



## NPCC 2010 New England Annual Interim Review of Resource Adequacy

ISO New England Inc.  
Approved by the NPCC  
Reliability Coordinating Committee  
November 30, 2010

## 1. Executive Summary

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This report is ISO New England's (ISO-NE) 2010 Annual Interim Assessment of its 2008 Comprehensive Review of Resource Adequacy covering the time period of 2009 through 2013. This assessment is conducted to comply with the Reliability Assessment Program (RAP) as established by the Northeast Power Coordinating Council (NPCC). This assessment follows the resource adequacy review guidelines as outlined in the *NPCC Regional Reliability Directory #1 Appendix D (Adopted: December 1, 2009)*.

Results of this interim resource adequacy assessment show that New England will comply with the NPCC resource adequacy reliability criterion under both the reference and the high demand forecasts. Tables E1 and E2 summarize the Loss of Load Expectation for the study years for the demand forecast scenarios simulated.

**Table E1 Reference Demand Forecast**

Year	2008 Comprehensive Review (Days/Year)	2010 Interim Review (Days/Year)
2011	0.032	0.028
2012	0.045	0.000
2013	0.060	0.008

**Table E2 High Demand Forecast**

Year	2008 Comprehensive Review (Days/Year)	2010 Interim Review (Days/Year)
2011	0.049	0.028
2012	0.080	0.001
2013	0.123	0.010

On June 16, 2006, the Federal Energy Regulatory Commission (FERC) approved a Settlement Agreement<sup>1</sup> (SA) creating a newly designed Forward Capacity Market<sup>2</sup> (FCM) in New England. The FCM establishes competitive auctions for capacity resources, both supply and demand-side, which are held approximately three years ahead of their anticipated need. Annual reconfiguration auctions are conducted every year after the primary auction. To enter into a Forward Capacity Auction (FCA), all capacity resources must comply with the qualification and financial-assurance requirements of the FCM. Existing capacity resources are required to participate in the FCA and are automatically entered into the capacity auction. However, these resources may indicate a desire to be removed from the FCA by submitting a delist bid before the existing-capacity qualification deadline. Since the obligation to participate in the New England energy market is assigned only to resources with a capacity supply obligation, delisted resources are not obligated to supply energy, although they are allowed to voluntarily supply electric energy at market prices. Reconfiguration auctions also may procure any quantities not purchased in the FCA as a result of delisting at specific price thresholds. These auctions allow adjustments that reflect changes in the Installed Capacity Requirement (ICR) for

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<sup>1</sup> [http://www.iso-ne.com/regulatory/ferc/filings/2006/mar/er03-563-000\\_030\\_055\\_3-7-06\\_corrected.pdf](http://www.iso-ne.com/regulatory/ferc/filings/2006/mar/er03-563-000_030_055_3-7-06_corrected.pdf)

<sup>2</sup> For a copy of the market rules, please reference: [http://www.iso-ne.com/regulatory/tariff/sect\\_3/v6\\_eff-1-9-08\\_mr1\\_sect\\_13\\_and\\_14.pdf](http://www.iso-ne.com/regulatory/tariff/sect_3/v6_eff-1-9-08_mr1_sect_13_and_14.pdf)

the region along the time, and they facilitate the trading of individual commitments made in the previous FCA. Unless an existing capacity resource follows specific criteria to become delisted each year, it will be assigned a one-year capacity supply obligation. New capacity that bids in the FCA can choose a capacity commitment period obligation between one and five years. The FCM requires all new and existing capacity resources that obtain a capacity supply obligation (i.e., that clear the auction) to perform during shortage events, which occur when the region is not able to meet its load and operating-reserve requirements. Purchased resources that fail to perform during a shortage event receive a significant reduction to their capacity payment, a measure intended to improve the alignment between resource needs and available capacity.

The first FCA took place in February 2008, procuring the capacity needed for the 2010/2011 capacity commitment period. The second FCA occurred in December 2008, procuring the capacity needed for the 2011/2012 capacity commitment period. The third FCA occurred in October 2009, procuring capacity for the 2012/2013 capacity commitment period. The fourth FCA occurred in August 2010, procuring capacity for the 2013/2014 capacity commitment period. In all these FCAs, adequate resources are procured to meet the regional ICRs. The operational use of FCM resources began on June 1, 2010.

## 2. Introduction

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This is the second update of the New England's 2008 Comprehensive Review of Resource Adequacy, which was approved by NPCC in November 2008. Since the approval of the 2008 Comprehensive Review, ISO New England has conducted additional comprehensive resource adequacy assessments as part of its Regional System Planning (RSP) process. The major assumptions of this interim review are consistent with those used for the most recent RSP, RSP 2010<sup>3</sup>.

## 3. Assumptions Changes

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### 3.1 Resource

Table 1 compares resource assumptions between the two reviews. In the 2008 Comprehensive Review, the resource assumptions for the years from 2011 to 2013 were based on the existing resources that had been qualified to participate in the 2011 FCA, as the capacity auctions for these periods had not yet been conducted at the time of the assessment.

Since then, capacity auctions have been held for these years, and for this review, only the resources that cleared the capacity auctions with a Capacity Supply Obligation (CSO) are included. All the resource assumptions are consistent with New England's *2010–2019 Forecast Report of Capacity, Energy, Loads, and Transmission* (2010 CELT Report)<sup>4</sup>, which reflects the latest Forward Capacity Auction outcomes at the time it was published. For 2011, resources participated in the FCA were more than the amount required to meet the regional ICR, and relying on only the resources with a CSO in this review attributes to the difference in resource assumptions. For 2012, additional new supply-side and demand-side resources participated and cleared the FCA for 2012 to assume capacity supply obligation. At the time this assessment was conducted, the auction outcomes for the 2013/2014 capacity commitment period were not finalized. Therefore, resources with capacity supply

<sup>3</sup> [http://www.iso-ne.com/committees/comm\\_wkgrps/prtcpts\\_comm/pac/mtrls/2010/sep162010/index.html](http://www.iso-ne.com/committees/comm_wkgrps/prtcpts_comm/pac/mtrls/2010/sep162010/index.html)

<sup>4</sup> *2010–2019 Forecast Report of Capacity, Energy, Loads, and Transmission*; <http://www.iso-ne.com/trans/celt/report/index.html>

obligation for 2012 were used for year 2013 in this review, but excluding the external capacity imports without long-term contract.

**Table 1 - Resources<sup>5</sup> Assumptions Comparison (Summer Ratings)**

Year	2008 Comprehensive Review (MW)	2010 Interim Review (MW)	Difference (MW)
2011	34,756	33,015	-1,741
2012	34,756	37,026	2,270
2013	34,756	35,440	684

### 3.2 Load

Tables 2 and 3 compare the New England peak demand forecasts for this interim review and the 2008 review. The differences are a result of the updated peak demand and energy forecast, which reflects impacts from both the regional economy and weather. Both reference and high demand forecasts in 2010 are lower than those used for the 2008 review. The New England and national economic recession that started in mid-2008 dominates the changes in the annual and seasonal peak demand forecasts. The new load forecasts are based on economic forecasts from November 2009 that projected the low point of the recession occurring in late 2009 and the economy starting to recover in 2010.

The high demand forecast is based on a high economic forecast which drives the energy forecast and the energy forecast drives the peak forecast. The high energy forecast as a percentage of the reference forecast is about the same for this review and last review. But the peak to energy response changed: 1) the peak forecast is now less sensitive to changes in energy; and 2) high peak as a percentage of the reference forecast was not as big as last review. This results in the differences in the high forecast being larger than the differences in the reference forecast.

**Table 2 - Reference Peak Load Forecast Comparison**

Year	2008 Comprehensive Review (MW)	2010 Interim Review (MW)	Difference (MW)
2011	29,405	27,660	-1,745
2012	29,820	28,165	-1,655
2013	30,190	28,570	-1,620

**Table 3 - High Load Forecast Comparison**

Year	2008 Comprehensive Review (MW)	2010 Interim Review (MW)	Difference (MW)
2011	29,925	27,780	-2,265
2012	30,565	28,360	-2,400
2013	31,155	28,850	-2,585

<sup>5</sup> Resources include internal generating units, demand-side resources and capacity imports.

### 3.3 Interface Limits

The sub-area representation and transmission interface limits for this interim review are consistent with those identified within New England’s RSP10. Table 4 shows the transmission transfer limits used within both reviews, with respect to the major transmission interfaces. The differences in the limits are the result of topology changes within the in-service dates of recent transmission upgrades as well as system configurations.

**Table 4 - Major Transmission Interface Limits Assumed in the 2008 & 2010 Reviews (MW)**

<u>Interface</u>	<u>Limit assumed in 2008 Comprehensive Review (MW)</u>	<u>Limit assumed in 2010 Interim Review (MW)</u>
New Brunswick to New England	1,000	1,000
Orrington South	1,200	1,200
Surowiec South	1,150	1,150
Maine – NH	1,575 (2011) 1,550 (2012) 1,525 (2013)	1,600 (2011 – 2013)
North to South	2,700	2,700
Boston Import	4,900	4,900
SEMA Export	No Limit	No Limit
SEMA / RI Export	3,000	3,000
East to West	2,800	2,800
Connecticut Import	2,500 3,600 (2013)	2,500 3,600 (2014)
Southwestern CT Import	3,650	3,200
Norwalk / Stamford Import	1,650	1,650
New York/New England (Summer/Winter)	1,400/1,700	1,400/1,875
HQII Import	1,400	1,400
Highgate Import	200	200
Cross Sound Cable	346	346

### 3.4 Unit Availability

Table 5 compares the average EFORd (weighted by unit size) assumptions used in this interim review and the 2008 Comprehensive Review. Overall, the 2010 system weighted average EFORd has slightly improved as compared to the 2008 value.

**Table 5 - Change In Unit EFORd Assumptions – Weighted Averages**

<b>Unit Type</b>	<b>2008 Comprehensive Review EFORd (%)</b>	<b>2010 Interim Review EFORd (%)</b>
<b>Fossil</b>	7.56	7.2
<b>Combined Cycle</b>	5.17	4.6
<b>Diesel</b>	6.51	5.7
<b>Jet</b>	6.55	6.7
<b>Nuclear</b>	1.56	1.4
<b>Hydro</b>	1.65	1.9
<b>System</b>	<b>5.11</b>	<b>4.9</b>

### 3.5 Fuel Supply Diversity

New England's power generation sector has had ongoing issues associated with the significant lack of fuel diversity, but actions over the past few years have improved the reliability of the fuel supply and associated generator performance. Although the region remains heavily dependent on natural gas as its primary fuel for power generation, recent natural gas infrastructure projects should satisfy the needs of New England's gas and power markets for years to come. These improvements include the diversification of natural gas supply sources that include new fields and expanded natural gas pipelines, storage, and liquefied natural gas (LNG) import facilities. The improvements in the regional natural gas system, combined with the addition of both demand-side and renewable resources, are expected to mitigate historical reliability concerns over the lack of fuel diversity within New England.

### 3.6 Impacts of Environmental Emission Regulations

There are many EPA proposals for stricter environmental regulations. They include tighter National Ambient Air Quality Standards for sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone and small particulate material (PM<sub>2.5</sub>). These will go into effect over the next several years and likely make continued environmental compliance more difficult for some generators. To deal with ozone transport from the south and west to the Northeast, a proposed Transport Rule (TR) will take effect in 2012 replacing the Clean Air Interstate Rule currently in effect, and which affects Connecticut and Massachusetts plus 26 other states. The TR will cover 31 states and impose lower SO<sub>2</sub> and NO<sub>x</sub> allowance budgets for the larger fossil units, i.e. greater than 25 MW than currently exists under CAIR. The TR will also restrict allowance trading more than under CAIR. In addition proposed regulations affecting toxic emissions will likely require lower emissions of mercury.

The Regional Greenhouse Gas Initiative (RGGI), a regional CO<sub>2</sub> cap has been in effect in New England as well as in New York, New Jersey, Maryland, and Delaware since 2009. The preliminary EPA data show 2009 RGGI generator emissions were about two-thirds of the RGGI cap of 188 million tons of CO<sub>2</sub> indicating a large margin of compliance. The RGGI program is currently being reevaluated.

In April 2009, a U.S. Supreme Court decision clarified the criteria for Best Available Control Technology (BACT) for reducing the impacts on aquatic organisms from the cooling water intakes of large fossil-steam, and nuclear generating plants. The decision allows the use of a benefit/cost ratio in evaluating the environmental impacts, but EPA has not indicated how it will apply this interpretation in renewing water permits of existing generators. This criterion has the potential to require retrofitting cooling towers on existing plants with once-through cooling systems. If required, this could have a significant impact on system reliability depending on the timing of such requirements and the number plants affected. NERC is completing a study to determine how this regulation and others discussed above may affect reliability in the NERC reliability regions in the U.S.

The combined Renewable Portfolio Standards (RPS) and related Energy-Efficiency (EE) targets will increase to approximately 25.5% of New England's total projected energy use by 2017, and increase to 30.4% by 2020. State goals for new energy-efficiency programs make up about 11.0% of the 30.4%; the remainder is attributable to Renewable Portfolio Standards and related policies. The ISO recognizes the uncertainty of success for the renewable generation projects within the current interconnection queue. Based on assumptions, these projects alone would likely meet the incremental growth in the RPS classes for new renewables sometime between 2013 and 2015. Also helping to

meet the RPS will be new projects being planned and not yet in interconnection queue, small renewable projects behind the meter, or the purchase of Renewable Energy Credits/Certificates (REC)s from projects in neighboring regions could meet any market shortfalls. Alternatively, affected Load Serving Entities (LSE) can make Alternative Compliance Payments to the states’ “Clean Energy Funds,” which would then help finance new, regional renewable energy projects.

### 3.7 Others

The interconnection benefits from neighboring Areas are considered in the LOLE assessments in both reviews. Since the 2008 Comprehensive Review, ISO-NE has conducted additional tie benefit studies to investigate the amount of tie reliability assistance New England can rely on from its neighbors for resource adequacy studies. Table 6 summarizes the tie benefit assumptions for these two reviews.

**Table 6 – Assumed Tie Benefits from Neighboring Areas (MW)**

Year	2008 Comprehensive Review	2010 Interim Review
2011	1,800	1,800 <sup>6</sup>
2012	1,800	1,665 <sup>7</sup>
2013	1,800	1,700 <sup>8</sup>

Other assumptions for these two reviews are consistent with each other, or the impacts on the reliability results are negligible.

## 4. RESULTS

Tables 7 and 8 summarize the New England system Loss of Load Expectation (LOLE) results for the scenarios investigated within this interim review and those from the 2008 Comprehensive Review. The differences in the results of the two reliability reviews can be attributed to the differences in assumptions used for each review as previously outlined.

**Table 7 – LOLE Under Reference Demand Forecast**

Year	2008 Comprehensive Review (Days/Year)	2010 Interim Review (Days/Year)
2011	0.032	0.028
2012	0.045	0.000
2013	0.060	0.008

<sup>6</sup> [http://www.iso-ne.com/genrtion\\_resrcs/reports/nepool\\_oc\\_review/2008/icr\\_2011-2012\\_report\\_final\\_12-01-08.pdf](http://www.iso-ne.com/genrtion_resrcs/reports/nepool_oc_review/2008/icr_2011-2012_report_final_12-01-08.pdf)

<sup>7</sup> [http://www.iso-ne.com/genrtion\\_resrcs/reports/nepool\\_oc\\_review/2009/icr\\_2012-2013\\_report\\_final\\_09-29-09.pdf](http://www.iso-ne.com/genrtion_resrcs/reports/nepool_oc_review/2009/icr_2012-2013_report_final_09-29-09.pdf)

<sup>8</sup> [http://www.iso-ne.com/genrtion\\_resrcs/reports/nepool\\_oc\\_review/2010/icr\\_2013-2014\\_may\\_2010.pdf](http://www.iso-ne.com/genrtion_resrcs/reports/nepool_oc_review/2010/icr_2013-2014_may_2010.pdf)

**Table 8 – LOLE Under High Demand Forecast**

<b>Year</b>	<b>2008 Comprehensive Review (Days/Year)</b>	<b>2010 Interim Review (Days/Year)</b>
<b>2011</b>	0.049	0.028
<b>2012</b>	0.080	0.001
<b>2013</b>	0.123	0.010

The LOLE results indicate that capacity resources that have been procured in the forward capacity auctions are adequate to satisfy reliability requirements.

## **5. Conclusion**

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Results of this interim review show that New England will comply with the NPCC resource adequacy reliability criterion under both the reference and the high demand forecasts.