

Approved by the RCC
November 19, 2008



**IESO 2008 Interim Review
of
Resource Adequacy**

**Covering the Ontario Area
for the period 2009 to 2011**

November 6, 2008

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1 EXECUTIVE SUMMARY

The Independent Electricity System Operator (IESO) submits this assessment of resource adequacy for the Ontario Area to comply with the Reliability Assessment Program established by Northeast Power Coordinating Council (NPCC). This 2008 Interim Review of Resource Adequacy covers the study period from 2009 through 2011, and highlights changes since the last Comprehensive Review was conducted in 2006. The guidelines for the review are specified in the NPCC Document B-8 entitled, "*Guidelines for Area Review of Resource Adequacy*" (Revised: November 29, 2005).

This Interim Review identifies changes in assumptions from the 2006 Comprehensive Review, including changes to facilities and system conditions, generation resources availability, load forecast, electricity sector regulations, and the impact of these changes on the overall reliability of the Ontario electricity system.

The assessment makes comparisons with the most recent Comprehensive Review, which was completed in 2006.

This 2008 Interim Review indicates that Ontario will be able to meet the NPCC resource adequacy criterion that requires an LOLE value of less than 0.1 days/year for all years from 2009 to 2011. For the calendar years of 2009 and 2011, emergency operating procedures (EOPs) were utilized to satisfy the NPCC criterion under the high demand forecast scenario. Imports or additional resources were not required to meet the criterion for any years.

2 INTRODUCTION

The information presented in this 2008 Interim Review of resource adequacy covers the forecast period from 2009 through 2011.

The previous Comprehensive Review was submitted at the November 2006 meeting of the Reliability Coordinating Committee. Comparisons between this review and the November 2006, "IESO 2006 Comprehensive Review of Ontario Resource Adequacy" review are included in this report.

3 ASSUMPTION CHANGES

3.1 Demand Forecast

Table 3.1 shows the summer peak demand forecast for the 2006 Comprehensive Review and for the 2008 Interim Review, if no reduction due to conservation is reflected. In this high demand growth scenario, the peak demand forecast at the time of the summer peak is now about 1,000 to 1,300 MW lower, when compared to the 2006 Comprehensive Review forecast. The general decrease in forecast demand is due, in part, to a slowing economy and lower demand from the energy-intensive industrial sector which has been in decline since 2005. These economic impacts are estimated to be in the range of 300-500

MW of reductions. As well, the calculation now considers a monthly normalization instead of a seasonal normalization, further reducing peak demands by roughly 200 MW. This would also increase the load forecast uncertainty values.

Table 3.1 Comparison of Demand Forecasts without Conservation Reductions – Summer Peak

Year	Normal Weather Summer Peak [MW]		
	2006 Comprehensive Review	2008 Interim Review	Difference
2009	26,675	25,657	-1,018
2010	26,973	25,845	-1,128
2011	27,337	26,033	-1,304

Table 3.2 shows the summer peak demand forecast for the 2006 Comprehensive Review and for the 2008 Interim Review, with targeted reductions due to conservation reflected. In this median demand growth scenario, the peak demand forecast at the time of the summer peak is now about 1,700 to 3,000 MW lower, when compared to the 2006 Comprehensive Review forecast. Conservation savings for the summer peak of 2011 are estimated to be 1,714 MW by the Ontario Power Authority. At this time the quantification of conservation program impacts is at an early stage. Ontario is gaining experience with conservation, with a focus on the evaluation, measurement and verification of conservation efforts.

Table 3.2 Comparison of Demand Forecasts with Conservation Reductions – Summer Peak

Year	Normal Weather Summer Peak [MW]		
	2006 Comprehensive Review	2008 Interim Review	Difference
2009	26,675	24,987	-1,688
2010	26,973	24,468	-2,505
2011	27,337	24,319	-3,018

3.2 Resources Forecast

Tables 3.3 shows the resources forecast to be available to the Ontario system at the time of the summer peak assumed for this 2008 Interim Review and for the 2006 Comprehensive Review.

Table 3.3 Comparison of Available Resource Forecasts

Year	Available Resources [MW] at Time of Summer Peak (July)		
	2006 Comprehensive Review	2008 Interim Review	Difference
2009	32,309	31,387	-922
2010	33,585	32,819	-766
2011	37,099	31,413	-5,686

This 2008 Interim Review assumes resource availability based on the latest available information regarding existing and future resources. Based on studies since the 2006 Comprehensive Review, assumptions estimating the amount of available capacity at peak demand have been revised for hydro and wind resources resulting in reduced levels of available energy. In addition, some new generation projects in Ontario including Kingsbridge II (159 MW), Greenfield South (280 MW) and smaller hydro projects, are no longer expected to contribute to the supply mix within the study period. This has further reduced the amount of available resources at the time of summer peaks within the study period. Several other projects that were previously identified to be in-service for the summer of 2011 are no longer identified to come into service by that time.

All coal units are identified to be removed from service on December 31, 2014 in accordance with Ontario Regulation 496/07 under the Environmental Protection Act. Some units may be removed from service earlier as considered in the Ontario Power Authority's Integrated Power System Plan submitted to the OEB in late August 2007. Units will only be removed from service earlier if there are adequate replacement resources available to ensure reliability. The 2008 Interim Review assumes that about 1465 MW of coal fired generation is removed from service by the time of summer peak of 2011.

In order to ensure system reliability and to support the coal replacement strategy, the government directed the Ontario Power Authority (OPA) (a) to work with the IESO to develop an off coal plan and (b) to procure additional power in Ontario to address various reliability needs. The expected results of these procurements, with the latest forecast of the expected in-service dates related to procurements are reflected in the planned additions.

3.3 Ontario Electricity Sector Changes

The first Integrated Power System Plan (IPSP) filing was submitted by the Ontario Power Authority (OPA) to the Ontario Energy Board (OEB) on August 29, 2007. Under its legislated mandate, the OPA has the obligation to ensure long-term supply adequacy by forecasting resource needs and preparing an integrated system plan that includes conservation, generation and transmission development. In conjunction with the IPSP, the OPA has the responsibility to procure new generation or initiate conservation programs. Many of the expectations for new generation projects and the retirement schedule of coal-fired generation assumed for the 2008 Interim review are based on the OPA's plan.

In keeping with the policies of the Government of Ontario amendments were made to Ontario Regulations to reduce CO₂ emissions from the use of coal fired generation and new OEB license provisions have been introduced such that the owner of the coal fired generators can reduce emissions. It is expected that the owner will provide details on implementation plans later in 2008.

On September 17, 2008, a Directive was issued by the Minister of Energy and Infrastructure requiring the OPA to revisit the IPSP with a view to establishing new and higher targets in a number of areas with respect to renewable energy sources and conservation. The OPA is to provide the revised IPSP to the OEB within six months of the Directive. This review does not include impacts of the revision, which are not yet completed.

3.4 Transfer Capabilities

The most significant change in transmission facilities affecting transfer capabilities during the study period is the new 1250 MW interconnection between Ontario and Hydro Québec which is scheduled to come into service on March 31, 2009. This will increase the maximum coincident import capability into Ontario by about 1250 MW.

3.5 Fuel Supply Diversity

A diverse generation mix is critical for resource adequacy and market efficiency, through the provision of dispatch flexibility, reduced vulnerability to fuel supply contingencies and fuel price fluctuations.

A significant amount of the proposed new generation in Ontario (over 2,000 MW from 2009 to 2011) is gas-fired. When all of these facilities are built, the volume of gas consumed for electricity generation will increase. Ontario is well situated with respect to natural gas transmission and storage although some infrastructure development will be required in conjunction with new gas-fired resources. Based on the input received from stakeholders, the IESO does not have any concern with the expected ability of the gas infrastructure to be modified to meet the future additional gas supply requirements.

4 RESOURCE ADEQUACY ASSESSMENT

This assessment is based on engineering judgment, IESO assessments and NPCC joint interconnected studies.

This 2008 Interim Review indicates that, for the future years in the study period horizon (2009 to 2011), there is a lower forecast of demands and there are fewer resources available at the time of summer peak compared to the 2006 Comprehensive Review. The OPA is presently reporting 9,871 megawatts (MW) of generation and demand management contracts. These contracts include 3,000 MW of nuclear refurbishment, over 5,400 MW of natural gas generation, and over 1,400 MW of renewable and demand reduction capacity. From 2009 to 2011, there is almost 3,891 MW of additional generation expected to come into service. Given the progress of projects since the 2006 review, there is increased certainty with respect to the completion of these resources compared to 2006.

MARS runs were completed based on the latest demand forecast, and latest forecast of available resources. Table 4.1 provides a summary of the LOLE results from these MARS runs for three different scenarios.

Table 4.1 LOLE Results from MARS Runs

Scenario	Demand Growth	EOPs			
			2009	2010	2011
1	Median	no	0.051	0.001	0.008
2	High	no	0.146	0.024	0.196
3	High	yes	0.014	-	0.016

Scenario 1 represents a scenario where a median demand growth forecast is used and no emergency operating procedures (EOPs) are included. Scenario 2 represents a scenario where a high demand growth forecast is used and no EOPs are included. Scenario 3 indicates a scenario where EOPs are utilized under a high demand growth forecast.

The IESO reliability assessment for the 2009 and 2011 calendar years includes MARS runs that indicate the NPCC criterion will be with met with the median demand forecast and without having to utilize EOPs or additional resources. However, to meet the criterion with a high demand forecast, EOPS will be required for both these calendar years. In the case of 2010, the NPCC criterion was satisfied under both median and high demand forecasts without having to utilize EOPs or additional resources. Ontario is therefore expected to be compliant with the target LOLE of 0.1 days per year over the next three years.

4.1 Alleviating Factors and Contingency Mechanisms

There are several study assumptions which may change in such a way that reserve levels in Ontario could be higher than presented in this 2008 Interim Review, including the amount of new generating resources available, the amount of conservation or the amount of demand response, the amount of imports and the amount of generation that may be on planned outage.

Recent changes, made by the Ontario Energy Board (OEB) to the IESO's licence, give the IESO the authority to manage the recent policy initiatives to curb coal-fired emissions. This authority combined with existing IESO processes will maintain grid reliability while facilitating an orderly reduction in emissions.

Every quarter, looking out 18 months into the future, the IESO assesses the integrated generator and transmission outage plans of market participants. Periods where outages result in inadequate resource levels are identified to generators and transmitters. If market participants fail to proactively reschedule outages to mitigate concerns, the IESO may veto outages in the near-term to ensure sufficient capacity is available to meet non-dispatchable demand.

The relief that can be expected from this measure can range from 0 MW to over 2,000 MW or more. Deviations from initial generator outage plans through outage rescheduling and rejection are not always desirable. This could stretch the ability of generator owners/operators to accommodate larger amounts of outages over shorter time periods and may increase forced outage occurrences. Operational experience so far indicates generator owners are usually able to adapt their outage plans.

5 CONCLUSIONS

This 2008 Interim Review indicates that Ontario will be able to meet the NPCC resource adequacy criterion that requires a LOLE value of less than 0.1 days/year for all years from 2009 to 2011. For calendar years 2009 and 2011, EOPs were required to satisfy the NPCC criterion when considering high demand forecast scenarios. Imports or additional resources were not required to meet the LOLE target for any years.

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