

NYSRC

New York State Reliability Council



Working to ensure the reliability of the
New York State electric power system

2013 – 2014

Biennial Report

June 2015

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The New York State Reliability Council At a Glance

MISSION: To ensure the reliability of the New York State Power System

FOUNDED: 1998

BUSINESS: 501(c)(6) not-for-profit organization

MEMBERS:

- Affiliated: 9
- Unaffiliated: 4

2014 BUDGET: \$761,000

MAJOR ACTIVITIES:

- Creates Reliability Rules
- Monitors compliance
- Establishes annual statewide Installed Capacity Requirements

WEB SITE: www.nysrc.org

LETTER FROM OUR CHAIR

I recall reading the following line in Walt Whitman's Leaves of Grass,
I am the man, I suffered, I was there.

Well, I can say, *I was there* because I witnessed the precise moment when the notion of the New York State Reliability Council (NYSRC) was conceived! Not sure I can say *I suffered* but it was not easy. I know I cannot say *I am the man* because this was a team effort.



A team with members representing all New York Transmission Owners who had created the New York Power Pool (NYPP) after the 1965 blackout was charged by the Federal Energy Regulatory Commission (FERC) to transform NYPP into an Independent System Operator (ISO). We knew that we had to salvage decades of reliability experience but what made it difficult was how to ensure that reliability would be maintained in an era with new competitive wholesale electricity markets. We looked at what other ISOs under development were doing or planning on doing with regard to protecting reliability and we were not totally satisfied. It was not until a consultant we brought in to help us with this issue asked why not form two organizations, one to operate the bulk power system and administer a power exchange, and one in charge of reliability standards. This was novel. No ISO was contemplating this (and none has since) and some feared that FERC would never accept it. Its proposed governance was different from the New York Independent System Operator (NYISO) in that interested market participants were represented along with unaffiliated members. However, the entire concept met all FERC guidelines and FERC did accept it. The first entity became the NYISO and the second became the NYSRC. FERC approved the NYSRC Agreement that describes the basic responsibilities, functions and governance of the NYSRC and the NYISO-NYSRC Agreement that describes the responsibilities of each and how the two institutions would work together. Looking back now, after more than 15 years, we can safely say that the decisions taken in the late nineties have worked well. I can attest to this because I have been on the Executive Committee since the NYSRC was formed and I am proud to be serving as its current chair.

The next decision was for the NYSRC to adopt all pre-existing NYPP reliability planning and operations reliability rules as its starting point instead of a blank slate. A key provision was that the NYSRC reliability rules could not be contradictory to those of North American Electric Reliability Corporation (NERC) and Northeast Power Coordinating Council (NPCC), but could be more stringent or detailed. Eventually this became Version One of the NYSRC Reliability Rules. We have been busy; we are now up to Version 34 of the Reliability Rules & Compliance Manual.

NYSRC Chairpersons are elected for a one-year term and customarily re-elected for a second term. This two-year cycle roughly coincides with the issuance of this Biennial Report. It becomes a summary, and to some extent a report card, on NYSRC accomplishments and the Chair's performance. This Biennial Report is designed to highlight the accomplishments of the past two years.

First, and foremost, the NYSRC's work on black start resources deserves a high mark. It has been completed, signed and sealed. It was a complex subject:

- It changed black start from a strictly voluntary service to a conditionally mandatory service once approved by FERC in early 2015;
- This transformation was replete with legal considerations subject to considerable debate at the NYSRC, the NYISO and FERC; and,
- It required the NYISO to make changes to its tariff, which were approved by its market participants.

As provided for in the NYISO-NYSRC Agreement the two organizations worked on the issue with the common purpose of enacting a reliability rule that was perceived to be essential for the prompt restoration of the Con Edison system after a blackout event. It is considered one of the most important actions on the part of the NYSRC.

Both NERC and NPCC have gone through major reorganizations of the format of their standards and criteria. The NYSRC felt that we must do the same to make it easier to see how the rules of the three organizations compare to each other. This was easier said than done. Our immediate goal was then to change the look and feel of our rules document but not its substance. This work was completed by the end of 2014 and became Version 34 of the Reliability Rules & Compliance Manual.

The NYSRC has established an Installed Capacity Requirement every year since it has existed. However, the model used has continuously been enriched in capabilities and accuracy. As soon as one yearly IRM has been approved a lessons learned process identifies areas for further improvement. These past two years have been no exceptions to this process and we can continue to say that the NYSRC's IRM evaluation is the most comprehensive in North America. This is another area where the close cooperation between the NYSRC and the NYISO has yielded positive results for reliability.

None of the above could have been accomplished without the expertise and hard work of all members and Support Team associated with the NYSRC, the NYISO and state agencies that are closely involved in NYSRC activities. As Chair, I salute their accomplishments.

Dr. Mayer Sasson

New York State Reliability Council Chair

OUR FOCUS ON RELIABILITY

Reliability means “keeping the lights on” in day-to-day operations and responding quickly and effectively to outages and emergency events that affect the electric power grid in New York State. Electricity is the driving force in our digital economy. The health and welfare and economic well-being of New York State’s residents depend on a reliable supply of electricity, delivered where and when it is needed at the speed of light. That is why the NYSRC also focuses on system resilience – the ability to reduce the magnitude and duration of major events affecting the reliable supply of electricity.

WHO WE ARE

The NYSRC was approved by FERC in 1998 as part of the restructuring of the electricity market in New York State. Under the restructuring, the New York Power Pool was replaced by two entities. The NYISO as the entity with the primary responsibility for the operations of the State’s bulk power generation and transmission system. FERC also approved a NYSRC Agreement which established the NYSRC and described its responsibilities; and an Agreement between the NYISO and the NYSRC, which established the relationship between the NYISO and the NYSRC and their respective responsibilities. Under these Agreements, the NYISO and its market participants are required to abide by the NYSRC Reliability Rules, as well as reliability standards and criteria established by NERC and NPCC. In turn, the NYISO Agreement requires all New York market participants to abide by the NYSRC Reliability Rules.

The NYSRC oversees reliability for a bulk power system that:

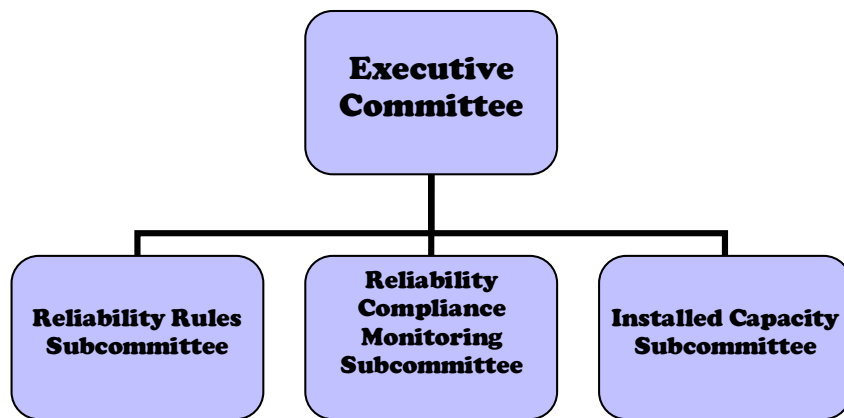
- Provides electricity to 19.75 million people in the Empire State.
- Forecasts a 2015 electricity demand of 33,567 Megawatts.
- Has 42,026 Megawatts of generation.
- Has 11,086 miles of high-voltage transmission lines, 115 kV and higher.

Governance and Structure

The NYSRC is an independent, not-for-profit organization governed by a 13-member Executive Committee. Nine members come from key sectors of New York’s electric industry: transmission owners (six members), wholesale sellers (one member), industrial and large commercial consumers (one member), and municipal electric systems and cooperatives (one member).

The remaining four NYSRC members are independent members with no affiliation with any sector of New York’s electric industry. Each member of the NYSRC Executive Committee is required to have substantial knowledge and/or expertise in the reliable operation of bulk power systems. The Executive Committee sets high standards for the organization’s subcommittees and working groups.

The NYSRC focuses on three primary roles in achieving its mission. First, the NYSRC develops reliability rules that are more stringent or specific than NPCC and NERC standards and criteria. These additional rules are necessary to meet the special requirements of New York’s bulk power system. Secondly, the NYSRC assesses NYISO and New York market participant compliance with these reliability rules. Finally, the NYSRC is responsible for adopting an annual statewide installed capacity requirement. There are three subcommittees reporting directly to the NYSRC Executive Committee that support all facets of the NYSRC’s responsibilities.



1. The **Reliability Rules Subcommittee** manages the review, development, and modification of NYSRC Reliability Rules to maintain or enhance the reliability of the New York State bulk electric system.

2. The **Reliability Compliance Monitoring Subcommittee** manages the NYSRC compliance monitoring process, develops procedures for measuring and documenting compliance, and assesses compliance with the NYSRC Reliability Rules.
3. The **Installed Capacity Subcommittee** is responsible for the development and analysis of studies related to the NYSRC's adoption of an annual statewide installed capacity requirement for the New York State bulk power system.

The industry sectors and independent members represented on the NYSRC Executive Committee are also represented on these subcommittees, as are representatives of the NYISO and New York State Department of Public Service (NYS DPS) staffs, and NYSRC consultants. Collectively, subcommittee members provide expertise in the planning and operating aspects of the reliable operation of the New York bulk power system.

The NYSRC is also a member of the North American Energy Standards Board (NAESB) that, in conjunction with the FERC, develops the business practice standards by which the natural gas and electric industries communicate in an open-market environment. NAESB decisions affect a number of stakeholders with whom the NYSRC coordinates its own activities, including the NYISO and the New York electric utilities. Membership also assures that the NYSRC has a voice in the implementation of reliability practices. Updates on NAESB activities such as Smart Grid, Gas-Electric Coordination, NAESB/NERC coordination, Green Button (data privacy and energy usage) challenges, cybersecurity activities, and Electric Industry Registry issues are monitored by NYSRC through its participation as a member of the NAESB Board of Directors.

We encourage you to visit our web site, <http://www.nysrc.org>. It includes proposed NYSRC Reliability Rules for which comments are requested, meeting schedules and meeting materials, and other useful information.

OUR 2013 & 2014 ACCOMPLISHMENTS

During 2013 and 2014, the NYSRC continued to fulfill its mission of promoting and preserving reliable service for New York State's electric customers through several important initiatives. Some of these accomplishments are reported in more detail later in this report.

1. Development of Black Start Generator Requirements for New York City

The NYSRC Reliability Rules require the NYISO and transmission owners to have system restoration plans that will return the bulk power system to a normal state after a blackout or major system disturbance as safely and as promptly as reasonably possible. Black start resources are generating facilities that have the capability of assisting in returning the system to a normal state. The 2003 Blackout, 35 years after the Northeast Blackout, reinforced the need for effective rules and procedures regarding system restoration from black start resources. Although all entities involved in the development of new rules worked diligently on the objective of restoring the New York State bulk power system and local systems following blackouts, it became clear that there was a need for the assignment of system restoration responsibilities through the NYSRC in the form of Reliability Rules for black start testing and capacity requirements, and through the NYISO with respect to the compensation for black start services. These provisions were both in place by 2006.

The NYSRC is satisfied that the NYISO has adequate black start resources for the restoration of the State's transmission system backbone. However, concern was raised regarding the adequacy of the Con Edison system restoration plan for New York City when a black start plant owner provided notice to the NYISO in 2010 that it was withdrawing three units from the NYISO's black start program and from the Con Edison system restoration plan a year later. This action raised significant concerns for both the NYISO and the NYSRC, and resulted in a comprehensive review of the Reliability Rules related to system restoration plans and the black start resources needed to implement those plans. This action also brought the realization that in the Con Edison service territory no new generation resource with black start capability had been built in recent years. Existing black start resources were aging, prompting the concern that in time New York City would have inadequate black start capability. Con Edison and the NYISO took action by requiring all future generators to be built in New York City to have black start capability if it would provide a material benefit to the Con Edison system restoration plan, unless providing that capability would be an unreasonable

burden. The NYSRC also adopted revised testing rules that applied mainly to large steam electric units. Finally, the NYISO introduced a new payment schedule. New system restoration procedures that were adopted in 2013 by Con Edison compensated for the potential reliability impact when the three black start units left the program in 2011.



Adequate black start resources are critical to New York City reliability.

Photo courtesy Consolidated Edison.

Having addressed requirements for new generators that in time

would replace the existing fleet, the NYSRC turned its attention in 2013 to existing black start generation. Although sufficient generators with black start capability were participating in the Con Edison system restoration program, the NYSRC was concerned with the possibility that one or more black start resources could decide to leave the program and seriously affect the system restoration process. This concern was heightened by the fact that the provision of black start service under the NYISO's tariff was on a voluntary basis.

Over an 18 month period this issue was assessed and studied from technical, legal and procedural standpoints at the NYSRC Reliability Rules Subcommittee and the Executive Committee. The NYISO was an active participant in these discussions. In April of 2014, the NYSRC adopted a Reliability Rule that applied to existing generators in the Con Edison service territory with black start capability, similar to the rules previously adopted for new generators. The new rules applied to existing generators whether they were not in the system restoration program or were in the program but had given notice to leave the program. The rules require Con Edison to conduct an annual review to identify whether black start capable resources would provide a material benefit to its restoration plan, and if so, commence a process leading to participation of needed black start resources. The NYISO proposed tariff amendments to implement the new Reliability Rule that were approved by FERC.

The coordinated actions of the NYSRC and NYISO resulted in a Reliability Rule and procedures that provide increased reliability by assuring, to the extent

feasible, that the Con Edison system will have the black start resources it needs to restore the system as promptly as possible after a blackout or major system disturbance. Additionally, early in 2015, the NYPSC adopted the new NYSRC Reliability Rule as New York State regulations.

We can look back on this process with the satisfaction that, after considerable time and effort and with the input of the NYISO and all interested parties, the NYSRC developed and implemented a reasonable and effective Reliability Rule to protect an extremely important aspect of the reliability of the New York bulk power system. This effort also demonstrated that the NYSRC and the NYISO are working well together, with the cooperation that was contemplated in the founding agreement between the two organizations.

2. Reliability Rules Enhancement Project

In 2013, work began to implement the NYSRC Rules Enhancement Plan (REP). This project had three objectives: (1) to reorganize and reformat the NYSRC Reliability Rule elements to be consistent with the structure of the NERC Reliability Standards, (2) to combine compliance element information, which had been located in a separate manual, with the Reliability Rules, and (3) to modify the NYSRC rules to assure consistency with NERC and NPCC standards and criteria, while retaining the more stringent and specific NYSRC requirements. The REP was completed in 2014, with the first Reliability Rules & Compliance Manual containing the newly reorganized and reformatted rules issued on January 1, 2015.

3. Development of Reliability Models for Calculating Installed Capacity Requirements

During 2013 and 2014 the NYSRC continued to improve its process for calculating the annual statewide installed capacity requirements. Three new models were developed with NYISO assistance during 2013 and 2014. They were:

- Multiple Load Shape Model
- Wind Shape Model
- PJM Interconnection (PJM) Demand Resource Model

Incorporation of these models in NYSRC reliability studies resulted in a more accurate representation of installed reserve requirements. These models are described later in the “Establish NYCA Installed Capacity Requirements” section of this report.

OUR CHALLENGES AHEAD

Challenge 1: Maintain electric power system resilience despite the occurrence of extreme events

The definition of *resilience* in the Merriam-Webster dictionary is “the ability to become strong, healthy, or successful again after something bad happens.” The New York electric system is subject to many events that could make something bad happen. That’s why much of the NYSRC’s attention is focused on maintaining reliability in spite of threats that can’t be fully anticipated or prevented. Below are examples of NYSRC initiatives focusing on reducing the duration and magnitude of such events.

- **System Restoration**

One of the attributes of a resilient system is to be able to reduce the duration of customer interruptions following a blackout. The establishment of Reliability Rules to ensure the adequacy of black start resources in New York City as reported above was one of the NYSRC’s major achievements during 2013-14. The NYSRC will continue to monitor implementation of these rules.

- **Protection of New York Power System Reliability Against Major Disturbances**

A major NYSRC effort continued in 2013-14 through its Defensive Strategies Work Group to assess and develop protection measures for New York which will address where, how and when to perform automatic control measures to protect New York against major disturbances originating both within and outside of the New York Control Area (NYCA). The status of this effort is described later in this report.

- **Extreme Load Conditions**

New York’s electric system met, with no loss of load, an all-time record peak load during a particularly long and sweltering heat wave in July of 2013. This record breaking hot weather illustrated the continued need to plan generation capacity requirements with sufficient reserve to meet higher than forecast load levels. The NYCA system representation used by NYSRC to determine future installed capacity requirements includes a model that recognizes load uncertainty by including the probabilities of occurrence of a range of possible load levels. The load forecast uncertainty model for the 2015 installed reserve margin (IRM) study determined that 7% of the IRM should allow for the possibility of extreme loads.

- **Loss of Gas Supply to New York’s Generators**

Natural gas-fired generation in NYCA is supplied by various networks of major gas pipelines. The NYSRC requires NYISO to conduct studies for examining the consequences of loss of generating unit fuel supply and to report mitigation measures in the event serious impacts are found.

Challenge 2: Increased reliance on natural gas as a fuel source for power plants

Natural gas has become the dominant fuel used to produce electricity in New York. About 8% of the generating capacity in NYCA is fueled by natural gas only and 47% by dual-fired oil and natural gas units. For New York City, these numbers are 15% and 79%, respectively. Natural gas continues to be the fuel of choice for new power plant construction. The growing availability of this relatively inexpensive and clean-burning fuel benefits New York in many ways. The increase in natural-gas-fired generation has resulted in a significant decrease in both power plant emissions and the wholesale cost of electricity. As older coal- and oil-fired plants retire and new gas-fired plants are built to replace them, it is likely that New York will come to rely even more on this fuel. This creates serious potential reliability risks. However, the natural gas that is supplied by the major gas pipelines into the State is also used for heating in the winter. At times there is not enough gas for both heating and electricity generation and reliance on successful switching to alternative fuels becomes paramount.

As part of the NYSRC Reliability Compliance Program, the NYISO is required annually to conduct loss of gas supply studies. Also, New York City and Long Island are required by the NYSRC Local Reliability Rules to be operated so that the loss of, or uncontrolled loss of, a single gas facility does not result in the loss of electric load on their respective systems. Periodic assessments are performed by the transmission owners and reviewed by the NYISO and NYSRC to ensure compliance with these rules. Recent loss of gas/minimum oil burn studies indicated compliance with the current NYSRC rules.

Challenge 3: Maintain reliability as new environmental regulations continue to emerge

In March 2010 the NYSRC established an ad hoc working group with several State agencies, including the New York State Department of Environmental Conservation

(DEC), to help define and promote understanding of the relationship between environmental policies and the reliability of the New York electric power system. The NYSRC/DEC Working Group has been meeting approximately every two months, and comprises representatives from the DEC, the New York State Energy Research Development Authority, the New York State Department of Public Service, the NYISO, market participants, and the NYSRC.

This collaborative effort provides a forum to discuss emerging State and federal regulations and to communicate potential reliability concerns. Potential impacts from State and federal regulations affecting O₃, SO₂, NO_x and CO₂ have been identified, including:

- MATS - Mercury and Air Toxics Standard (Mercury, acid gas & particulates)
- CSAPR - Cross State Air Pollution Rule (O₃, SO₂ & NO_x)
- RGGI - Regional Greenhouse Gas Initiative (CO₂ market)

The NYSRC/DEC Working Group is monitoring these and other environmental initiatives to determine their potential impact on the reliability of New York State's electric power system. Separately, the NYSRC Executive Committee is monitoring EPA's Clean Power Plan activities and related activities at FERC and Congress, aimed at preserving reliability under emergency conditions.

WHAT WE DO: Develop Reliability Rules

One of the NYSRC responsibilities is to ensure the reliability of the New York bulk power system by developing Reliability Rules that are clear, consistent and technically sound. The NYISO and all of the NYISO's market participants – in accordance with the NYSRC/NYISO Agreement – must comply with these rules. The Reliability Rules define the requirements for planning and operating the New York State electrical grid, so that widespread cascading outages and blackouts do not occur. NYSRC Reliability Rules are developed using a process that is open to all entities directly and/or materially affected by the reliability of the New York power system. This rulemaking process is transparent to the public and provides for reasonable notice and opportunity for comment.

NYSRC rule development activities are primarily guided by NYSRC Policy 1, *Procedure for Developing, Modifying, and Disseminating NYSRC Reliability Rules*. The Reliability Rules Subcommittee (RRS) directs and oversees the Reliability Rule development process.

The NYSRC is always working to improve its Reliability Rule development process and the soundness of the rules it produces. To that end, during 2013 and 2014 RRS implemented the Rules Enhancement Plan (REP). The scope of the REP was two-fold: (1) to reorganize the components of NYSRC Reliability Rules to be more consistent with the NERC Standards format, including specifying requirements for complying with the related Reliability Rule and those elements necessary to demonstrate and monitor compliance with the Rule's Requirements; and (2) where necessary, to modify the Reliability Rules to assure consistency with NERC and NPCC standards and criteria, while retaining the more stringent and specific requirements in the Reliability Rules. The REP project was completed in late 2014, with the first version of the new Reliability Rules & Compliance (RR&C) Manual published on January 1, 2015. This new manual combines the previous NYSRC Reliability Rules and Compliance Template Manuals into a single manual, eliminating the need for separate manuals. The REP project is highlighted under the *Our Major Accomplishments* section. The RR&C Manual can be downloaded from <http://nysrc.org/NYSRCReliabilityRulesComplianceMonitoring.asp>.

A second phase of the REP project, to be completed in 2015, will be the revision of several Reliability Rules that were identified during the process of reorganizing the Reliability Rules. One such rule change identified is the need to provide more specific requirements concerning establishment of the list of facilities subject to NYSRC

Reliability Rules, and to resolve which elements should be included in accordance with the NYSRC Bulk Power System definition.

During 2013 and 2014, the NYSRC adopted one new Reliability Rule and two new measurements. In addition, one existing Reliability Rule and three existing measurements were modified. Measurements identify the specific NYISO and market participant actions necessary for compliance with the related Reliability Rule. The new and modified Reliability Rules and measurements were all related to black start testing requirement modifications and new requirements for the identification of eligible black start resources. These new and modified black start rules are highlighted under the *Our Major Accomplishments* section. Also, one Reliability Rule and three related measurements covering system protection were retired. By the end of 2014, there were a total of 51 NYSRC Reliability Rules and 59 measurements.

The NYSRC is also an active participant in the development of NERC and NPCC standards and criteria. An important part of our participation is to ensure that NYSRC Reliability Rules are consistent with any new NERC and NPCC standards and criteria, and to make any necessary modifications to the Reliability Rules. During 2013 and 2014, we continued to review NERC standards under development and prepare comments and, as a member of the NERC Registered Ballot Body, voted on a number of proposed standards. An important NYSRC focus is to ensure that changes in NERC reliability standards will not weaken the level of electric system reliability in New York.

WHAT WE DO: Monitor Compliance with the Reliability Rules

Compliance monitoring is the process used to assess, investigate, evaluate, and measure compliance with the NYSRC Reliability Rules. The NYSRC conducts its compliance monitoring activities by a number of methods, including an annual NYSRC Reliability Compliance Program developed and administered by the Reliability Compliance Monitoring Subcommittee (RCMS). In addition to this program, from time to time the NYSRC initiates compliance audits, assesses NYISO self-reports of rule violations, and performs compliance spot checks as needed. These processes are described in NYSRC Policy 4, *Procedure for Monitoring Compliance with the NYSRC Reliability Rules*. This policy describes compliance monitoring procedures and responsibilities of the NYSRC and NYISO for implementing these procedures. Policy 4 was revised in 2013.

RCMS directly monitors NYISO compliance with Reliability Rules, including those for which the NYISO is directly responsible and those which require action by its market participants. The NYSRC relies on the NYISO to monitor compliance with the rules for which market participants have compliance responsibility. RCMS provides oversight with respect to these NYISO reviews.

If non-compliance by the NYISO is identified by the NYSRC, mitigation plans and corrective actions are developed to achieve compliance. In addition, when a non-compliance finding is made, a letter reporting non-compliance is sent to the NYISO and a list of appropriate entities depending on the severity of the non-compliance issue. The NYSRC also provides oversight review of NYISO compliance with NERC and NPCC standards, which are separately monitored and assessed by NPCC. Through the entire process, the NYSRC and the NYISO work closely to review and monitor plans to mitigate and resolve any reliability issues as quickly as possible. A very important objective of the compliance monitoring process is that reliability will be improved as a result of NYSRC and NYISO efforts to prevent compliance violations.

In 2013 and 2014, RCMS monitored NYISO and market participant compliance in accordance with the NYSRC Reliability Compliance Program. During this period, the NYISO and the market participants were found in full compliance with all measurements that were assessed.

NYSRC Reliability Compliance Program

By the numbers in 2013 and 2014:

- 43 NYISO compliance reviews performed
- 27 market participant compliance reviews performed
- 0 compliance violations by the NYISO
- 0 compliance violations by market participants

It is the NYSRC's responsibility to assess the future transmission and generation adequacy of the New York power system. Accordingly, the NYSRC Reliability Rules require that the NYISO conduct annual transmission and generation reliability assessments. The timing of the annual transmission review is coordinated with that of a similar transmission review submission that is required by NPCC. A 2013 transmission review submitted to RCMS in 2014 concluded that the NYS bulk power system, as planned through the year 2018, conforms to the NYSRC transmission planning Reliability Rules. However, the implementation of designated corrective actions are necessary to meet the performance requirements of the NYSRC Reliability Rules. With these mitigation plans in place no additional upgrades will be necessary. RCMS will review the status of these mitigation plans in future transmission reviews.

A NYISO study conducted during 2014 evaluated the adequacy of resources during the 2014-2016 period. The study concluded that NYCA will have sufficient existing and planned resource capacity to meet NYSRC resource adequacy criteria though the study period assuming a baseline load forecast, while accounting for load uncertainty.

WHAT WE DO: Establish NYCA Installed Capacity Requirements

Another important NYSRC role is the establishment of an annual statewide installed capacity requirement (ICR) for the New York bulk power system. The ICR represents the amount of generating capacity that must be in place in order to ensure an acceptable level of reliability. The Installed Capacity Subcommittee (ICS) conducts reliability studies performed by the NYISO for determining and setting statewide installed capacity requirements. These studies utilize state-of-the-art probabilistic computer modeling techniques to calculate the probability of losing electric load in the event of insufficient capacity. Implementation of the statewide ICR is administered by the NYISO. Consistent with NYSRC reliability requirements, the NYISO also establishes the amount installed capacity that New York load serving entities must purchase, as well as locational capacity requirements for New York City and Long Island in order to meet the statewide reliability requirements. The process of determining the statewide ICR is through calculation of an Installed Reserve Margin (IRM) requirement. Procedures for calculating the IRM are described in NYSRC Policy 5, *Procedure for Establishing NYCA Installed Capacity Requirements*. Policy 5 was revised during 2013-14. Most of these revisions reflected descriptions of updated IRM study models.

For many years, the New York power industry has pioneered the application of probability methods for capacity planning, including the development of computer models, reliability evaluation techniques and methods, and resource adequacy criteria. Studies for establishing statewide ICRs using probabilistic techniques were initially implemented during the late 1960's by the New York Power Pool. For many years the NYSRC has been recognized by the U.S. electric industry as a leader in the calculation of resource adequacy requirements.

During 2013 and 2014, we continued to make significant progress at improving capacity and load modeling representations for use in our reliability studies. Three new models were developed as follows:

1. Multiple Load Shape Model

In 2013, new model for representing the NYCA statewide load shape was completed after extensive testing. The new model enables a different load shape to be assigned to each load forecast uncertainty bin. For this model, a combination of historical load shape for the years 2002, 2006 and 2007 were

selected, each representing different load shape characteristics. Use of this new model resulted in a 0.9% IRM reduction.

2. Wind Shape Model

In 2013, an analysis was conducted that examined different generation output of different years and load levels, and found small changes in reliability values. Based on a review of these analyses, ICS concluded that the shape for modeling wind generation in the 2014 IRM Study be derived from actual 2012 NYCA wind generation production instead of the simulation method based on 2002 load and wind generation used in previous IRM studies. The 2015 IRM Study used a wind shape model was derived from actual 2013 data. Use of this new model resulted in a very small IRM decrease.

3. PJM Demand Resource Model

A major modeling change in the 2015 IRM Study introduced slightly more than one-third – 5,600 MW – of the PJM control area’s demand resource (DR) capability in the Outside World model. This change provided the benefit of permitting additional emergency assistance from PJM to NYCA that reduces the probability of load shedding – thereby reducing NYCA IRM requirements in 2015 by 1.5%. Further work will be conducted in 2015 to further improve the PJM model representation, including its DR component.

Loss of Load Expectation (LOLE) studies were conducted by ICS in 2013 and 2014 to establish NYCA IRM requirements for the 2014-15 and 2015-16 Capability Years, respectively. The results of these studies, compared to earlier studies, show a stabilization of annual IRM requirements.

NYCA Installed Reserve Margin (IRM) Requirements	
Capability Year	IRM
2011-12	15.5%
2012-13	16.0%
2013-14	17.0%
2014-15	17.0%
2015-16	17.0%

PROTECTING THE NEW YORK POWER SYSTEM FROM MAJOR DISTURBANCES

An NYSRC initiative to explore the feasibility of implementing defensive strategies commenced immediately following the August 14, 2003 Blackout. This effort was implemented through the formation of the NYSRC Defensive Strategies Working Group (DSWG) with a charge to explore the mitigation of major system disturbances impacting New York. The working group is comprised of representatives of the NYCA transmission owners, NYISO, PSC Staff, NPCC, and members of the NYSRC Executive Committee. During 2011 and 2012, the DSWG worked with the NYISO on a study, referred to as CSSS (Controlled System Separation Study), which showed promise of reducing the impact of major disturbances on New York.

DSWG Accomplishments during 2013 and 2014

The DSWG accomplishments during 2013 and 2014 are listed below:

1. The DSWG met in April of 2013 to perform a full review of the CSSS results and contemplate “next steps”.
2. In August of 2013 a “brainstorming session” was held to explore how the studies could be advanced and determine key factors that should be considered in the studies. Some of the ideas included earlier detection, improved PMU algorithms, use of “out of step” protection, focusing on other extreme contingencies (as in complete loss of transmission substations and/or multiple line outages resulting from potential terrorist activities), additional consideration of external disturbances and consideration of more detailed load models.
3. Also in August of 2013, NYSERDA offered additional grant opportunities for “smart grid” related projects. DSWG members worked with EnerMex (prime contractor on the CSSS) in developing a proposal to extend the research performed under CSSS. The proposal team included members of the DSWG, the NYISO and EnerMex (prime contractor). The resulting project is referred to as the Major Disturbance Mitigation Study (MDMS).
4. MDMS Project – Once the contract details were worked out, the MDMS project was “kicked off” in July of 2014. DSWG members, including NYSRC Executive Committee members George Smith and George Loehr, agreed to serve as advisors and study participants on behalf of the NYSRC. Initial

accomplishments included review of related NERC standards, setting up base cases, review of related research as well as determining contingencies to be studied. The MDMS project is expected to be completed in December 2015.

DSWG Challenges Ahead

The primary objective of the DSWG remains to assess and develop protection measures for New York which will address where, how and when to perform automatic control measures to protect New York against major disturbances originating both within and outside of the New York Control Area. Focus remains on maintaining security of the New York electrical load, as follows:

1. In today's world, technologies related to system protection and control area are advancing at a rapid pace. Phasor measurement technology enables enhanced observability with regard to the state of the power system on a dynamic real-time basis. One challenge is to stay on top of this advancement and incorporate any applicable and beneficial technologies into the MDMS.
2. A second challenge, once a feasible and secure protection and control concept is developed, is to leverage New York's installed base of PMU's and associated high speed communications infrastructure an installed and tested real-time system.
3. While the DSWG is looking at automated measures that can respond to sudden events that evolve in seconds, the NYISO operations planning group is presently looking at ways to utilize the its PMU information to better prepare the New York system for situations that evolve in a timeframe of "minutes and hours" as was the last major widespread blackout of 2003 initiated in the Midwest. The third challenge is to ensure that information is shared between the MDMS work and the NYISO operations work that will afford mutual benefit.

Through its DSWG, the NYSRC remains dedicated to the identification of strategies that would reduce the likelihood and mitigate the impact of events similar to the 2003 Blackout and protect New York from extended outages.

OUR NYSRC EXECUTIVE COMMITTEE MEMBERS



Left to Right:

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George E. Smith, Unaffiliated Member
Richard J. Bolbrock, Municipal & Electric Cooperative
Frank S. Pace, Central Hudson Gas & Electric, Alternate Member
William H. Clagett, Unaffiliated Member
Christopher J. LaRoe, Wholesale Seller Sector
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