

**NYISO 2010 Interim Review  
of  
Resource Adequacy**

**Covering the New York Balancing Authority**

**For the period 2011 to 2014**

**Approved by the NPCC  
Reliability Coordinating Committee**

**November 30, 2010**

## EXECUTIVE SUMMARY

This report is the New York Independent System Operator's (NYISO) 2010 Annual Interim Assessment of its 2009 Comprehensive Review of Resource Adequacy which covered the time period of 2010 through 2014. This assessment is conducted to comply with the Reliability Assessment Program established by the Northeast Power Coordinating Council (NPCC). This assessment follows the resource adequacy guidelines as outlined in NPCC's Regional Reliability Reference Directory #1, Appendix D<sup>1</sup> and relies on the 2010 Reliability Needs Assessment<sup>2</sup> (RNA) report as the basis for the underlying data and analysis.

The New York Balancing Authority has an 18% Installed Reserve Margin requirement for the 2010-2011 Capability Year and locational Installed Capacity Requirements of 80% and 104.5% for New York City and Long Island respectively.

The 2010 RNA identified no Reliability Need, assuming all modeled transmission and generation facilities remain in service over the time period covered by this review from 2011 through 2014 under the Base Case energy forecast. There are three primary drivers for this conclusion:

1. Two new proposed generating plants totaling 1063 MW located in Zone J were included in this review, but were not included in the 2009 Comprehensive Review.
2. A lower energy forecast resulting from the continuing effect of the 2009 recession to reduce the peak energy demand forecast and larger cumulative energy reductions resulting from the statewide energy efficiency programs.
3. An increase in Special Case Resource (SCR) registration of 167 MW over the Comprehensive Review.

Therefore, results of this Interim Assessment show that the New York Balancing Authority (NYBA) will comply with the NPCC resource adequacy reliability criterion of not more than one unplanned disconnection of firm load in ten years or 0.1 days/year on average under the Base Case energy forecast.

The NYISO also conducted scenario analyses in order to test the robustness of the needs assessment studies and to bound the conditions under which resource adequacy or transmission security needs may arise. In some scenarios, violations of Reliability Criteria were identified; however, a scenario will not identify or propose additional Reliability Needs. Scenarios are variations on key assumptions in the RNA Base Case to assess the impact of possible changes in circumstances that could impact the RNA.

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<sup>1</sup> <http://www.npcc.org/documents/regStandards/Directories.aspx>

<sup>2</sup> The 2010 RNA was released by the NYISO Board of Directors and published September 22, 2010.

The Zonal Capacity at Risk Scenario looked only at potential LOLE violations to determine how much capacity could be removed from downstate Zones J and K, lower-Hudson Zones G-H-I, and upstate Zones A through F while maintaining the LOLE requirement. The results generally showed that it may be possible to remove approximately 1,000 MW from Zone J, or from Zone K, or from the combined Zones of G-H-I, without an LOLE violation for 2020, but not from all these Zones. For Zones A-F, the removal of capacity and its impact on the reliability of the transmission system and the transmission system's transfer capability are highly location dependent. The study did not attempt to assess a comprehensive set of potential scenarios that might arise from specific unit retirements. In all Zones, transmission security analyses would need to be performed to determine the precise reliability impact and to test the impact of removing any specific generator to the transmission system operations. This can be particularly important around congested interfaces.

The NYISO also performed an evaluation of the potential impacts of major environmental program initiatives on New York generators. This was done by placing each of those generators into categories of impact and presenting the results by groups of zones. A comparison of those affected capacities against the numbers resulting from the Zonal Capacity at Risk results showed that, except for the NOx RACT program taken alone, the cumulative effect of the air program initiatives could result in retirements that exceed the amount of capacity that can be lost as reflected in the Zonal Capacity at Risk limits, and thus, may result in resource adequacy violations. Similar impacts could result from the BTA Policy taken alone.

# 1. Introduction

This is the first update of NYISO's 2009 Comprehensive Review of Resource Adequacy which was approved by NPCC in March 2010. Since the approval of the 2009 Comprehensive Review, NYISO has conducted the 2010 RNA as part of the NYISO's Comprehensive System Planning Process (CSPP)<sup>3</sup>. The major assumptions of this interim review are consistent with the 2010 RNA<sup>4</sup>.

## 2. Assumption Changes

### 2.1 Resources

For this review, resource assumptions are based upon the 2010 summer capability ratings of generation resources in the New York Balancing Authority as reported in the 2010 Load and Capacity Data<sup>5</sup> Report. Capacity values in Table 2-1 include resources electrically internal to the New York Balancing Authority, additions, re-ratings, retirements, purchases, sales, UDRs with firm capacity, and SCRs. The table includes two resources that are expected to come on line in Zone J in 2011, totaling 1,063 MW, which were not included in the 2009 Comprehensive Review.

Year	2009 Comprehensive Review	2010 Interim Review	Delta
2010	41,741		
2011	42,580	42,698	118
2012	42,580	42,898	318
2013	42,586	43,589	1003
2014	42,586	43,590	954

Table 2-1: Resource Assumptions Comparison (Summer Ratings)

### 2.2 Load

The peak demand forecasts for this interim review and the 2009 Comprehensive Review are compared in Table 2-2 below. Two factors contribute to the reduction in peak demand. First, the 2009 recession resulted in a 1,400 MW reduction in peak demand for 2011 before any energy efficiency adjustments. Second, the 2010 Base Case forecast reflects a larger energy efficiency reduction than incorporated into the 2009 Base Case forecast. The 2010 Interim Review Base Case Energy Forecast for 2014 is based on an assumption that approximately 31% of the statewide energy efficiency programs will be achieved.

<sup>3</sup> [http://www.nyiso.com/public/webdocs/documents/tariffs/oatt/oatt\\_attachments/att\\_y.pdf](http://www.nyiso.com/public/webdocs/documents/tariffs/oatt/oatt_attachments/att_y.pdf)

<sup>4</sup> [http://www.nyiso.com/public/markets\\_operations/committees/meeting\\_materials/index.jsp?com=mc](http://www.nyiso.com/public/markets_operations/committees/meeting_materials/index.jsp?com=mc)

<sup>5</sup>

[http://www.nyiso.com/public/webdocs/services/planning/planning\\_data\\_reference\\_documents/2010\\_GoldBook\\_Public\\_Final\\_033110.pdf](http://www.nyiso.com/public/webdocs/services/planning/planning_data_reference_documents/2010_GoldBook_Public_Final_033110.pdf)

Comparison of Energy Forecasts (MW)						
	Base Case Energy Forecast			High Growth Energy Forecast		
Year	2009 Comprehensive Review	2010 Interim Review	Delta	2009 Comprehensive Review	2010 Interim Review	Delta
2010	33,441			35,227		
2011	33,693	33,160	-533	35,502	34,932	-570
2012	33,906	33,367	-539	35,737	35,159	-578
2013	34,080	33,737	-343	35,931	35,559	-372
2014	34,309	33,897	-412	36,183	35,738	-445

Table 2-1: Base Load Energy Forecast with 31% of Statewide Energy Efficiency Goal (2014)

## 2.3 Transfer Limits

The 2010 Base Case Peak Load forecast, which includes reductions for energy efficiency programs, was utilized in the analysis to determine transmission system transfer limits. The transfer limits are derived from transfer cases that reflect critical system conditions. Limits on Dysinger East and West Central increased due to local transmission system upgrades and the addition of a static VAR Compensator (SVR) in Zone B. Changes to the 345 kV transmission system and base case conditions in ISO-NE contributed to the increase in the UPNY-SENY transfer limit by impacting the distribution of base flow on the UPNY-SENY circuits. Table 2-3 summarizes the emergency thermal transfer limits for key interfaces in the NYBA.

Interface	2009 Comprehensive Review				2010 Interim Review			
	2011	2012	2013	2014	2011	2012	2013	2014
Central East less PV-20 plus Fraser-Gilboa	3075	3075	3075	3075	3250	3525	3475	3475
Dysinger East	3050	2925	3075	3075	2725	3125	3200	3175
F to G	3475	3475	3450	3450	3500	3475	3475	3475
I to J	4400	4400	4400	4400	4350	4350	4350	4350
I to K	1290	1290	1290	1290	1290	1290	1290	1290
UPNY-SENY less Ramapo 500 kV Tie	5150	5150	5150	5150	5250	5400	5400	5400
West Central	1825	1800	1800	1825	1475	1875	1850	1900

Table 2-1: Emergency Thermal Transfer Limits for Key Interfaces

## 2.4 Unit Availability

Table 2-4 compares the 5-year weighted EFORd values for generation units in the New York Balancing Authority that NYISO used in this Interim Review to the EFORd values used in the 2009 Comprehensive Review. The EFORd for thermal units and large hydro units is calculated from NERC GADS data submitted by the generators. Run of River Hydro units and wind units are given a 45%

and 90% summer capacity derate factor, respectively, for modeling purposes. A performance factor for SCRs is determined based upon their actual load reduction in either required system tests of their capability to reduce load or actual Demand Response activation calls. Overall, the EFORD values increased slightly from the 2009 Comprehensive Review.

Unit Type	2009 Comprehensive Review	2010 Interim Review
Coal	6.0	6.3
Oil	6.5	9.2
Gas	11.7	9.4
Nuclear	1.6	1.7
Combustion Turbines	8.6	12.2
Jet Engine	7.3	10.1
Combined Cycle	5.8	5.5
All Thermal Units (5-Year EFORD)	---	6.9
All units including Hydro, Wind, and SCRs		11.4

**Table 2-1: 5-Year Weighted EFORD values (%)**

## 2.5 Fuel Diversity

The NYISO benefits from a diverse fuel supply. Future resources are projected to be fueled primarily by renewable resources (e.g. wind and solar) and natural gas. Natural gas units in critical areas, such as New York City, are required to have a back-up fuel supply, primarily distillate oil. These units must also comply with the New York State Reliability Council’s rule IR-3 that states “The NYS Bulk Power System shall be operated so that the loss of a single gas facility does not result in the loss of electric load within the New York City and Long Island zones.” This rule requires certain generating units to burn oil in lieu of natural gas as “Minimum Oil Burn Service” in certain situations. Additionally, since the NYBA is a summer peaking Area with adequate gas supply during the summer months, the NYISO does not anticipate fuel shortages or potential interruptions as problematic over this study period. For the winter capability periods, the NYISO has a gas-electric coordination protocol to prevent loss of electric system capacity due to a wintertime loss of gas event.<sup>6</sup>

## 2.6 Environment Initiatives

The 2010 RNA Environmental Scenario was conducted to identify the population of generation resources that are likely to require major capital reinvestment decisions to comply with several evolving environmental program initiatives. The premise of this analysis is that the risk of unplanned retirements is directly related to the cumulative capital investment required.

<sup>6</sup> See New York State Gas-Electric Coordination Protocol, NYISO Open Access Transmission Tariff, Attachment BB; [http://www.nyiso.com/public/webdocs/documents/tariffs/oatt/oatt\\_attachments/att\\_bb.pdf](http://www.nyiso.com/public/webdocs/documents/tariffs/oatt/oatt_attachments/att_bb.pdf).

The State's Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency annually publish their respective regulatory agendas which describes the new environmental initiatives that it will focus on during the coming year. Four new regulatory programs were selected for this analysis: Reasonably Available Control Technology for Oxides of Nitrogen (NOx RACT), Best Available Retrofit Technology (BART), Maximum Achievable Control Technology (MACT), and Best Technology Available (BTA). These programs were selected for evaluation because they are generally widespread in effect, are sufficiently defined with proposed compliance requirements, and are expected to require compliance actions in the earlier portion of the planning period. Further, the individual or combined impact of these programs is likely to require substantial additional capital investment and therefore could lead to unplanned retirements. The NOx RACT, BART, and MACT are programs designed to lower air emissions from fossil fueled power plants. The BTA program is designed to minimize the impact of power plant cooling water systems on aquatic life.

Each of the four programs was examined to determine the category of capital cost potentially required of affected units to comply with each program. Three category levels were used to qualify the expected impacts of each program on the existing generation fleet. Category 1 applies for affected generators that are already in compliance with the proposed requirements, or that could be expected to achieve compliance with changes in operating procedures and/or through the use of fuel switching. Thus the capital cost to achieve compliance for Category 1 generators is relatively small. Category 2 applies where generators' required capital expenditures are of a magnitude that is consistent with other capital expenditures that are necessary to maintain a generator over the planning horizon, *e.g.*, a five year major overhaul of the steam turbine or less than \$25/kW. Category 3 applies where the capital expenditures required to comply with the new regulation are above the average level of routinely expected capital expenditures.

While the total population of affected units is represented by the summation of the three impact categories, in each of these categories the primary concern is with the capital investment decisions represented by Categories 2 and 3. The level of impact for each unit is summed across the four programs for Categories 2 and 3. Units with the highest cumulative total impact are considered to be potentially at risk for premature retirement. The results were reported by super zones and compared to the RNA's Zones at Risk scenario analysis.

The programs are estimated to affect a total of 23,957 MW of capacity in the NYBA, or 64% of the installed generating capacity NYISO currently relies on to meet the electricity needs of New York consumers.

For Zones F-K, the environmental initiatives studied are likely to result in LOLE violations if plant retirements occur as delineated in the summations for Categories 2 & 3. Super Zone A-F will require more focused zonal and specific transmission security analyses.

Subsequent to the completion of this analysis in the 2010 RNA, the USEPA released the proposed Clean Air Transport Rule (CATR) which is intended to replace the Clean Air Interstate Rule (CAIR) that

had been vacated by the Courts. The new proposal consists of three possible rules of which one variant will ultimately be selected. When compared to the CAIR rule, one proposed version eliminates allowance trading, a second version essentially eliminates interstate allowance trading, and a third version allows for interstate trading with significant restrictions. The proposal allocates an emission budget to New York that is significantly reduced compared to the CAIR budget. The first stage of reductions is required in 2012 with a greater reduction required in 2014. Additional reductions of NOx will be required once the NAAQS for ozone is finalized.

### 3. Results

Table 3-1 summarizes the Loss of Load Expectation (LOLE) results comparing the 2009 Comprehensive Review results with the 2010 Interim Review for the Base Case and High Growth Forecast Case results.

Year	Base Case Forecast		High Growth Forecast	
	2009 Comprehensive Review	2010 Interim Review	2009 Comprehensive Review	2010 Interim Review
2010	<0.01		0.05	
2011	<0.01	<0.01	0.03	0.02
2012	<0.01	<0.01	0.04	0.01
2013	<0.01	<0.01	0.06	0.03
2014	<0.01	<0.01	0.09	0.05

**Table 3-1: LOLE Results**

### 4. Conclusion

This Interim Review finds that the New York Balancing Authority will comply with the NPCC resource adequacy criterion under both the Base Case energy forecast and the high growth energy forecast. The NYISO will continue to monitor and evaluate progress on pending environmental initiatives and their impact on capacity retirements. Should the NYISO determine that conditions have changed during or outside of the normal planning cycle, it will determine whether market-based solutions that are currently progressing are sufficient to meet the resource adequacy and system security needs of the New York power grid. If not, the NYISO will address any newly identified Reliability Need in the subsequent RNA or, if necessary, issue a request for an interim, or “Gap” solution, to maintain bulk power system reliability.