

# NEW ENGLAND 2003 INTERIM REVIEW OF RESOURCE ADEQUACY



Approved by the RCC on November 4, 2003

October 27, 2003

# **NEW ENGLAND 2003 INTERIM REVIEW OF RESOURCE ADEQUACY**

## **EXECUTIVE SUMMARY**

This is ISO New England's 2003 Annual Interim Assessment of its 2002 Area Review of Resource Adequacy covering 2004 through 2007. 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 comply with the NPCC resource adequacy reliability criterion under the Reference Load Forecast. However, 90 MW of load relief resources will be needed in southwestern Connecticut in 2007, should the High Load Forecast materialize.

If the new generation additions in southwestern Connecticut are delayed, approximately 100 to 420 MW of load relief resources will be needed in southwestern Connecticut in order for New England to comply with the resource adequacy reliability criterion during the study period.

## **INTRODUCTION**

This is the first update of the New England 2002 Triennial Review of Resource Adequacy, which was approved in November 2002. Since then, ISO New England has conducted a comprehensive resource adequacy assessment as part of the Regional Transmission Expansion Plan, 2003 (RTEP03). The major assumptions of this interim review are consistent with those used for the RTEP03 assessment.

## **ASSUMPTION CHANGES**

### **Resources**

The 2002 Triennial Review assumed a total of 5,984 MW cumulative new capacity additions by the year 2004. As of August 2003, 4,912 MW of that has been placed in commercial operation. The remaining 1,072 MW includes the Milford Units<sup>1</sup> (536 MW) and Meriden Power (536 MW). Since Meriden Power had stopped construction, it is not modeled in this review. This review assumes that the Milford Units will be in service in 2004. In addition, two units not modeled in the 2002 Triennial Review, English 7 and 8 (70 MW), are assumed to be in service by 2004. This Interim Review also reflects the 100 MW generations increase as a result of the Great Lakes Hydro America new interconnection not modeled in the 2002 Triennial Review.

In the 2002 Triennial Review, the deactivation of Devon Units 7, 8 and 10 (a total of 231 MW) was modeled only as a sensitivity scenario; however, in this review, the deactivation of these units is modeled in the Base Case.

---

<sup>1</sup> In RTEP03, the Milford Units are rerated to 450 MW.

# NEW ENGLAND 2003 INTERIM REVIEW OF RESOURCE ADEQUACY

Considering the uncertainty of their commercial operation, the Milford and English Units are assumed to be delayed beyond the study period from 2004 to 2007 as a sensitivity scenario. This sensitivity scenario also assumes the continued operation of Devon Units 7 and 8.

In summary, the installed capacity comparisons between the 2002 Review and this Interim Review are shown in the following table.

**Table 1. Installed Capacity Comparison**

Year	Base Case		Sensitivity Case	
	2002 Triennial Review (MW)	2003 Interim Review (MW)	2002 Triennial Review (MW)	2003 Interim Review (MW)
2004	33,292	31,984	33,067	31,638
2005	33,292	31,984	33,067	31,638
2006	33,292	31,984	33,067	31,638
2007	33,292	31,984	33,067	31,638

## **Load**

Tables 2 and 3 compare the New England peak load forecasts for the 2002 Triennial Review and this review. As shown in Table 2, the reference annual peak loads used in the 2003 Interim Review are about 500 to 600 MW higher than the corresponding values used in the 2002 Triennial Review. The difference is mainly due to the result of the updated load forecast parameters used for the forecast process, including both economy and weather.

As shown in Table 3, the annual peak loads associated with the High Load Forecast for this interim review are approximately 100 to 400 MW lower than those assumed in the 2002 review due to lower economic growth assumptions than the assumptions used in the 2002 Triennial Review.

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

Year	2002 Triennial Review (MW)	2003 Interim Review (MW)	Difference (MW)
2004	25,123	25,690	+567
2005	25,443	25,996	+553
2006	25,817	26,292	+475
2007	26,159	26,622	+463

# NEW ENGLAND 2003 INTERIM REVIEW OF RESOURCE ADEQUACY

**Table 3. High Load Forecast Comparison**

<b>Year</b>	<b>2002 Triennial Review (MW)</b>	<b>2003 Interim Review (MW)</b>	<b>Difference (MW)</b>
2004	26,507	26,139	-368
2005	27,054	26,729	-325
2006	27,629	27,339	-290
2007	28,152	28,004	-148

## **Interface**

The sub-area representation modeled in this 2003 Interim Review is consistent with the 2002 Triennial Review. However, the transfer capabilities of some interfaces have changed to reflect changes (e.g. upgrades) made to the transmission system. Table 4 compares the interface limits used for these two studies.

**Table 4. Change In Interface Limits<sup>2</sup>**

<b>Interface or Interface Group</b>	<b>2002 Triennial Review (MW)</b>	<b>2003 Interim Review (MW)</b>	<b>Explanation for Change</b>
Boston Import	3,500 3,600 (Jan 2006)	3,600	System Upgrades
SEMA Export	1,450	2,300	System Upgrades
SEMA/RI Export	2,200	3,000	System Upgrades
East to West	2,100	2,400	System Upgrades
Connecticut Import	2,500	2,200	2,500 MW values used in 2002 was based on temporary system configuration
Southwestern CT Import	1,850 2,150 (May 2004)	2,000 2,600 (Jan 2005)	Further analysis; Scheduled system upgrade
Norwalk/Stamford Import	1,100	1,100 1,300 (Jan 2005)	Scheduled system upgrade
New York/New England	1,400 (summer) 1,700 (winter)	1,550 (summer) 975 (winter)	New operating studies
Highgate Import	225	210	Load increase on HQ system

<sup>2</sup> Only those interfaces having limit changes are included in this table.

# **NEW ENGLAND 2003 INTERIM REVIEW OF RESOURCE ADEQUACY**

## **Fuel Supply Diversity**

An important aspect of regional system planning for reliability is the degree of diversity and dependency on specific fuels for energy supply. ISO New England has conducted various assessments regarding fuel dependency. Given that New England is becoming more and more dependent on natural gas as an electrical energy fuel source, the assessments have particularly focused on issues relating to the ability of the gas pipeline infrastructure to supply the energy needs of New England. Results of these assessments have been published in reports and are available from ISO New England upon request. The 2003 Regional Transmission Expansion Plan also included a fuel diversity assessment. As noted in the Draft 2003 Regional Transmission Expansion Plan Executive Summary, "Studies indicate that New England's projected reliance upon natural gas-fired generating units has potentially negative system-wide impacts. The advent of several thousand megawatts of new gas-fired combined cycle units in New England could have serious reliability impacts on the system should gas pipe line interruptions or extremely cold weather occur...ISO New England has formed a Fuel Diversity Working Group to examine the problem. The effort will focus on understanding the dynamic relationships between the electric and natural gas infrastructure in New England, and how electric reliability could be impacted." In summary, ISO New England is concerned with issues relating to fuel supply and is actively reviewing associated reliability impacts on the bulk power system to make sure that system reliability would not be compromised due to fuel supply issues.

## **New Market Rules**

ISO New England and the New England Transmission Owners are planning to file a joint proposal to the Federal Energy Regulatory Commission by the end of October 2003 for the formation of a Regional Transmission Organization (RTO) for New England. The creation of an RTO is expected to strengthen the independent oversight of the region's bulk power system and wholesale electricity marketplace thus assuring for power system reliability and a competitive wholesale market for the region's consumers and its economy.

ISO New England and the New England Power Pool are working toward the development of a locational installed capacity market (LICAP) with a June 1, 2004 target implementation date. The implementation of LICAP is expected to provide appropriate market and reliability signals regarding the need for resources in sub-regions of New England.

## **Others**

Other assumptions for these two reviews are quite consistent, or the changes are negligible due to not having dramatic impacts on the reliability results.

## **RESULTS AND CONTINGENCY PLAN**

## NEW ENGLAND 2003 INTERIM REVIEW OF RESOURCE ADEQUACY

Tables 5 through 8 summarize the New England system Loss of Load Expectation (LOLE) results for various scenarios. Tables 5 and 6 indicate that, with the Reference Load Forecast, New England is in compliance with the NPCC criterion except in the year 2004 of the Sensitivity Case. However, with the High Load Forecast as presented in Tables 7 and 8, there will be violations of the criterion in 2007 for the Base Case, and in 2004, 2006 and 2007 for the Sensitivity Case.

**Table 5. Base Case LOLE With Reference Load Forecast**

<b>Year</b>	<b>2002 Triennial Review (Days/Year)</b>	<b>2003 Interim Review (Days/Year)</b>
2004	0.000	0.055
2005	0.000	0.012
2006	0.000	0.019
2007	0.003	0.030

**Table 6. Sensitivity Case LOLE With Reference Load Forecast**

<b>Year</b>	<b>2002 Triennial Review (Days/Year)</b>	<b>2003 Interim Review (Days/Year)</b>
2004	0.002	0.202
2005	0.002	0.042
2006	0.003	0.054
2007	0.006	0.073

**Table 7. Base Case LOLE With High Load Forecast**

<b>Year</b>	<b>2002 Triennial Review (Days/Year)</b>	<b>2003 Interim Review (Days/Year)</b>
2004	0.004	0.099
2005	0.007	0.031
2006	0.015	0.066
2007	0.033	0.127

**Table 8. Sensitivity Case LOLE With High Load Forecast**

<b>Year</b>	<b>2002 Triennial Review (Days/Year)</b>	<b>2003 Interim Review (Days/Year)</b>
2004	0.014	0.370
2005	0.016	0.095
2006	0.041	0.170
2007	0.082	0.299

## **NEW ENGLAND 2003 INTERIM REVIEW OF RESOURCE ADEQUACY**

Detailed results of the LOLE simulation indicate that the southwestern Connecticut areas (SWCT and NOR sub-areas) contribute most to the system risk. This is the result of inadequate installed capacity within these areas to supply their loads, or inadequate transmission transfer capabilities to import power from the rest of the system. In the past two years, requests for proposals (RFPs) have been issued during the critical summer period for load relief resources (including temporary generation, interruptible loads, and/or equipment upgrade to maximize transmission import capabilities) to assure near-term electric system reliability in these areas. Should the operation of the Milford and English Units be delayed and the High Load Forecast materialize in the future, as a contingency plan, such RFPs will continue to be needed to meet the electric system reliability needs in southwestern Connecticut areas. In addition, the Load Response Program under Standard Market Design (SMD) is expected to provide certain load relief in such a situation.

Further studies show that in order for New England to be in compliance with the 0.1 days/year LOLE criterion:

100 MW of load relief resources will be needed in 2004 for the Sensitivity Case with Reference Load Forecast.

90 MW of load relief resources will be needed in 2007 for the Base Case with High Load Forecast.

200, 170 and 420 MW of load relief resources will be needed in the years 2004, 2006 and 2007, respectively, for the Sensitivity Case with High Load Forecast.

### **CONCLUSION**

New England will meet the NPCC Resource Adequacy Criterion with Base Case assumptions and the Reference Load Forecast. If higher than forecast loads materialize and the expected generating unit additions do not become commercial during the study period, New England would not be able to meet the NPCC Resource Adequacy Criterion in 2004, 2006 and 2007. Most of the system risk of load loss comes from the southwestern Connecticut areas, which do not have adequate local capacity to supply their own load, nor adequate transmission capability to import power from the rest of the system. Should the assumed new capacity additions in these areas be delayed and the High Load Forecast materialize, then RFPs for emergency resources will again be issued as a contingency plan to meet the short-term reliability needs, if the market does not respond. Approximately 90 to 420 MW of emergency resources (demand response, generating resources, or increase in transmission import) in southwestern Connecticut would be needed to comply with the NPCC Resource Adequacy Criterion.