Approved by the RCC
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NPCC 2007 New England Interim Review of Resource Adequacy

ISO New England Inc.
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1.0 EXECUTIVE SUMMARY

This is ISO New England's 2007 Annual Interim Assessment of its 2005 Area Review of Resource Adequacy covering 2006 through 2010. 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 review guidelines as outlined in the NPCC B-8 Document "Guidelines for Area Review of Resource Adequacy."

Results of this interim assessment show that New England will be able to comply with the NPCC resource adequacy reliability criterion under both the reference and the high load forecasts.

Table E1 Reference Load Forecast

Year	2005 Triennial Review (Days/Year)	2007 Interim Review (Days/Year)
2008	0.045	0.039
2009	0.098	0.067
2010	0.144	0.100

Table E2 High Load Forecast

Year	2005 Triennial Review (Days/Year)	2007 Interim Review (Days/Year)
2008	0.100	0.046
2009	0.238	0.094
2010	0.397	0.100

On June 16, 2006, FERC approved a Settlement Agreement[1] creating a newly designed Forward Capacity Market[2] (FCM) in New England. The FCM will establish competitive auctions for capacity resources to be held three years ahead of their anticipated need. [The Forward Capacity Auction (FCA), which will be held annually, will be a descending clock auction. There are also annual reconfiguration auctions two years, one year, and just prior to the Commitment Period. All qualified capacity resources[3] (existing, new, and imports) may offer or bid into the auction. One hundred percent of the Installed Capacity

[1] http://www.iso-ne.com/regulatory/ferc/filings/2006/mar/er03-563-000_030_055_3-7-06_corrected.pdf

[2] 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

[3] In accordance to ISO New England Forward Capacity Market rules, each resource must qualify as either a New or Existing Capacity Resource (including Generating Capacity, Import Capacity and Demand Resources) in order to participate in the FCA. In the qualification process, the ISO will determine a summer Qualified Capacity for each existing resource. For each New Resource, the ISO will evaluate the Qualification Package submitted by the project sponsor to determine if the New Resource is accepted for participating in the auction, taking into consideration its interconnection impact on the system, and whether the milestones in the Critical Path Schedule are reasonable and likely to be met.

Requirement (ICR) will be procured by ISO New England. Capacity cleared in an FCA will be entitled to receive capacity payment. The first auction was held in early February 2008 for a commitment period from June 1, 2010 to May 31, 2011. During the transition period from December 1, 2006 to May 31, 2010, the UCAP products will be retained, and all listed ICAP resources will receive a monthly capacity payment based on a fixed payment rate that is adjusted annually.

Such a capacity market setup aims to provide incentives to attract adequate capacity supply in New England to maintain reliability. The capacity payment during the FCM transition period has resulted in approximately 450 MW of new generating resources installed to the system since the last review. As of September 2007, the demand resources have also increased to about 1,100 MW from the 300 MW assumed in 2005. An additional 140 MW of generation is currently under construction, and is expected to be in-service by the summer of 2008. The amount of demand resources is expected to continue to increase.

The ISO has determined that 32,305 MW of resources are needed for 2010 under the reference load forecast in order to meet the once in 10 years resource adequacy criterion, and will procure at least that amount of resources in the FCA. A total of 38,405 MW resources have been qualified to participate in the auction, which is well above the 32,305 MW required. Should the high load forecast materialize, the ISO will recalculate the ICR values, and procure additional resources through the subsequent yearly reconfiguration auctions to meet the 0.1 days per year LOLE resource adequacy criterion.

2.0 INTRODUCTION

This is the second update of the New England's 2005 Triennial Review of Resource Adequacy, which was approved in November 2005. Since the approval of the 2005 Triennial Review, ISO New England has conducted comprehensive resource adequacy assessments as part of the Regional System Plans (RSP). The major assumptions of this interim review are consistent with those used for the RSP.

3.0 ASSUMPTION CHANGES

3.1. RESOURCE

The 2005 Triennial Review assumed a total installed capacity of 31,393 MW, and demand response resources of 300 MW for 2008 and 45 MW for 2009 and 2010. In this review, for the FCM transition period from 2008 to 2009, a total of 31,176 MW of generating resources and 1,127 MW of demand resources have been assumed, which reflects the following major supply resource changes since then:

- Approximately 450 MW of new generating resources have been installed in the system, which includes nuclear unit uprates.
- Approximately 827 MW of demand resources have been added as of September 2007.
- About 140 MW of new generation resources currently under construction are expected to be in-service by the summer of 2008.
- New Boston unit 1 (350 MW) has retired.
- The 345 MW LIPA capacity sale has been added

For the year 2010, this review assumes a total of 38,405 MW supply resources that have been qualified to participate and be procured in the first FCA, consisting of:

- 32,875 MW of qualified existing resources
- 5,630 MW of qualified new resources
    - 1,033 MW from repowering and uprates
    - 1,928 MW from new generating capacity
    - 658 MW from import capacity
    - 2,011 MW from demand resources
- 100 MW of qualified export delist

Note that not all of the 38,405 MW of these qualified resources will be procured in the forward capacity auctions. Only the resources that are cleared in the auctions will be committed and available during the commitment period of 2010. In the 2010 FCA, at least 32,305 MW will be procured to meet the resource adequacy criterion.

Table 1 Resources Assumptions Comparison (Summer Ratings)

Year	2005 Triennial Review (MW[4])	2007 Interim Review (MW[5])	Difference (MW)
2008	31,694	32,303	609
2009	31,438	32,303	865
2010	31,438	32,305 - 38,405	867- 6,967

3.2. LOAD

Tables 2 and 3 compare the New England peak load forecasts for this interim review and the 2005 Triennial Review. The differences are mainly a result of the updated load

[4] Demand resources are included in these values so that they are comparable to the values in the 2007 review.
[5] Unit Ratings are based on the 2007 September Seasonal Claimed Capability Report.

forecast parameters used for the forecast process, which include both the economy and weather.

As shown in Table 2, the reference annual peak loads used in this interim review are about 150 to 500 MW higher than the corresponding values used in the 2005 Triennial Review.

Table 2 Reference Peak Load Forecast Comparison

Year	2005 Triennial Review (MW)	2007 Interim Review (MW)	Difference (MW)
2008	27,750	27,885	135
2009	28,145	28,495	350
2010	28,565	29,035	470

As shown in Table 3, the annual peak loads associated with the High Load Forecast[6] for this interim review are 270 MW to 510 MW lower than those assumed in the 2005 Triennial Review.

Table 3 High Load Forecast Comparison

Year	2005 Triennial Review (MW)	2007 Interim Review (MW)	Difference (MW)
2008	28,570	28,060	-510
2009	29,220	28,885	-335
2010	29,920	29,655	-265

3.3. INTERFACE LIMITS

The sub-area representation and interface limits for this interim review are consistent with New England's RSP07. Table 4 shows the transfer limits used in the 2005 review and this review for the major interfaces. The differences are the result of changes in the in-service date of transmission upgrades as well as system configurations. In the 2005 review, the Cross Sound Cable (CSC), an HVDC interconnection between New England and New York, was not modeled. In this review, this interconnection is modeled with a 330 MW transfer capability. In addition, a 345 MW[7] capacity export is assumed on this interconnection for 2008 and 2009, decreasing to 100 MW in 2010.

[6] The high load forecast represents the expected loads if New England experiences high economic growth.
[7] New England needs to inject 345 MW at our terminal in order to deliver 330 MW at the NY terminal.

Table 4 Major Interface Limits assumed in the 2005 and 2007 Reviews (MW)

Interface	Limit assumed in 2005 Review (MW)	Limit assumed in 2007 Review (MW)
New Brunswick to New England	1,000	1,000
Orrington South	1,200	1,200
Surowiec South	1,250	1,250
Maine – NH	1,500	1,600 (2008) 1,575 (2009)
North to South	2,700	2,700
Boston Import	4,700	4,600 (2008) 4,900 (2009)
SEMA Export	No Limit	No Limit
SEMA / RI Export	3,000	3,000
East to West	2,400	2,400
Connecticut Import	2,300	2,500
Southwestern CT Import	2,575 3,400 (2010)	2,350 3,650 (2010)
Norwalk / Stamford Import	1,300 1,650 (2010)	1,300 1,650 (2010)
New York/New England (Summer/Winter)	1,400/1,700	1,525/1,600
HQII Import	1,500	1,400
Highgate Import	210	200
Cross Sound Cable	Not modeled	330

3.4. Unit Availability

Table 5 below compares the average EFORd (weighted by unit size) assumptions used in this interim review with those used for the 2005 Triennial Review. Overall, the system weighted average EFORd has slightly improved in the 2007 Review as compared to the 2005 Review.

Table 5 Change In Unit EFORd Assumptions – Weighted Averages

Unit Type	2005 Triennial Review EFORd (%)	2007 Interim Review EFORd (%)
Fossil	6.71	7.19
Combined Cycle	6.03	5.74
Diesel	5.56	4.28
Jet	7.09	7.70
Nuclear	1.35	1.56
Hydro	3.80	2.26
System	5.40	5.31

3.5. Fuel Supply Diversity

Results of recent RSPs show that New England will continue to face potential reliability risks associated with the availability of natural gas during winter peak load periods due to coincident demand for natural gas from both the core natural gas and electricity generation sectors during this review horizon. To mitigate the impact of the natural gas shortage, ISO New England has made significant progress in improving system

operations during the winter. ISO New England has promoted the dual-fuel capability of gas-fired generation and has developed an operating procedure (Operating Procedure No. 21, Action During an Energy Emergency) to provide additional commitment and dispatch flexibility to manage and conserve fuel-limited supply-side resources.

In addition, new market incentives, such as those provided by the FCM, are designed to promote the availability of resources when needed the most. These incentives have increased and should continue to increase the number of generators with dual-fuel generating capability or firm fuel supplies.

3.6. Impacts of Environmental Emission Regulations

Federal, regional, and state environmental regulations being implemented over the next 10 years will directly affect the operation and planning of fossil-fueled electric generators throughout the Northeastern United States. These regulations include the Regional Greenhouse Gas Initiative, which affects all six New England states as well as neighboring regions. By specifically encouraging the development of new renewable resources and other low-emitting resources, or the retrofitting of existing resources, these regulations will affect the mix of fuels used to generate electricity. New England's Regional System Plan[8] and the Scenario Analysis[9] show that meeting New England's allocation of RGGI's carbon dioxide cap will be a challenge for the generators affected by RGGI. Stronger conservation and energy-efficiency measures, the addition of low- or zero-emitting baseload generation, or a combination of all these measures will be needed. The cost of buying RGGI allowances and offsets will likely be reflected in the wholesale electricity markets.

RGGI goes into effect on January 1, 2009 for fossil generators 25 MW or larger in a ten-state region that includes all the New England states. This means that these generators will need to include the value of CO2 allowances as a cost adder in their market bids starting next year. Depending on these CO2 allowance costs, the relative dispatch of the generators may be impacted. Since RGGI power plants do not have to show compliance until March 1, 2012 with sufficient allowances in their account to cover their CO2 emissions for the period 2009 to 2012, it seems unlikely that RGGI will have any impact on system reliability in the period 2009-2010.

3.7. New Market Rules

On June 16, 2006, FERC approved a Settlement Agreement creating a newly designed Forward Capacity Market (FCM) that will replace the current monthly Installed Capacity (ICAP) auctions. The FCM will establish competitive auctions for capacity resources to be held three years ahead of their anticipated need. Under the FCM, 100 percent of the Installed Capacity Requirement (ICR) needed to meet the once in 10 years resource adequacy criterion will be procured by the ISO through the FCA. The FCA, which will be held annually, will be a descending clock auction. There are also annual reconfiguration auctions two years, one year, and just prior to the Commitment Period. All qualified capacity resources (existing, new, or imports) may bid into the auction.

[8] http://www.iso-ne.com/trans/rsp/2007/rsp07_final_101907_public_version.pdf
[9] http://www.iso-ne.com/committees/comm_wkgrps/othr/sas/mtrls/elec_report/scenario_analysis_final.pdf

Capacity clearing in an FCA will be entitled to receive capacity payment. The first auction was held in early February 2008 for a commitment period beginning June 1, 2010. A total of 38,405 MW of resources were qualified to participate in the first FCA, which is well above the 32,305 MW of ICR that will be procured to meet the once in 10 years resource adequacy criterion.

During the transition period from December 1, 2006 to May 31, 2010, the current UCAP products will be retained, and all listed ICAP resources will receive a monthly capacity payment based on a fixed payment rate that is adjusted annually:

December 1, 2006 to May 31, 2007	$3.05/kW-month
June 1, 2007 to May 31, 2008	$3.05/kW-month
June 1, 2008 to May 31, 2009	$3.75/kW-month
June 1, 2009 to May 31, 2010	$4.10/kW-month

The capacity payment during the FCM transition period has resulted in approximately 450 MW of new generating resources installed to the system. An additional 140 MW of generation is currently under construction, and expected to be in-service by the summer of 2008. As of September 2007, the demand resources have also increased to about 1,100 MW from the 300 MW assumed in 2005. The amount of demand resources is expected to continue to increase.

3.8. OTHERS

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

4.0 RESULTS

Tables 6 and 7 summarize the New England system Loss of Load Expectation (LOLE) results for the scenarios investigated in this interim review and those from the 2005 Triennial Review. The differences in the results of the two reviews can be attributed to the differences in assumptions used for each review as outlined previously.

Table 6 Reference Load Forecast

Year	2005 Triennial Review (Days/Year)	2007 Interim Review (Days/Year)
2008	0.045	0.039
2009	0.098	0.067
2010	0.144	0.100

Table 7 High Load Forecast

Year	2005 Triennial Review (Days/Year)	2007 Interim Review (Days/Year)
2008	0.100	0.046
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The LOLE results indicate that existing capacity resources are adequate in New England to assure that the system meets its resource adequacy standard during the FCM transition period through 2009. The over 38,000 MW of resources qualified to participate in the February 2008 Forward Capacity Auction for capability year 2010 will be more than adequate to meet the 32,305 MW that ISO New England will procure to meet its 1 day in 10 years disconnection of firm customers resource adequacy planning criterion for the that year.

5.0 CONCLUSION

Results of this interim assessment show that New England will be able to comply with the NPCC resource adequacy reliability criterion under both the reference and the high load forecasts.