New York State Reliability Council

2007-2008 Biennial Report

10 Year Anniversary 1999-2009

A Decade of Promoting Electric System Reliability in New York State

NYSRC At-A-Glance

Approved by FERC: 1998
Began Operations: 1999
Activities:

- Develops Reliability Rules
- Assesses Compliance with the Reliability Rules
- Establishes Statewide Installed Capacity Requirements
- Assesses Future Reliability, Adequacy and Security
- Governed by a 13-Member Executive Committee

Our Mission

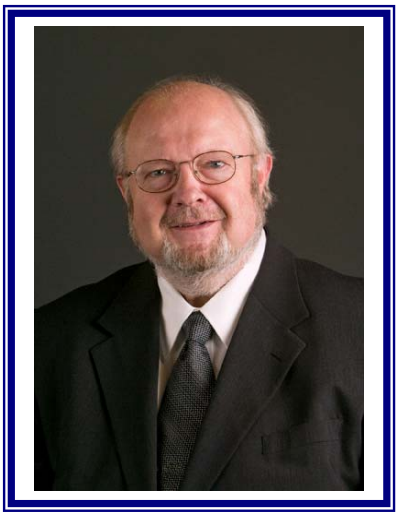
To facilitate the maintenance and enhancement of the reliability of New York State's electric power system.

Our Vision

A professional organization managed by a team of experts who are dedicated to achieving excellence in the promoting and preserving of reliable electricity service for the businesses and 19 million residents of New York State.

On the Cover: The Brooklyn Bridge, New York City
(Courtesy Consolidated Edison Co. of New York)

Message from the Chairman



The mission of the New York State Reliability Council (NYSRC) is to maintain and enhance the reliability of the bulk electricity grid in New York State. This charge includes developing, maintaining, and from time-to-time updating Reliability Rules with which the New York Independent System Operator (NYISO) and all market participants must comply. In fulfilling its mission, the NYSRC works in close conjunction with the NYISO.

During 2007 and 2008, the NYSRC continued its cooperation with the NYISO and various state agencies in identifying potential reliability impacts of environmental initiatives. The integration of wind energy into the New York State resource mix was a particular focus of the NYSRC's efforts. We also worked with state agencies to ensure that reliability would be included as a critical requirement in the development of the State Energy Plan. New reliability rules were proposed, reviewed and adopted, and conformance with existing rules was monitored and confirmed. In conjunction with the Northeast Power Coordinating Council (NPCC), we continued to explore "defensive strategies" to protect New York State from power system disruptions which originate outside New York – like the 2003 Blackout.

The bulk electric system in New York is part of a vast synchronous interconnection (or "transmission grid") stretching from the Canadian Maritimes to Florida and from the Atlantic Ocean to the Rocky Mountains; thus joint interregional studies of the overall system are critically important to reliability. During 2008, the NYSRC worked closely with the NPCC to restart such efforts. We also continued our long-term participation in the development and review processes for reliability standards in both the NPCC and the North American Electric Reliability Corporation.

New York has always been in the forefront in developing probability methods for assessing resource adequacy. During 2007 and 2008, the NYSRC continued to refine its methodology, along with determining the required installed reserve margin for the New York electric power system.

The NYSRC will celebrate its tenth anniversary during 2009. We are proud of our accomplishments in helping to maintain the reliability of the electric power system for the citizens of New York State, and confidently look forward to the future. As Chair, I would like to personally express my thanks to the members of the Executive Committee

and the various entities they represent. I especially want to thank the chairs and members of the several subcommittees and task forces, our legal counsel, and our superb consultants – without their tireless efforts, our job would be more difficult if not impossible. I also extend the NYSRC's appreciation to the management and staff of the NYISO, with whom we work so closely and effectively. Finally, our thanks are due to the many individuals from other organizations who have rendered much assistance to us; in particular, we are grateful to the employees of the New York State Department of Public Service, the New York State Energy Research and Development Authority, and the NPCC.

George C. Loehr
Chairman, New York State Reliability Council

A Decade of Promoting Reliability

Development of a reliable supply of electricity that meets New York's growing needs is a foundation of the quality of life and vital for our economy.

The New York State Reliability Council (NYSRC) celebrates its ten year anniversary this year, having launched operations in May 1999. Formation of the NYSRC was approved by the Federal Energy Regulatory Commission as part of the comprehensive restructuring of the competitive wholesale electricity market in New York State. Under the restructuring, the New York Power Pool was replaced by the New York Independent System Operator (NYISO) as the entity with the primary responsibility for the operations of the State's bulk power generation and transmission system in compliance with the Reliability Rules established by the NYSRC. The NYISO also assumed responsibility for administration of the newly established competitive wholesale electricity markets.

The NYSRC is dedicated to promoting and enhancing the reliable and efficient operation of the New York bulk electricity system – a system consisting of hundreds of generating units and thousands of miles of high-voltage transmission lines. Development of a reliable supply of electricity that meets New York's growing needs is a foundation of the quality of life and vital for our economy. New York households and businesses count on the electric industry to "keep the lights on."

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 electric systems.

The Executive Committee sets high standards for the organization's subcommittees and working groups.

Many lessons were learned during our first decade of NYSRC operations. Our mission was underscored in August 2003 by a power system collapse that originated in the Midwest and affected much of the Northeast and Midwestern U.S. and southern Canada. This event provided the opportunity for the NYSRC to step back, assess where we stood, and evaluate what course we should follow to minimize the impact of any future system disturbance that occurs outside of New York. To this end, the NYSRC formed a working group to explore the feasibility of implementing "defensive strategies" – techniques which could protect New York's electric power system from events originating outside of New York State. The NYSRC also continued to actively participate in the North American Electric Reliability Corporation (NERC) standard development program. It's critically important to maintain appropriate reliability standards in North America and, in particular, prevent any weakening of those reliability standards which could impact the reliability of the New York bulk electric grid.

Since its inception in 1999, the NYSRC has worked diligently to implement its responsibilities, and is committed to support the reliability of the New York power system.

Since its inception in 1999, the NYSRC has worked diligently to implement its responsibilities, and is committed to supporting the reliability of the New York power system. We are appreciative of the collaborative relationships we have established with the Northeast Power Coordinating Council (NPCC) and the NERC, and state government agencies such as the New York State Energy Research and Development Agency (NYSERDA), the New York State Department of Environmental Conservation (NYS DEC), and the New York State Department of Public Service (NYS DPS). We are especially proud of our close relationship with the NYISO throughout the past ten years.

Our Many Roles

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 electric grid. Second, the NYSRC assesses NYISO and New York market participant compliance with these reliability rules. Finally, the NYSRC is responsible for adopting statewide installed capacity requirements. There are three subcommittees reporting directly to the NYSRC Executive Committee that support all facets of these roles.

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 bulk electricity grid.

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 annual statewide installed capacity requirements for the New York power system.

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

In 2007, the NYSRC conducted its second successful bulk power transmission system workshop for over 135 people from the NYISO and market participants. A second workshop addressing resource adequacy was also held in 2007.

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

Supporting New York State's Renewable Resource and Environmental Goals

The State of New York is developing initiatives and regulations to increase the percentage of electricity produced from power plants that use renewable fuels and to develop new environmental standards to control greenhouse gas emissions and ground level ozone. Collectively, these goals present challenges that can affect the reliability of the electric power system.

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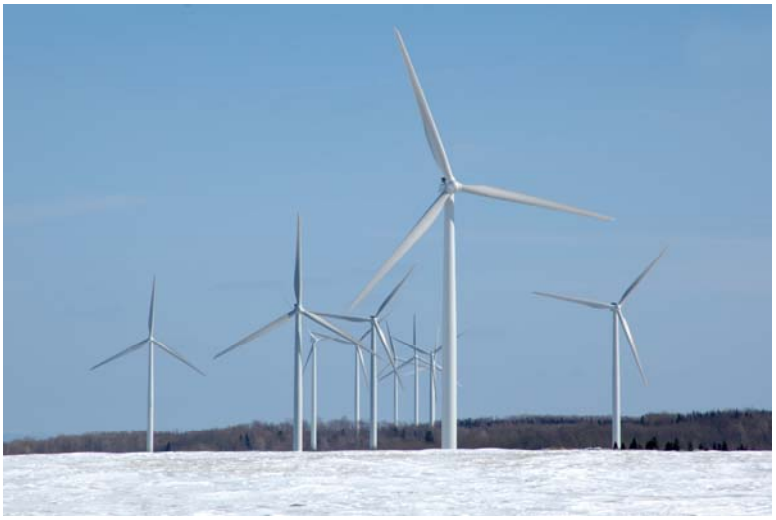
State policies to increase renewable energy production have encouraged the introduction and expansion of wind power projects in New York State. Based on the current pace of development, wind will become an increasingly important resource in the years to come. In 2008 there was a total of 380 MW of wind-powered generation in New York. It is projected that by the end of the 2009, 825 MW of wind generation will be added, providing a total of 16 wind-powered generation sites in Upstate New York. Wind developers are currently proposing to install an additional 8,000 MW of wind capacity after 2009.

Because of the intermittent nature of wind, the currently projected wind power capacity factor during the summer peak period is, on average, 11%. As a direct result of this relatively low capacity factor, the NYSRC projects increases in statewide installed margin reserve (IRM) requirements – so as to continue the same level of reliability – as more wind projects become operational.

New environmental standards will likely have a significant impact on statewide generating capacity reserve requirements in the future. This is due to their potential effect on the operation and availability of fossil fueled generating plants in New York State. The NYS DEC enacted regulations during 2008 to implement the

market-based Regional Greenhouse Gas Initiative (RGGI) which, beginning in 2009, will seek to limit CO_2 emissions from fossil fueled generators in ten member states. The use of RGGI emission allowances will likely become a power system reliability issue.



Maple Ridge Wind Farm in the Tug Hill Region of New York
(*Courtesy Jennifer Harvey, New York State Energy Research & Development Agency)*

A second environmental initiative, the Clean Air Interstate Rule (CAIR), is focused on bringing air quality in New York and other states into compliance with National Ambient Air Quality Standards for ozone. Ground level ozone is the product of hydrocarbon and NO_x emissions and sunlight. Fossil-powered generating stations are the largest source of NO_x emissions in New York State and strategies for the control of ozone will likely focus on the reduction of NO_x emissions from these power plants. Although specific plans for the reduction of ambient ozone remain under development and are not expected to be in effect until after 2009, it is more than likely that rigorous NO_x emission control requirements will impact reliability.

During 2008, the NYSRC closely monitored these and other important environmental initiatives because of their potential impacts on New York system reliability. As a part of this effort, the NYSRC initiated a collaborative process to exchange information on pending regulations. Accordingly, we formed an ad hoc working group – composed of NYS DEC, NYS DPS, NYISO, NYSERDA, and NYSRC representatives – which provides a forum to receive detailed updates concerning emerging regulations and to communicate potential reliability impacts to state policymakers.

Developing NYSRC Reliability Rules

NYSRC Reliability Rules define the reliability requirements for operation of the New York bulk electric grid. They apply to the NYISO and to all market participants that operate, plan, and use the New York bulk power system. The NYSRC Reliability Rules include requirements that are more stringent or more specific than NERC and NPCC standards and criteria. These are necessary to satisfy the special reliability needs of New York's electric power system.

The NYSRC Reliability Rule development process is open to all interested parties. Consistent with this open process, drafts of proposed reliability rules can be viewed on the NYSRC web site. Comments and recommendations from the NYISO, market participants and other entities within the industry are encouraged and carefully considered. Any entity may propose new or revised Reliability Rules. The Reliability Rules Subcommittee (RRS) manages the NYSRC Reliability Rule development process.

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 modifications necessary. During 2007 and 2008 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 focus is to ensure that future NERC reliability standards will continue to maintain adequate reliability, and that changes will not weaken the standards, thereby threatening New York reliability interests. As an example, in December 2007, NYSRC sponsored a revision of an existing NERC standard to require that determination of operating transfer limits consider common mode contingencies that result in loss of two or more (multiple) elements. NYSRC Reliability Rules and NPCC criteria now meet this requirement.

However, without this proposed strengthening of the NERC standard, a contingency of this kind in a region outside New York could adversely impact the New York system – as was the case during the 2003 Blackout. NPCC also supports this change. During 2008, the proposal was reviewed and comments received within the NERC standard development process.

Another priority of RRS in 2007 and 2008 was to evaluate the impact of new environmental regulations on the need for new Reliability Rules.

During 2007 and 2008, the NYSRC adopted 12 new and modified Reliability Rules. Also adopted during this period were 13 new and modified measurements. One or more measurements are associated with each NYSRC Reliability Rule; measurements identify specific NYISO and market participant requirements and actions for complying with the related Reliability Rule. By the end of 2008, there were a total of 52 NYSRC Reliability Rules and 58 measurements. The NYSRC Reliability Rules and measurements can be found on the NYSRC web site at www.nysrc.org/documents.

Assessing Compliance with NYSRC Reliability Rules

Compliance monitoring is the process the NYSRC uses to assess, investigate, evaluate, and audit compliance with the NYSRC Reliability Rules. This process is implemented primarily through 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 special compliance reviews.

RCMS directly monitors NYISO compliance with those Reliability Rules for which the NYISO is directly responsible. 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 to other appropriate entities. The NYSRC also provides oversight review of NYISO compliance with NERC and NPCC standards, which are separately monitored and assessed by NPCC.

In 2007, NYISO and market participant compliance with 33 measurements was monitored through the NYSRC Reliability Compliance Program; in 2008, compliance with a like number of measurements was monitored. We are pleased that the NYISO and the market participants were in full compliance with every one of these measurements.

In 2008, a special compliance review was conducted by the RCMS. The NYISO reported to the RCMS that it had identified a Reliability Rule violation by a market participant. This violation stemmed from the submission of incorrect outage data to the NYISO in 2004. This data error adversely impacted NYSRC reliability studies and

NYISO market operations. A RCMS investigation of this violation led to a series of recommendations to the NYISO for improving its procedures for outage data reporting and review.

The NYSRC Reliability Rules require that the NYISO conduct annual long term adequacy and reliability assessments of the New York power system. The NYSRC concluded that, based on the 2007 and 2008 assessments, the New York power system, as currently planned, is in conformance with all NYSRC Reliability Rules.

During 2008, the NYSRC encouraged the NPCC to initiate and actively participate in joint interregional transmission planning studies with neighboring reliability councils. The primary purpose of these studies is to ensure that system changes in other regions will not adversely affect NPCC and New York reliability. We will be monitoring an interregional study that is projected to be completed in 2009.

Empire State Plaza, Albany, NY
(Courtesy George C. Loehr)

Establishing Installed Capacity Requirements

Another important NYSRC responsibility is the establishment of an annual statewide installed capacity requirement for the New York power system. The amount of generating capacity that must be in place is based on ensuring an acceptable level of reliability. The Installed Capacity Subcommittee (ICS) conducts reliability studies 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 customer load in the event of insufficient capacity. The statewide installed capacity requirement is administered by the NYISO. Consistent with NYSRC reliability requirements, the NYISO establishes New York load serving entity capacity requirements as well as locational capacity requirements for New York City and Long Island.

We continued to make significant progress at improving capacity and load modeling representations. This included the consideration of two emerging energy issues that have the potential to impact IRM requirements: the growing capacity of wind generation and environmental initiatives.

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 capacity requirements using probabilistic techniques were implemented during the late 1960's by the New York Power Pool. During 2007 and 2008, we continued to make significant progress at improving capacity and load modeling representations. This included the consideration of two emerging energy issues that have the potential to impact IRM requirements: the growing capacity of wind generation and environmental initiatives.

An installed reserve margin (IRM) requirement of 18.0% was determined by the NYSRC for each year during the

period between 2000 through 2006. In 2007, the NYSRC reduced the required IRM to 16.5%, which was then further reduced to 15.0% in 2008. These IRM reductions resulted from improved availability trends of New York's generating units and increases in transmission capability and availability. Variations of required IRM levels from year to year such as these do not increase or decrease New York electric system reliability; the amount of IRM required for a given year is designed to meet a fixed level of reliability that is mandated by the Reliability Rules.

A notable addition to our IRM study transmission models was the Neptune HVDC submarine cable which was energized during the summer of 2007. This 600 MW cable connects Long Island and New Jersey. In addition to this new facility there were improvements in the transmission capability of the Dunwoodie-South transmission interface in Westchester. These transmission projects increased the ability of the system to transfer capacity and contributed to the IRM decreases in 2007 and 2008.

Studies conducted in 2008 for the 2009 capability year, however, resulted in an IRM increase from 15.0% to 16.5%. Projected decreases in the availability of New York's power plants and a significant increase of wind capacity were largely responsible for this 1.5% increase.

Although there had been a trend of improved availability for the New York electric system's fleet of power plants for several years prior to 2007, during 2007 generating unit forced outage rates, on average, increased. This led to a lower power plant availability projection for 2009. A joint study by the NYSRC and NYISO will be conducted during 2009 to analyze this outage rate trend.

The second factor which was responsible for the increased IRM in 2009 was the significant increase in amount of wind generating capacity. It is projected that by the end of 2009 there will be a total capacity of

approximately 1,200 MW of wind capacity in New York. This represents an increase of 825 MW since the 2008 capability period. Our studies developed new wind generation models, which recognized the low capacity factor performance of this type of capacity.

The 2009 IRM Study also examined the RGGI and CAIR environmental regulations presently being developed by environmental regulators in New York and other states. When implemented, these may impact IRM requirements. A NYISO analysis on the implementation of these regulations concluded that neither initiative will impact the 2009 capability year IRM requirement, although our studies have shown that both initiatives have the potential to cause substantial increases in statewide IRMs in later years.

In 2008 the NYISO began an evaluation of the implementation of a "Forward Capacity Market" (FCM) to help address the need for an adequate power supply into the future. Under an FCM, auctions would be held to purchase resources to meet future capacity needs. This FCM initiative will require the projection of IRMs several years into the future. In 2008 we prepared a study scope to conduct such an IRM analysis, and will perform an initial study during 2009 to assist the NYISO in its implementation of the FCM program.

Protecting the New York Power System from Disturbances Originating Outside of New York

Immediately following the August 2003 Blackout, the NYSRC formed a Defensive Strategies Working Group to explore the mitigation of major system disturbances impacting the New York electric power system. This work continued during 2007 and 2008. The Working Group is comprised of representatives of the New York Transmission Owners, NYISO, NYS PSC, NPCC, and members of the NYSRC Executive Committee. The NPCC's representation includes a member of a NPCC ad hoc working group which is charged with conducting dynamic studies related to the 2003 Blackout, including the upgrading of the NPCC's under frequency load shedding program.

Initiatives Undertaken

During 2007 and 2008, the Working Group closely monitored the NPCC's under frequency load shedding studies since this program forms the base upon which additional defensive strategies can be built. Based on recent NPCC studies, this program will be modified to provide additional steps for load shedding. As part of this work, the Working Group gained awareness of "coherent generation groups" which are a driver in the formation of electrical islands as a result of a major disturbance.

Given that island formation is likely during major disturbances, any defensive strategy must be designed to facilitate an organized response to a loss of synchronism condition, as opposed to breaking up the system in an ad hoc manner. Toward this end, the Working Group has reviewed basic transmission system protection concepts as well as loss of synchronism protection concepts. In addition, the Working Group has started a series of presentations by major transmission protection system vendors in order to understand present state-of-the-art systems and their potential application in New York.

Our Challenges Ahead

During 2009 the Defensive Strategies Working Group will continue to monitor and provide input to NPCC blackout studies. This task involves evaluation of various possible mitigation measures to improve the ability of NPCC member systems to withstand a major system disturbance originating from a wide range of initiating conditions. The Working Group participation will ensure that the interests of the New York electricity grid are reflected in these studies, as well as to develop concepts that may uniquely apply to New York.

A future challenge will be to develop defensive strategies that augment the NPCC under frequency load shedding program. The goal is to make the New York power system more robust with regard to disturbances that could arise due to a variety of causes, including: (1) future tightening of the Eastern Interconnection coupled with shrinking system inertia; (2) "beyond criteria events" (including terrorist attacks) within New York; (3) "beyond criteria events" beyond New York, but within the NPCC, and (4) events in neighboring regions, particularly if these systems are allowed to operate to lower reliability requirements because of weaker NERC reliability standards. The major challenge is to enhance reliability of the New York bulk electricity grid considering all of these factors.

Advancing Reliability into the Future

In addition to the emphasis placed on setting Reliability Rules and monitoring compliance, the NYSRC is acutely aware of the need to identify, well in advance, trends in the energy business that may signal the need for Rule modifications or new Rules. These signals are particularly significant because they may afford the lead-time necessary to plan and affect transmission transfers and generator capacity installations/locations in advance of need. Also, an effective early warning regime can assist State policy makers by avoiding "unintended consequences" in decisions that subtly impact the reliability of New York State's electric system. Therefore, the NYSRC embraces a wide range of pro-active actions designed to protect the integrity of the New York electric system as described in previous sections.

We are confident that a diligent awareness of longer term reliability trends – including corrective actions as necessary – will lessen the risk of major electrical system disturbances. However, no single entity can fully protect electricity system reliability. State and Federal governments, the NYISO, and market participants must constantly be alert to the impact on reliability of governmental actions, market rules and market participant actions. Open electric markets, cleaner air, and more renewable resources are laudable goals. However, each presents a challenge to retaining the required level of electricity grid reliability. We hope that the actions we take will produce valuable information and provide an important perspective from the viewpoint of reliability; specifically (1) broadening the transparency and understanding of reliability issues, (2) working collaboratively with the other entities towards solutions that recognize state policy goals and the concerns of market participants, without jeopardizing system reliability, and (3) enhancing awareness of private infrastructure owners and related support industries of the necessity to be attentive to the reliability requirements within which they must operate, and to offer alternative

solutions if and when those requirements are felt to be overly burdensome.

The Obama Administration's priorities include a national cap and trade program that would reduce U.S. greenhouse gas emissions from fossil fuel plants and other sectors of the economy. There are numerous proposals of cap and trade proposals that have been introduced in Congress. We will be assessing any potential risk to reliability as these proposals are more clearly defined.

New York State Reliability Council
Executive Committee Members

Executive Committee (left to right – standing)

Curt J. Dahl ..... *Long Island Power Authority*
Glenn D. Haake ..... *Wholesale Sellers Sector, Alternate Member*
Thomas C. Duffy ..... *Central Hudson Gas & Electric Corporation*
A. Ralph Rufrano ..... *New York Power Authority*
Mayer Sasson ..... *Consolidated Edison Company of NY*
George E. Smith ..... *Unaffiliated Member*
Joseph C. Fleury ..... *New York State Electric & Gas Corporation/ Rochester Gas & Electric Corporation*
Joseph J. Hipius ..... *National Grid, USA*

(left to right – seated)

George C. Loehr ..... *NYSRC Chairman, Unaffiliated Member*
Bruce B. Ellsworth ..... *Unaffiliated Member*
William H. Clagett ..... *Unaffiliated Member*
Richard J. Bolbrock ..... *Municipals & Electric Co-Op Sector*

(not shown)

Michael B. Mager ..... *NYSRC Vice Chairman, Industrial and Large Commercial Consumers Sector*
Timothy R. Bush ..... *Wholesale Sellers Sector*

The paper used in this report is FSC Certified (the mark of responsible forestry), Carbon Neutral and Green Seal Certified.

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