IESO 2010 Interim Review of Resource Adequacy

Covering the Ontario Area

for the period 2011 to 2014

November 10, 2010

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Approved by the Reliability Coordinating Committee – November 30, 2010.

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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 the Northeast Power Coordinating Council (NPCC). This 2010 Interim Review of Resource Adequacy covers the study period from 2011 through 2014, and highlights changes since last year's 2009 Comprehensive Review. The guidelines for the review are specified in Appendix D of the NPCC Regional Reliability Reference Directory #1, "*Guidelines for Area Review of Resource Adequacy"* (Original document: December 1, 2009).

This Interim Review identifies changes in assumptions from the 2009 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 2009 Comprehensive Review.

The 2010 Interim Review reports that Ontario will be able to meet the NPCC resource adequacy criterion that requires a loss of load expectation (LOLE) value of less than 0.1 days/year for all years from 2011 to 2014. Under the high demand growth scenario, emergency operating procedures (EOPs) are utilized to satisfy criterion in the 2012 forecast year. For all other forecast years under both median and high demand growth, NPCC criterion is achieved using only existing, contract committed, and government directed resources without EOPs, additional resources, or imports.

2 INTRODUCTION

The information presented in this 2010 Interim Review of resource adequacy covers the forecast period from 2011 through 2014.

The previous Comprehensive Review was submitted at the September 2009 meeting of the Reliability Coordinating Committee. Comparisons between this review and the September 2009, "IESO 2009 Comprehensive Review of Ontario Resource Adequacy" review, are included in this report.

3 ASSUMPTION CHANGES

3.1 Demand Forecast

Tables 3.1 and 3.2 show comparisons between the peak demand forecasts for the 2009 Comprehensive Review and the 2010 Interim Review under median and high demand growth scenarios respectively.

Under median growth, peak demands are lower across all years resulting in a negligible change in average annual growth rate. These lower demands reflect a dampening in the economic recovery in 2010, as well as an expected increase in contribution from

embedded generation as a result of Ontario's recently implemented feed-in tariff (FIT) program (see Section 3.3).

Table 3.1 Demand Forecast Comparison – Median Demand Growth

Year	Normal Weather Annual Peak Median Demand Growth [MW]		
	2009 Comp. Review	2010 Interim Reivew	Difference
2011	24,000	23,463	-537
2012	23,541	23,316	-225
2013	23,092	22,823	-269
2014	22,932	22,545	-387
Growth Rate (%)	-1.5%	-1.3%	0.2%

Under the high growth scenario, the softer than expected economic recovery results in a lower peak demand forecast in 2011, with a rebound in 2012.

Table 3.2 Demand Forecast Comparison – High Demand Growth

Year	Normal Weather Annual Peak High Demand Growth [MW]		
	2009 Comp. Review	2010 Interim Reivew	Difference
2011	24,581	23,784	-797
2012	24,907	25,077	170
2013	25,234	25,061	-173
2014	25,563	25,179	-384
Growth Rate (%)	1.3%	1.9%	0.6%

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 2010 Interim Review and for the 2009 Comprehensive Review. This 2010 review assumes resource availability based on the latest available information regarding existing and future resources. Available resources include all existing units and projects under contract with the Ontario Power Authority (OPA), as well as units to be procured for contracts with the OPA as directed by the Ontario Ministry of Energy.

Following the publication of the 2009 Comprehensive Review, Ontario introduced a feed-in tariff (FIT) program that has resulted in a significant increase in the amount of renewable generation capacity expected to come online over the forecast timeframe and beyond. Wind and solar generation is expected to comprise the bulk of this new

renewable capacity, with significant amounts expected to connect directly to the distribution system[1]. The available capacity at summer peak for wind and solar generation is considerably lower than conventional thermal generation[2]. Demand-side management assumptions have been revised, with approximately 300-1,000 MW shifting from the committed capacity to the planned capacity category over the forecast timeframe, and therefore not part of the available resources in Table 3.3.

In October 2010, four coal-fired generators representing 2,000 MW of generating capacity were shutdown. Coal-fired generation is scheduled to cease production by the end of 2014.

Table 3.3 Comparison of Available Resource Forecasts

Year	Available Resources [MW] at Time of Summer Peak (July)		
	2009 Comp. Review	2010 Interim Review	Difference
2011	32194	30288	-1906
2012	31243	31146	-97
2013	32316	31446	-870
2014	32739	31317	-1422

3.3 Ontario Electricity Sector Changes

In September 2009 the provincial government passed the Green Energy and Green Economy Act (GEGEA) providing a comprehensive framework for developing renewable energy generation. This framework includes a feed-in tariff (FIT) program and provisions that will facilitate the implementation of the necessary transmission and distribution infrastructure to support those renewable projects.

Assumptions related to amounts and types of renewable resources used in the Interim Review are from the Ontario Power Authority (OPA). The OPA is the electricity system planner for the province of Ontario.

3.4 Transfer Capabilities

As mentioned in the Comprehensive Review of 2009, the new interconnection between Ontario and Hydro Québec went into commercial operation in July 2009. This project consisted of a 230 kV double circuit line between Ontario and Québec with back-to-back

[1] Generation connected directly to the distribution system (also called embedded generation) is treated as a decrement to demand, and therefore not included in the Available Resources table. For 2014, approximately 2,500 MW of embedded generation with an available capacity of 900 MW at the time of summer peak is assumed to be in service.

[2] The expected capacity contribution at summer peak for wind resources is 12.6% of installed capacity. For solar resources, the expected summer peak capacity contribution is 40% of installed capacity.

HVdc converters at the Outaouais substation in Québec. With the transmission reinforcements in Québec completed in June 2010 as planned, this new tie increased the coincident export/import capability out of/into Ontario by 1,250 MW.

Also described in the Comprehensive Review, the construction of a new 176 km (110 mile) 500 kV double-circuit line from the Bruce Power complex to Milton Switching Station (SS) is in progress, with completion expected in December 2012. This new line is required to accommodate the output of all eight generating units at the Bruce complex together with approximately 500 MW of existing wind- generating capacity, as well as a further 1,200 MW of new renewable generating capacity that is forecasted for development within the area.

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.

With the addition of almost 3,000 MW of gas-fired generation since 2009, the volume of gas consumed for electricity generation in Ontario is increasing. Ontario is well situated with respect to natural gas transmission and storage. Based on the input received from stakeholders, the IESO does not have any concern to meet the additional gas supply requirements.

3.6 Emergency Operating Procedures

In May 2010, the IESO discontinued the Emergency Load Reduction Program (ELRP) and the Emergency Demand Response Program (EDRP) representing a combined 288 MW of emergency operating procedure (EOP) capacity. The cancellation of these programs came as a result of other reliability enhancements such as the implementation of the Day Ahead Commitment Process (DACP) and implementation of OPA demand response programs. Some capacity from the ELRP and EDRP have already signed onto the OPA demand response programs, with more expected to do so in the future.

4 RESOURCE ADEQUACY ASSESSMENT

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

This 2010 Interim Review indicates that, for the future years in the study period horizon (2011 to 2014), there is a lower forecast of demands and there are fewer resources available at the time of summer peak compared to the 2009 Comprehensive Review. 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	Additional Resources [MW]	LOLE [days/year]			
				2011	2012	2013	2014
1	Median	no	0	0.029	0.006	0.000	0.000
2	High	no	0	0.058	0.125	0.022	0.041
3	High	yes	0	-	0.021	-	-

Scenario 1 reflects median demand growth, available resources, and no emergency operating procedures (EOPs). Under this scenario, the NPCC resource adequacy criterion of 0.1 days per year LOLE is met in all years.

Scenarios 2 and 3 reflect the conditions required to meet NPCC criterion under the high demand growth scenario. Table 4.1 shows that NPCC criterion is met under available resource conditions in 2011, 2013 and 2014, and that EOPs are required to meet NPCC criterion for 2012.

These results demonstrate that Ontario is expected to be compliant with the target LOLE of 0.1 days per year over the next four 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 2010 Interim Review, including 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.

The IESO will maintain grid reliability while facilitating an orderly reduction in emissions from coal-fired generators.

Every quarter, looking out nine 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 reject 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 2010 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 2011 to 2014. Under the high demand growth scenario, emergency operating procedures (EOPs) are utilized to satisfy criterion in the 2012 forecast year. For all other forecast years under both median and high demand growth, NPCC criterion is achieved using only existing, contract committed, and government directed resources without EOPs, additional resources, or imports.

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