous interconnections in North America without burdening other entities within the interconnection. The NYISO is within the Eastern Interconnection.

NPCC has three basic categories of documents: Criteria, Guidelines, and Procedures. The key NPCC document (for purposes of this Manual) is Directory #1, "Design and Operation of the Bulk Power System," which establishes the principles of interconnection planning and operations.

The NYSRC Reliability Rules for planning and operating the New York State Power System include the required rules and define the performance that constitutes compliance. These rules incorporate the NERC Planning Standards and Operating Policies and the NPCC Criteria, Guidelines and Procedures. The NYSRC Reliability Rules also include New York-specific reliability rules and local transmission owner reliability rules. The NYISO’s implementation and compliance with NYSRC Reliability Rules are codified in its operations, planning, and administrative manuals and other written procedures.

The NYSRC establishes the annual statewide Installed Capacity Requirement (ICR) to maintain resource adequacy. Factors that are considered in establishing the ICR include the characteristics of loads, uncertainty in load forecast, outages and deratings of generation units, the effects of interconnections on other control areas, and the transfer capabilities of the New York State transmission system. The NYISO determines the Installed Capacity (ICAP) Requirements for load serving entities (LSEs), including the Locational Minimum Installed Capacity Requirements (LCR) of LSEs in New York City, Long Island, and the Zones G-J Locality.

4.4 Applicable Reliability Criteria

As noted earlier, a probabilistic approach is used for resource adequacy and a deterministic approach is used for transmission reliability analyses. A system is adequate if the probability of not having sufficient resources (generation, transmission and other allowable curtailment measures) to meet expected demand is equal to or less than a predetermined value. Similarly, a transmission system is reliable if specified contingencies do not result in the unplanned loss of load on the bulk power system.

4.4.1 Resource Adequacy Reliability Criteria

Resource adequacy is measured using a probability-based index such LOLE, which is the most common metric used. It is defined as the expected number of days in a year in which the daily peak load may exceed the available resources. According to the NYCA Installed Reserve Margin Requirement³, the New York bulk power system must be planned to meet an LOLE metric of not more than one forced disconnection on the bulk power system in every ten years (expressed mathematically as 0.1 days per year) or less.

³The NYCA Installed Reserve Margin is established by the NYSRC pursuant to Section A-R1 of the NYSRC Rules.

4.4.2 Transmission System Security Criteria

The criteria for transmission security determination are based on a deterministic approach, which must meet the reliability requirements defined by NERC, NPCC, and NYSRC.⁴ In the deterministic approach, the security criteria define the types of contingencies and the required performance of the transmission network in the post-contingency (or disturbance) period. The contingencies to be tested and the required performance are defined in Section B (Transmission Capability – Planning) of NYSRC Reliability Rules. The contingencies for testing are divided into two categories, namely, Design Criteria Contingencies (containing 7 types or classes) and Extreme Contingencies (containing 9 types or classes). Evaluation of design criteria contingencies should not reveal any violation of system performance parameters, or loss or separation of a major portion of the system. Extreme contingency testing can provide insight for planning purposes, but it is not required that the system be designed to withstand an extreme contingency event.

The applicable design criteria can be found in the NYSRC Reliability Rules, the NPCC Directory 1, and the NERC TPL and other relevant standards.

The system performance requirements under normal conditions (pre-contingency) and after applying the design and extreme contingencies (post-contingency) are defined in B-R1 through B-R4 of the NYSRC Reliability Rules.

4.4.3 Limits for Transmission System Performance Testing

In general, transmission system performance is tested for loadings, voltages and stability for the postulated base case(s) and contingencies (in accordance with system security criteria). The thermal and steady state voltage limit assessment will be based on the NYSRC B-R1 and B-R2 Reliability Rules. The requirements for the transient and voltage stability assessment are listed in B-R3 of the NYSRC Reliability Rules.

4.5 Methodology for Transmission Reliability Assessment

The transmission reliability assessment performs necessary steady state and dynamic simulations for normal system conditions and contingencies. In addition fault duty level calculations are performed to determine the impact of faults.

Analyses conducted of the bulk power system in steady state will consist mainly of power flow simulations, contingency analyses (both thermal and voltage aspects) and voltage collapse analysis. Simulations of the system under dynamic conditions will include voltage stability and angular stability (including oscillatory damping). The transmission system analyses will also include determination of power transfer limits over the ties to external systems and the interfaces within NYCA.

The basic voltage analysis methodology will be conducted using the power-voltage (P-V) curve approach as described in the NYISO Transmission Planning Guideline and the Operations Engineering Voltage Guideline.

⁴ See Section 1.2.2 of this manual for a definition of these requirements.

4.6 Transmission Reliability Assessment

The NYISO will conduct the transmission system analyses to fulfill three separate purposes, namely:

1. Determine transmission Reliability Needs based on security criteria,
2. Calculate independent emergency transfer limits for all noted interfaces for the MARS resource adequacy model, and
3. Develop transfer limits and joint interface groupings for use in the MARS resource adequacy model.

Before beginning these assessments, the NYISO will review other existing transmission security and transfer limit studies related to the RPP. The establishment of the base cases may also provide information used in the screening step, which is described below. The detailed assessment consists of power flow (steady state) and stability (dynamic) simulations focusing mainly on areas in the system identified in this screening step.

The major types of analyses are:

- Thermal contingency analysis
- Steady-state Contingency Voltage Drop analysis
- Voltage Collapse/Voltage Stability analysis
- Transient (Angular) Stability analysis
- Short circuit analysis

These types of studies are also performed for several other purposes, as shown below:

- Inter-Regional Reliability Assessments
- NPCC Area Transmission Reviews
- NYISO/Neighboring Areas Inter-Area Studies
- NYISO Seasonal Operating Assessments, Short Term Operating Studies
- NYISO Interconnection Project Studies (Feasibility Studies, SRIS, SIS, and Facilities Studies)

Technical consistency and coordination of procedures, models, applicable criteria and methodology used in the above studies and the RPP transmission studies is important.

Attachment Y of the NYISO OATT describes the process that the NYISO, the TOs, and Market Participants shall follow for planning to meet the Reliability Needs of the New York BPTFs and contains the definitions for Reliability Criteria and Reliability Need.

Violations of Local TO criteria, as well as Reliability Criteria violations that are clearly distinguishable as not impacting BPTFs are not identified as Reliability Needs. When violations occur on both the bulk and non bulk system, the non bulk violations are mitigated first, and the impact on the bulk power system is reevaluated to determine if a Reliability Need still exists.

Depending upon the extent of changes included in the base case, there may be violations of criteria (including local TO criteria) on the both the non-bulk and bulk power systems under contingency conditions. If these violations are clearly on the non-bulk power system (a

local problem, for example within a “load pocket”) certain generic facilities, modeled in the form of building-blocks (representative and practical size and type of generators, lines, transformers, voltage control devices, demand response, energy efficiency, etc.) are added to the system model in consultation with the local TO to complete the base case. These additions are for study and analytical purposes only, and they are of a minimal nature. However, generation dispatch may be adjusted, to the extent possible, to resolve the criteria violations and base case convergence requirements. These generic additions may be removed or modified or separately identified, at the conclusion of the RNA, as possible requirement(s) to resolve an identified Reliability Need. It is important to note that some of these additions may be essential to obtaining a minimum solvable power flow base case. Further additions of facilities may be required after the initial transmission security assessment performed per Section 4.5

4.7 Transmission System Screening Step for Transfer Limit Assessments

The purpose of this screening step is to determine where to focus detailed analysis. Only steady state simulations and analyses are performed for screening purposes. The interfaces employed in the MARS resource adequacy assessment are screened for thermal and voltage transfer limits. Figure 7 below represents the internal NYCA interfaces (this list may expand based on the results of the analysis):

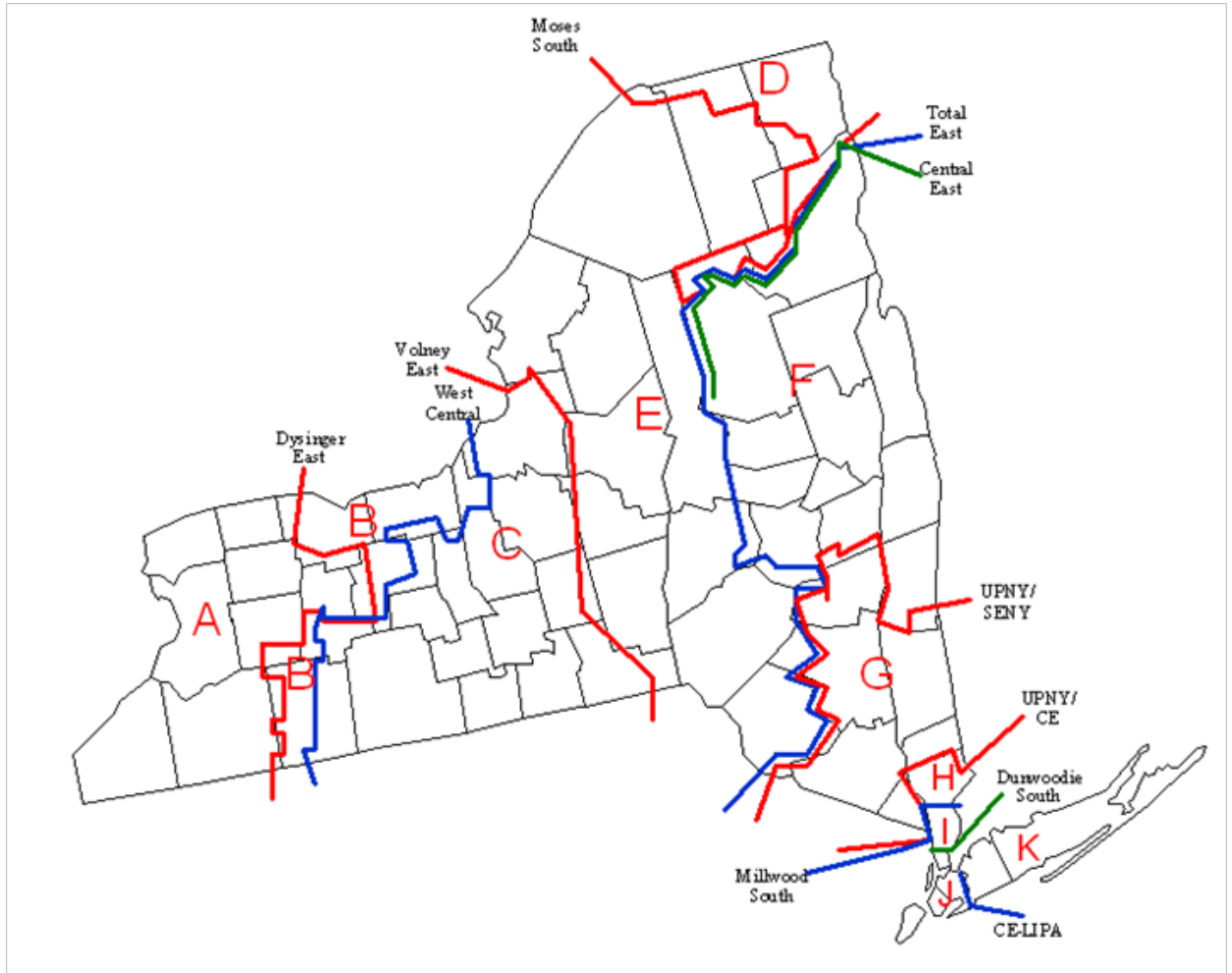


Figure 4-1 NYCA Internal Interfaces

The NYISO will repeat the calculations and analyses described in the above paragraphs for all the defined scenarios.

4.8 Methodology for Resource Adequacy Assessment

Resource adequacy calculates the LOLE for the specified bulk power system conditions. The primary tool used for resource adequacy analysis is General Electric’s MARS program. MARS computes the reliability of a system comprised of any number of interconnected areas or zones, including the impacts of the transfer capability of the transmission system. Figure 8 is an example of the topology used for MARS analysis.

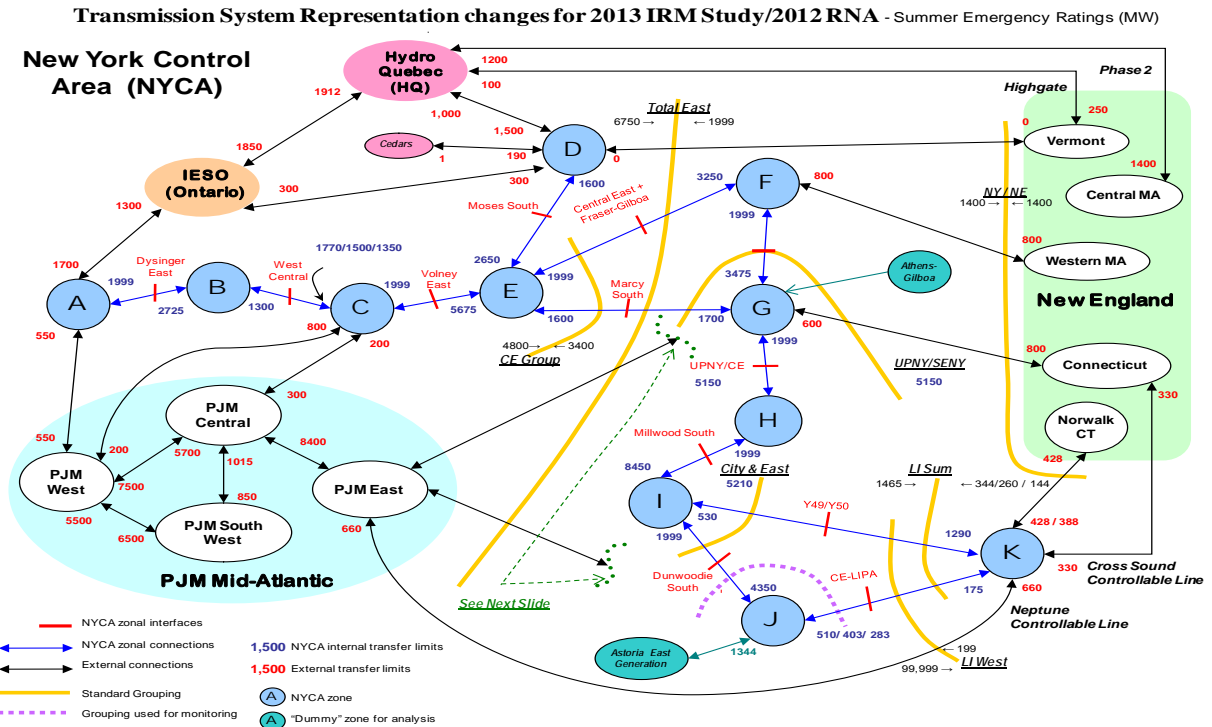


Figure 4-2 Transmission System Representation for MARS modeling

The initial study case system is developed by modeling the existing system, including expected generation and transmission system additions and upgrades, in accordance with Section 3 of this Manual. A starting point for the assumption matrix is the preceding IRM study performed for the NYSRC. The NYISO will adjust the assumptions to conform to the rules and procedures for conducting the RNA.

Given that the transmission topology utilized in the MARS analysis is a transportation algorithm, rather than being based upon network flow, many assumptions have to be made in translating network-based transfer limits into the interface transfer limits utilized by MARS. These assumptions involve the construction of interface groupings and nomograms to capture the important effects and conclusions that may be derivable from the analysis of a network flow based model. The construction complexity and implementation is impacted by other assumptions made in the MARS model.

Underground cables generally have much longer repair times than overhead lines. Because of the potential impact of these extended cable outages on transfer capability, interfaces that include transmission circuits that are comprised of cables are modeled in the MARS simulation with discrete transition rates, based on historic facility forced outage rates. This modeling captures the effect of reduced transfer capability on a probabilistic basis across such interfaces due to the typically long duration of cable outages.

The following computation steps will be used during the transmission and resource adequacy evaluation:

- LOLEs for the entire NYCA and its individual Load Zones are determined with the calculated base case transfer limits representing the most limiting value for thermal, voltage, or stability. This step is the initial base case assessment.
- LOLEs for the entire NYCA and its individual Load Zones are determined without considering any transmission transfer limitations within the NYCA system (free flow case). This will differentiate whether any LOLE violations identified in step 1 are purely resource related or if they are caused by limitations in the transmission system. The LOLEs are compared to those in step 1, and if any violations identified in step 1 no longer exist, the problem is identified as a transmission adequacy deficiency.
- LOLEs for the entire NYCA and its individual Load Zones are determined with thermal transfer limits only for the internal NYCA system. The LOLEs are compared to those in step 1 to determine whether any voltage limited interfaces are contributing to any violations.

The resource adequacy calculations are performed with the voltage limits removed to determine whether a deficiency in available reactive resources is affecting the NYCA or its individual zonal LOLEs. If the voltage limits are found to be contributing to any of the LOLEs, analysis will be performed to determine the amount of reactive resources (and/or MWs) that would be required to return the interface limit to the thermal limit, if reasonably possible.

Further details and expansion of this analysis for the development of the Compensatory MWs and MVARs appears in Section 4.11.

4.9 Short Circuit Analyses

These calculations determine whether the interrupting duty of the existing circuit breakers within the NYS transmission system would be exceeded or not. In addition, these calculations also provide information for the rating of new circuit breakers and capability remaining in the existing breakers.

Before beginning these calculations, the NYISO will review other existing short circuit adequacy studies. The basis and methodology for the short circuit calculations is documented in the NYISO Transmission Expansion Interconnection Manual.

The NYISO will calculate the maximum short-circuit level at all substations for the horizon year of the Study Period. The NYISO substations in which the total fault current exceeds the lowest interrupting duty of the breakers in the corresponding substations are identified for future individual breaker duty requirements. If the calculated values are within the rating of the existing breakers, then there is no necessity to perform these calculations for the intervening years. Otherwise, the NYISO will repeat these calculations to determine in which year the fault levels will be exceeded. The intervening year calculations (performed backwards) will be undertaken only for the specific fault locations and substations where the excessive fault levels were identified for the next year.

4.10 Evaluate Operational Modes

In accordance with Section 31.2.2.6 of Attachment Y⁵, the NYISO will conduct appropriate sensitivity analyses to determine whether alternate system configurations or operational modes can mitigate the previously identified Reliability Needs. The nature of sensitivity studies is to examine the impact of smaller changes to the base case assumptions, configuration and limits. These types of studies are distinctly different in scope and extent in that only ‘micro’ changes are evaluated as compared to scenario analyses, where ‘macro’ changes are considered. The changes considered may include factors, such as re-dispatch, split bus operation, temporary connection or disconnection of certain facilities, special protection systems, and short time operational responses.

4.11 Compensatory MWs/MVARs

After the Reliability Needs are initially identified as deficiencies in LOLE or other applicable reliability criteria, the NYISO will translate those deficiencies into MWs (or MVARs) of resources that could satisfy the needs. These resources have locational dependency and are referred to as compensatory MWs (or MVARs). The Reliability Needs determined by the NYISO may be met through various combinations of resources located in different NYCA load Zones, and the NYISO may provide examples of alternative amounts and locations of compensatory MWs (or MVARs) to meet the identified needs. This translation provides further information to the marketplace on the magnitude of the resources that are required to meet bulk power system Reliability Needs. The calculations of compensatory MWs or MVARs are not meant to reflect specific facilities or types of resources that may be offered as solutions to Reliability Needs. Accordingly, compensatory MWs may reflect generating capacity, demand management or transmission additions that may be offered as market-based, regulated backstop or alternative regulated projects to meet Reliability Needs, and MVARs could be static or dynamic as needed. For this analysis, the amount and effective location of the compensatory MWs or MVARs is determined by testing combinations of generic blocks of generation on the system-wide LOLE or other criteria violations.

4.12 Responsible Transmission Owners

A Responsible TO is designated by the NYISO to prepare a proposal for a regulated backstop solution to a Reliability Need or to proceed with a regulated solution to a Reliability Need. The Responsible TO will normally be the TO in whose transmission district the NYISO identifies a Reliability Need. Accordingly, the TOs in whose transmission districts the need for compensatory MWs has been identified are normally the TOs that will be designated by the NYISO as the Responsible TOs for purposes of identifying regulated backstop solutions. When designating the Responsible TO, the NYISO may consider which TO owns the transmission facilities that are in violation of applicable reliability criteria and/or the TO that owns the facilities, the outage of which, creates the reliability violations. For situations in which statewide Reliability Needs are

⁵ All section number references for Attachment Y in this Manual are from the NYISO October 15, 2013 Compliance Filing at the FERC.

identified, all NYCA TOs other than the New York Power Authority (NYPA) will be designated as Responsible TOs. Ordinarily, NYPA will not be designated as a Responsible TO because it does not have an obligation to serve native load in a service territory. The NYISO will request that NYPA work with the other TOs on the development of regulated backstop solutions on a voluntary basis. Attachment Y provides that the Responsible TOs will develop a regulated backstop solution or combination of solutions to timely address Reliability Needs identified in the RNA.

4.13 Preparation of RNA Draft Report

Upon completion of all the analyses for the RNA, the NYISO Staff will prepare a draft report including discussion of its assumptions, reliability criteria, the results of its analyses, and conclusions. The draft report may consist of a main report, supporting document(s) and appendices containing more detailed information. All of these documents in combination constitute the RNA. Concurrent with the review of any Reliability Needs identified in the RNA draft report, the NYISO will request that the TOs provide in writing any updated LTPs which might serve to mitigate the Reliability Needs in the draft report. The updated LTPs, if any, will be analyzed as described in Section 5 of this Manual.

4.14 Review and Approval of RNA Draft Report

Market Participants review the RNA draft report through TPAS and ESPWG. Upon completion of the review by TPAS and ESPWG, the draft RNA will be presented to the Operating Committee (OC) for discussion and action. The Business Issues Committee (BIC) shall be notified of the date of the draft RNA presentation to the OC. Following the Operating Committee vote, the draft RNA will be transmitted to the Management Committee (MC), along with minority views on the RNA expressed at the Operating Committee, for discussion and action.

Following the MC vote, the draft RNA, with working group, Operating Committee, and Management Committee input, will be forwarded to the NYISO Board for review and action. Concurrently with transmittal of the draft RNA to the Board, the draft RNA will be provided to the Market Monitoring Unit for review. The Market Monitoring Unit will indicate whether market rules changes are necessary to address an identified failure, if any, in one of the NYISO's competitive markets. The Board will act on the draft RNA as provided in the tariff.

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5. DEVELOPMENT OF SOLUTIONS TO RELIABILITY NEEDS

After the NYISO Board of Directors approves the RNA Report, the NYISO will request updated LTPs before issuing a formal request for (i) regulated backstop, (ii) market-based, and (iii) alternative regulated solutions to meet Reliability Needs. The TOs will report information about their updated LTPs [or the updated NYPA transmission plan](#) for use by developers prior to the formal request for solutions to Reliability Needs. The NYISO will evaluate all of the submitted solutions to determine their viability and sufficiency to meet the identified Reliability Needs.

Proposed solutions may take the form of new, upgraded or returning generation, new or upgraded transmission projects, demand-side management or energy efficiency programs, operating procedure changes, or market rule changes, or any combination of these solution types.

The initial assessment of proposed solutions will address their viability and sufficiency as described in Section 5.3 of this Manual. Following the initial assessment, the NYISO will perform the evaluation and selection of the more efficient or cost effective transmission solution as described in Section 6 of this Manual.

5.1 Developer Qualifications

Entities wishing to be eligible to propose a regulated transmission solution to an identified Reliability Need and to be eligible to use the cost allocation and cost recovery mechanism for regulated transmission projects, shall submit their qualifications to the NYISO as required in Section 31.2.4.1 of Attachment Y and as set forth in the Developer Qualification Form in Attachment A of this Manual.

5.2 Request for Regulated Backstop Solutions

The NYISO will undertake three steps to begin the development of regulated backstop solutions:

1. The NYISO will designate the Responsible TO or TOs to propose a regulated backstop solution or solutions to meet all the identified Reliability Needs. The Responsible TO will normally be the Transmission Owner in whose Transmission District the NYISO identifies a Reliability Need. The Responsible TO or TOs are obligated to prepare one or more regulated backstop solutions for each identified need. These solutions will be called upon by the NYISO to fulfill Reliability Needs in case a sufficient, viable and timely market-based solution(s) is not forth-coming.
2. The appropriate and relevant system models and base cases will be provided to the Responsible TO(s) subject to the NYISO rules for confidentiality and other stipulations.
3. The necessary lead-time for each of the proposed regulated backstop solutions must be established. The greatest challenge to meeting reliability for future system

conditions is constructing and commissioning the proposed projects (solutions) by the time of actual need. Thus, careful evaluation of the lead-time necessary for completing each proposed regulated backstop solution is critical. Accordingly, regulated backstop solutions submitted by the Responsible TO(s) must provide the necessary lead-time for each of the solutions because it is a key factor for the NYISO's evaluation of their feasibility.

Proposals for regulated backstop solutions must contain the information required in Section 31.2.4.4 of Attachment Y. The form for the initial submission is provided in Attachment B, and the form for the later evaluation and selection is provided in Attachment C of this Manual.

5.3 Request for Market-Based Solutions

Market-based solutions are the first choice to meet Reliability Needs. These proposals may consist of transmission, generation or demand-side projects. Market-based project Developers obtain revenues through the NYISO's Energy and Installed Capacity markets, Ancillary Services sales, and bilateral contracting arrangements.

Proposals for market-based solutions must contain the information required in Section 31.2.4.6 of Attachment Y. The form for such submissions is provided in Attachment B of this Manual.

Subject to the execution of appropriately drawn confidentiality agreements and the Federal Energy Regulatory Commission's standards of conduct, the NYISO and the appropriate TO shall provide access to the data that is necessary to develop proposed solutions.

5.4 Request for Alternative Regulated Solutions

Alternative regulated solutions may consist of transmission, generation or demand-side projects. The NYISO will solicit proposal(s) for alternative regulated solutions from any Developers who wish to offer them. In response to the NYISO's request, Other Developers and TOs, at their option, may propose alternative regulated solutions to address a Reliability Need, and submit such proposals to the NYISO. Other Developers and TOs may submit such proposals to the NYDPS for review at any time.

Proposals for alternative regulated solutions must contain the information required in Section 31.2.4.8 of Attachment Y. The form for the initial submission is provided in Attachment B, and the form for the later evaluation and selection is provided in Attachment C of this Manual.

5.5 Initial Assessment of Proposed Solutions

In each planning cycle, Developers will have 60 days from the date the NYISO solicits solutions to deliver such solutions to the NYISO. Incomplete proposals will be returned to the Developer for completion and must be returned within 15 days.

The NYISO will conduct three initial assessments to determine whether the submitted proposals, including market-based solutions and alternative regulated solutions, are: (1) complete, (2) viable and (3) sufficient to satisfy the Reliability Need(s) throughout the Study Period by the need date(s). The NYISO will identify any reliability deficiencies in each of the proposals and will discuss any identified deficiencies with the Developer. The Developer must resolve any reliability deficiency within 30 days of being notified by the NYISO.

The NYISO, after determining the completeness of each proposed solution, will evaluate each complete proposed solution independently to confirm whether the solution proposed by the Developer is viable as defined in 31.2.5.3 of Attachment Y of the OATT. Each viable proposal will then be evaluated, in the same manner in which the Reliability Needs Assessment was performed, to confirm whether the proposed solution is fully sufficient to meet the Reliability Needs throughout the Study Period. Proposals not deemed viable and sufficient will be rejected. The NYISO may also assess its own conceptual solutions to the Reliability Needs. These individual assessments will be performed in parallel for all proposed solutions. The NYISO will report in the CRP whether each proposed solution is viable and is sufficient to satisfy the identified Reliability Need by the need date, and the Trigger Dates for the proposed regulated solutions as required by 31.2.5.7 of Attachment Y of the OATT.

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6. EVALUATION AND SELECTION OF MORE EFFICIENT OR COST EFFECTIVE SOLUTIONS

The purpose of this phase of the CRP is for the NYISO to evaluate and select among the viable and sufficient regulated transmission solutions as provided by Attachment Y of the OATT. These solutions will have been previously evaluated as to their ability to meet, in a timely manner, the identified Reliability Needs throughout the Study Period and would then be eligible for selection for purposes of cost allocation and recovery under the NYISO Tariffs.

If the NYISO determines, pursuant to Section 31.2.6.1 of Attachment Y, that the Trigger Date for any regulated backstop solution or alternative regulated solution which was found viable and sufficient within the current planning cycle would be within 36 months of the viability and sufficiency determination, the NYISO will commence the process for the evaluation and selection of the more efficient or cost effective transmission solution.

If the NYISO, however, determines that no regulated backstop solution or alternative regulated solution which was found viable and sufficient in the current planning cycle would have a Trigger Date within 36 months of the viability and sufficiency determination, the NYISO will not perform an evaluation and selection of the more efficient or cost effective transmission solution in the current planning cycle.

6.1 Evaluation and Selection of the Regulated Transmission Solution

Before the NYISO commences the evaluation of proposed regulated transmission solutions that have been determined to be viable and sufficient, the Developer shall enter into a Study Agreement with the NYISO. The pro forma Study Agreement is presented in Attachment G to this Manual.

The NYISO evaluates eligible transmission solutions using the metrics set forth in Attachment Y based on the project information provided by the Developer and all other information available to the NYISO. The NYISO may engage an independent consultant to assist in the review of the reasonableness and utilization of the information submitted by a Developer. Requirements for a Developer's submission of project information are set forth in Attachment C to this Manual which contains standard forms for the submission of this information by the Developer.

In determining which of the eligible proposed regulated transmission solutions is the more efficient or cost effective solution to satisfy the Reliability Need, the NYISO will consider and rank each proposed solution based on the quality of its satisfaction of the metrics. The metrics are set forth in Attachment Y Section 31.2.6.5.1 and include: capital costs, cost per MW ratio, expandability, operability and performance of the solution, availability of property rights, and schedule for project completion. The NYISO may also rely on the

independent consultant's analysis in evaluating the proposed project using some or all of the metrics. The NYISO will consult with the NYDPS (Section 31.2.7) regarding the basis of the NYISO's selection and seek input from NYDPS for inclusion in the draft CRP.

The metrics as set forth in Attachment Y Section 31.2.6.5.1 will be evaluated as prescribed in that section and as further described below:

Capital costs for a proposed transmission solution will be evaluated for accuracy and reasonableness and will be performed on a comparative basis with other proposed transmission solutions. The Developer must submit detailed and credible estimates for the capital costs associated with the engineering, procurement, permitting, and construction of a proposed transmission solution including technical data, drawings, and itemized costs for each phase of the project, as specified in Attachment C of this Manual. The total capital cost estimate must be accompanied by a cost certainty range surrounding the estimate to account for anticipated contingencies.

The metric "Cost per MW" is calculated by dividing the present worth of the total capital cost by the MW value. The present worth is calculated by using a discount rate which is the current weighted average cost of capital for the NYTOs as determined in the most recent CARIS Phase 1 study. The MW value is determined by adding the compensatory MWs associated with the Reliability Need in the horizon year, which are provided by the proposed solution, to any additional beneficial MW (on that same binding interface associated with the Reliability Need) that the proposed project offers. Additional beneficial MW cannot exceed the amount of MW which would bring the NYCA to its free-flow LOLE. Because a proposed project might provide beneficial MW on more than one constrained interface, the NYISO may also calculate the Cost per MW for any substantive benefits and combine the value of the benefits. This value can be used, as appropriate, for quantitative ~~and~~or qualitative comparisons among competing projects.

In assessing the expandability of the proposed project, the NYISO may consider the ease of physically expanding a facility, which can include consideration of future opportunities to economically expand a facility, and the facilitation of future transmission siting. Such consideration may include future modifications to increase equipment ratings of the proposed facilities, staging or phasing of future transmission development, or otherwise benefiting from the proposed facilities for future reliability or congestion relief purposes.

The assessment of the relative operability and performance of the solution may consider any improved or diminished operability and performance even if only a qualitative or relative impact can be attributed to these factors. The NYISO will consider and evaluate any claims of operability and performance impacts made by the Developer, as well as considering any potential impacts raised by NYISO operations, planning, or other personnel.

In assessing the availability of property rights the NYISO may seek the use of consultants, the knowledge of the NYDPS, other government agencies and departments, and any information provided by the TO(s) in the applicable Transmission District(s).

The schedules for project completion are first evaluated as part of the initial viability assessment and then again using the additional engineering and design information provided in the subsequent evaluation and selection process as required in Section 31.2.6.5.1.7 of Attachment Y to the OATT. The scheduling metric will ensure that each proposed solution remains viable to satisfy the Reliability Need by the need date.

6.2 Determination Regarding Triggering and Halting a Regulated Solution

The NYISO will direct Responsible TOs or the selected Developer to proceed with their regulated solutions to satisfy a Reliability Need – i.e., to “trigger” the projects – following the completion of the NYISO’s evaluation and selection process pursuant to the requirements set forth in Section 31.2.8.1 of Attachment Y of the NYISO OATT. Specifically, the NYISO will not trigger a regulated solution if it determines that there are sufficient market-based solutions to satisfy the identified Reliability Need. However, if the NYISO determines that: (i) there are not sufficient market-based solutions to satisfy the Reliability Need and (ii) the Trigger Date for a regulated solution – either the regulated backstop solution or an alternative regulated transmission solution selected by the NYISO in the CRP as the more efficient or cost-effective transmission solution – will occur within thirty-six months of the NYISO’s presenting the results of its review of the viability and sufficiency of proposed solutions, the NYISO will trigger the regulated backstop solution and/or the selected alternative regulated transmission solution pursuant to the provisions of Section 31.2.8.1 of Attachment Y of the NYISO OATT.

The NYISO will inform the appropriate Responsible TO and/or Developer of the triggered regulated solution(s) that it should submit its proposed solution to the appropriate governmental agencies and authorities to begin the necessary approval process to site, construct, and operate the solution, and the relevant Developer should make such submission. If the NYISO triggers an alternative regulated transmission solution to satisfy the Reliability Need, the appropriate Other Developer or Transmission Owner must satisfy the requirements set forth in Section 31.2.8.1.5 of Attachment Y of the NYISO OATT to ensure that it will develop and construct its project to meet the Reliability Need, including entering into a development agreement with the NYISO and providing its project milestones.

If the NYISO triggers a regulated solution to ensure the Reliability Need is met, the NYISO may later halt the development of this project pursuant to the requirements set forth in Section 31.2.8.2 of Attachment Y of the NYISO OATT.

6.3 Determination of Need for GAP Solution

If the NYISO determines that neither market-based proposals nor regulated proposals can satisfy the Reliability Needs in a timely manner, the NYISO will set forth its determination

that a Gap Solution is necessary in the CRP. The NYISO will also request the Responsible TO to seek a Gap Solution. If there is an imminent threat to the reliability of the New York power system, the NYISO Board, after consultation with the NYDPS, may request the appropriate TO or TOs to propose a Gap Solution outside of the normal planning cycle. Upon the NYISO's determination of the need for a Gap Solution, the Responsible TO will propose, as soon as possible, such a solution for consideration by the NYISO and NYDPS.

Any party may submit for consideration an alternative Gap Solution proposal to the NYISO and to the NYDPS. The NYISO shall evaluate all Gap Solution proposals to determine whether they will meet the Reliability Need or imminent threat. The NYISO will report the results of its evaluation to the party making the proposal as well as to the NYDPS and/or other appropriate regulatory agency(ies) for consideration in their review of the proposals. Gap Solution proposals submitted under Sections 31.2.10 of Attachment Y shall be designed to be temporary solutions and strive to be compatible with permanent market-based proposals. A permanent regulated solution, if appropriate, may proceed in parallel with a Gap Solution.

6.4 Preparation of Draft Comprehensive Reliability Plan Report

The NYISO will prepare a draft CRP report, which includes input from various stakeholders and which assesses and establishes the grid's Reliability Needs and solutions to maintain long-term reliability of NYCA's bulk power system. The draft report will be presented as described in Section 7 of this Manual. In addition to addressing reliability issues, the CRP offers valuable information to the state's wholesale electricity marketplace.

Technical evaluation and comparison of various solutions offered from the market-based, regulated backstop, and alternative regulated solutions is the essential part of the draft CRP. The results, analyses and conclusions from the evaluation of all the solutions for the Study Period will be documented in this report. When required according to Section 31.2.7 of Attachment Y of the OATT, the CRP will also present the more efficient or cost effective regulated transmission solution.

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7. CRP REVIEW AND APPROVAL PROCESS

7.1 TPAS and ESPWG Review of Draft CRP

The NYISO staff submits the draft CRP to the TPAS and ESPWG for review and comment. Following completion of the TPAS and ESPWG review, the draft CRP with revisions resulting from the TPAS and ESPWG review shall be forwarded to the Operating Committee for discussion and action.

7.2 Operating Committee and Management Committee Review and Vote on the CRP

The NYISO Operating Committee discusses and votes on the draft CRP document. Thereafter the final draft CRP document is provided to the MC, along with input from the working groups and OC, for its discussion and action.

7.3 NYISO BOD Action on CRP and Market Monitoring Unit Review

The NYISO will present the draft CRP along with input from the working groups, OC, and MC, if any, to the NYISO's Board of Directors following the MC's review and vote. Concurrently, the draft CRP will also be provided to the Market Monitoring Unit for its review and consideration of whether market rule changes are necessary to address an identified failure, if any, in one of the NYISO's competitive markets. The Board will act on the CRP in accordance with the tariff.

Upon final approval of the CRP by the NYISO's Board of Directors, the NYISO will issue the CRP to the marketplace by posting the CRP on its website and providing the CRP to the appropriate regulatory agency(ies) for consideration and appropriate action.

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8. NYISO COST ALLOCATION AND RECOVERY PRINCIPLES AND ANALYSIS

8.1 Cost Allocation Principles and Methodology

The cost allocation principles and methodology covering regulated transmission solutions to Reliability Needs are contained in Sections 31.5.3.1 and 31.5.3.2 of Attachment Y.

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9. PROJECT MONITORING AND REPORTING

Attachment Y of the NYISO OATT establishes the responsibility of the NYISO for monitoring and reporting the progress of all solutions to assess their continued viability to meet the identified Reliability Needs on a timely basis. Section 9.1 of this Manual describes this process.

Attachment X of the NYISO OATT provides for the NYISO to obtain status and updated information from Developers, Connecting TOs and Affected TOs throughout the development of a new Large Facility. In order to meet the requirements outlined in Attachment X, Section 30.8.2 and Attachment X, Appendix 6 “Standard Large Generator Interconnection Agreement,” Developers, Connecting TOs and Affected TOs shall submit a status report as described in Section 9.2 of this Manual.

The NYISO may also request regular status reports from Developers or sponsors of other projects which may be of interest to the NYISO in relation to the CSPP.

9.1 Reliability Projects

The NYISO will monitor and report on the status of market-based solutions, regulated solutions, and LTPs to ensure their continued viability to meet Reliability Needs on a timely basis in the CRP. The NYISO will monitor the status according to the criteria set forth in Attachment Y Sections 31.2.8 and 31.2.12.

The NYISO will maintain lists of potential market-based solutions and regulated solutions that it has determined would, if implemented, satisfy an identified Reliability Need. In order to remain on the CRP list as a potential market-based solution, regulated solution, or LTP, each Developer shall submit updated information to the NYISO on a quarterly basis, or as requested by the NYISO, using the Project Status Report form set forth in Attachment D to this Manual. The updated information of the project status shall include, but not be limited to:

- Evidence of a commercially viable technology
- Major milestone schedule
- Demonstration of site control
- Whether a contract is under negotiation or in place
- Status of NYISO interconnection studies
- Status of NYISO interconnection agreement
- Status of any required permits
- Status of equipment procurement
- Evidence of financing and regulatory approvals (e.g., rate filings)
- Material changes in financial condition (e.g., bankruptcies, reduced bond ratings)
- Any other information that is requested by the NYISO

The status reports shall be submitted electronically to Interconnect_Project_Status@nyiso.com on or before the first day of each calendar quarter, or as requested by the NYISO. The NYISO will treat any confidential data in accordance

with the provisions of Attachment Y of the NYISO OATT, and the NYISO Code of Conduct, which is contained in Attachment F of the NYISO OATT.

Failure to provide any data requested by the NYISO within a reasonable period of time (not to exceed 60 days from the date of the NYISO request) will result in the rejection of the proposed market-based solution, regulated solution, or LTP from further consideration in that round of the RPP.

The Developer will immediately notify the NYISO when it has any indication of a material change⁶ in the status of the market-based solution. The NYISO may independently verify the progress and completion of critical path activities for each solution. The NYISO will provide reasonable advance notice of each office or field visit. The NYISO expects each solution proposer and Responsible TO to fully cooperate with NYISO employees or designated consultants during each visit. If the NYISO, at any time, learns of a material change in the status of a market-based solution or regulated solution, it may, at that time, make a determination as to the continued viability of the proposed solution.

The NYISO, prior to making a determination about the viability of a proposed market-based solution or regulated solution, will communicate its intended determination to the project sponsor along with the basis for its intended determination. The NYISO shall provide the sponsor a reasonable period (not more than two weeks) to respond to the NYISO's intended determination, including an opportunity to provide additional information to the NYISO to support the continued viability of the proposed market-based solution or regulated solution. If the NYISO, following its analysis, determines that a proposed market-based solution or regulated solution is no longer viable, the proposed market-based solution or regulated solution will be removed from the list of potential solutions in the next CRP.

9.2 Large Facility Interconnection Projects

Upon completion of the Facilities Study or as otherwise determined by the NYISO, each Developer, Connecting TO and Affected TO shall submit a status report on a quarterly basis, or as requested by the NYISO, using the Project Status Report form set forth in Attachment D to this Manual. This form shall be used to document the current status of the project and to identify changes since the completion of the Facilities Study. Status reports shall include indication of scope changes to point of interconnection, generator manufacturer or data, equipment configuration or layout, cost estimates, and any other data provided in the Interconnection Request. Status reports shall also include the status of the generator registration process, changes to milestone schedule, and project progress.

The status reports shall be submitted electronically to Interconnect_Project_Status@nyiso.com on or before the first day of each calendar quarter, or as requested by the NYISO until the submission of as-built data. The Developer, Connecting TO and Affected TO shall only provide information regarding the portion of the project which is under their control and responsibility as described in the Facilities

⁶ In the context of the RPP, the term "material change" shall include, but not be limited to: (a) a change in the financial viability of the Developer; (b) a change in the siting or permitting status of the project; (c) a change in a major element of the project as proposed or in its development; or (d) a change in the projected schedule for completion.

Study and/or interconnection agreement. The NYISO will treat any confidential data in accordance with the provisions of Attachment X of the NYISO OATT, and the NYISO Code of Conduct, which is contained in Attachment F of the NYISO OATT.

The Project Status Report includes a list of typical major milestones. The responsible party shall provide the planned start and finish date for each item. If schedule changes have occurred or an item has been completed since the last report, enter these dates in the appropriate columns provided in the form. Additional milestones may be added as appropriate to accurately describe the scope of work required for the project.

The Project Status Report includes text boxes for reporting project status. The report should include at a minimum the following items: site control status, permitting application status, funding status, fuel supply, major equipment procurement, engineering/design activities and construction activities. The report should also note any changes of ownership and any concerns and potential risks that may impact the project's ability to meet the planned milestone schedule.

If any scope changes have occurred to the project Attachment Facilities or the System Upgrade Facilities since the completion of the Facilities Study, the responsible party shall separately notify the NYISO of the change in a timely manner as outlined in Attachment X and/or the interconnection agreement. The responsible party shall provide a description of the change, the reason for the change and supporting documentation outlining the change. The responsible party should not wait until the next reporting period to submit information regarding a change. However, any scope changes should be noted in the Project Status Report.

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Attachment A. NYISO Developer Qualification Form

The NYISO Developer Qualification Form is available under the *Reliability Planning Process Manual* which is located in the Manuals>Planning folder on the NYISO Manuals & Guides Web site:

http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp)

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Attachment B. Qualifications for a Proposed Solution to a Reliability Need.

The Qualifications for a Proposed Solution to a Reliability Need Form is available under the *Reliability Planning Process Manual* which is located in the Manuals>Planning folder on the NYISO Manuals & Guides Web site:

http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp)

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Attachment C. Required Data Submission for Solutions to Reliability Needs

(initial draft under review by ESPWG)

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Attachment D. Project Status Report

The Project Status Report is available under the *Reliability Planning Process Manual* which is located in the Manuals>Planning folder on the NYISO Manuals & Guides Web site:

http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp)

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Attachment E. Request for Additional Reliability Study

The Request for Additional Reliability Study Form is available under the *Reliability Planning Process Manual* which is located in the Manuals>Planning folder on the NYISO Manuals & Guides Web site:

http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp)

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Attachment F. Agreements for Additional Reliability Studies

The Agreements for Additional Reliability Studies Form is available under the *Reliability Planning Process Manual* which is located in the Manuals>Planning folder on the NYISO Manuals & Guides Web site:

http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp)

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Attachment G. Study Agreement for Evaluation and Selection of Proposed Regulated Transmission Solutions Which Have Been Found to be Viable and Sufficient

The Study Agreement Form is available under the *Reliability Planning Process Manual* which is located in the Manuals>Planning folder on the NYISO Manuals & Guides Web site:

http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp)