



**IESO 2005 Interim Review
of
Resource Adequacy**

**Covering the Ontario Control Area
for the period 2006 to 2008**

September 13, 2005

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Approved by the RCC
November 29, 2005

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1.0 EXECUTIVE SUMMARY

The Independent Electricity System Operator (IESO) submits this assessment of resource adequacy for the Ontario control area to comply with the Reliability Assessment Program established by Northeast Power Coordinating Council (NPCC). This 2005 Interim Review of Resource Adequacy covers the study period from 2006 through 2008, and highlights changes since the last Comprehensive Review was conducted in 2003. The guidelines for the review are specified in the NPCC Document B-8 entitled, “*Guidelines for Area Review of Resource Adequacy*” (Revised: June 28, 2001).

This Interim Review identifies changes in assumptions from the 2003 Comprehensive Review, including changes to resources, demand, electricity sector regulations, and the impact of these changes on the overall reliability of the Ontario electricity system.

The assessment falls within the band between the Base Case and the Sensitivity Case of the 2003 Comprehensive Review:

- Under median demand growth assumptions, Ontario does not need to secure additional resources, during the timeframe from 2006 through to 2008 in order to meet the NPCC resource adequacy criterion that requires an LOLE value of less than 0.1 day/year.
- Under high demand growth, Ontario would expect to require 440 MW of additional resources to be available in 2008 in order to comply with the NPCC resource adequacy criterion that requires an LOLE value of less than 0.1 day/year. If no additional resources from newly constructed generation, demand-side initiatives or imports become available, compliance can be achieved by postponing the shutdown of coal-fired units.
- Recently announced changes to the Ontario electricity sector, when implemented, are expected to have beneficial effects on the long-term supply-demand situation of the province.

2.0 INTRODUCTION

The information presented in this 2005 Interim Review of resource adequacy covers the forecast period from 2006 to 2008.

The previous Comprehensive Review was submitted by the IMO (IESO’s predecessor) and was approved at the November 2003 meeting of the Reliability Coordinating Committee. Comparisons between this review and the November 2003, “IMO Year 2003 Comprehensive Review of Ontario Resource Adequacy” are included in this report.

3.0 ASSUMPTION CHANGES

3.1 Demand Forecast

Table 3.1, show the summer peak demand forecast for the 2003 Comprehensive Review and the 2005 Interim Review. For the median demand growth scenario, the peak demand forecast at the time of the summer peak is now about 600 to 700 MW lower, when compared to the 2003 Comprehensive Review forecast. The general decrease in forecast demand is mainly due to a slightly lower economic growth outlook and lower than expected demand in 2004. In other words,

the weather corrected actual demand for 2004 is now seen to be lower than the demand forecast for 2004 that was in place at the time that the 2003 Comprehensive Review was prepared.

Table 3.1 Comparison of Demand Forecasts – Summer Peak

Year	Normal Weather Summer Peak in MW (July)					
	Median Demand Growth			High Demand Growth		
	2003 Comprehensive	2005 Interim	Difference	2003 Comprehensive	2005 Interim	Difference
2006	24,689	24,089	-600	25,275	24,442	-833
2007	25,005	24,301	-704	25,672	24,756	-916
2008	25,326	24,627	-699	26,072	25,116	-956

3.2 Resources Forecast

Tables 3.2 and 3.3 show the resources forecast to be available to the Ontario system at the time of the summer peak assumed for this 2005 Interim Review and for the 2003 Comprehensive Review.

The 2003 Comprehensive Review included two resource scenarios: a Base Scenario, and a Sensitivity Scenario. Under the Base Scenario, 3,246 MW of generation resources would come into service by the end of 2004, with another 515 MW in 2005 and 515 MW in 2006 adding to the Ontario installed resources. Under the Sensitivity Scenario, 1,545 MW less generation resources was assumed to be added to the Ontario installed resources for the years 2006 through 2008.

**Table 3.2 Comparison of Available Resource Forecasts:
Base Scenario**

Year	Available Resources [MW] at time of Summer Peak (July)		
	2003 Comprehensive Base Scenario	2005 Interim	Difference
2006	29,695	28,655	-1,041
2007	29,731	28,541	-1,190
2008	29,602	28,477	-1,125

**Table 3.3 Comparison of Available Resource Forecasts:
Sensitivity Scenario**

Year	Available Resources [MW] at time of Summer Peak (July)		
	2003 Comprehensive Sensitivity Scenario	2005 Interim	Difference
2006	28,150	28,655	505
2007	28,186	28,541	355
2008	28,057	28,477	420

This 2005 Interim Review assumes resource availability based on the latest available information regarding existing and future resources. Since the summer of 2003, approximately 2,000 MW of nuclear generation was returned to service from laid-up state. Another 710 MW of new gas-fired generation was brought into service. Approximately 1,500 MW of nuclear capacity that was assumed in the 2003 Comprehensive Review, Base Scenario, to gradually come into service by 2006 remains in a laid-up state. However, work has progressed significantly on 515 MW of the laid-up nuclear capacity and it is expected that this capacity will return to service during the fourth quarter of 2005.

Therefore the present resource assumptions for the 2005 Interim Review indicate a level of nuclear resources somewhat higher than the Sensitivity Scenario, but less than the Base Scenario considered in the 2003 Comprehensive Review.

The Ontario government continues to commit to retiring coal-fired generation in the province (approximately 7,500 MW) when adequate alternatives are available. The IESO, in its latest 10-Year Outlook, has stipulated the need to retain coal-fired generation in an operable state beyond the forecast in-service dates of new supply, to allow for delays in construction and commissioning of new resources. IESO will be closely monitoring the implementation plans for the coal-replacement program to ensure adequacy requirements continue to be met.

Greater details are now available to identify specific generating facilities that will replace coal-fired generation. By 2008, about 2000 MW of new gas-fired generation is expected to come into service. The specific generation facilities are listed in the IESO's 10-Year Outlook, which is located on the IESO web-site at the following URL:

http://www.ieso.ca/imoweb/pubs/marketReports/10YearOutlook_2005jul.pdf .

In order to ensure system reliability and to support the coal replacement strategy, the government has directed the Ontario Power Authority (OPA) to launch new procurement processes for additional power in Toronto and surrounding areas (Greater Toronto Area), new demand-side management and demand response initiatives, and industrial co-generation and district energy projects across the province. These initiatives are targeted to be in service by the summer of 2009, just beyond the time horizon of the 2003 Review.

3.3 Ontario Electricity Sector Changes

The Ontario government has initiated a series of changes in the electricity sector. On December 9, 2004, the Government of Ontario passed the Electricity Restructuring Act, 2004, which reorganizes the province's electricity sector. The purpose of the Act is "to restructure Ontario's electricity sector, to promote the expansion of electricity supply and capacity, including supply and capacity from alternative and renewable energy sources, facilitate load management and electricity demand management, encourage electricity conservation and the efficient use of electricity and regulate prices in parts of the electricity sector." Based on the amendments, the Independent Electricity Market Operator (IMO) was renamed the Independent Electricity System Operator (IESO).

A new independent body called the Ontario Power Authority (OPA) was also established by the new legislation. The OPA has, as one of its mandates, long-term power system planning for

Ontario. The OPA has the obligation to ensure long-term supply adequacy by forecasting resource needs and preparing an integrated system plan for conservation, generation and transmission. Also, the OPA will have the responsibility to call on the private sector to build new generation or initiate demand management, through a competitive procurement process.

Although the Ontario Power Authority (OPA) is responsible for long term forecasting, the IESO agreed to produce a 10-year Outlook in 2005 while the OPA determines how best to address its forecasting responsibilities. The 10-year Outlook from the IESO provides an assessment of the demand-supply picture for the province over the next decade and provides a plan identifying the timing and requirements of system changes needed to meet the government's coal shutdown timeframe. It is the IESO's 10-Year Outlook that provides the basis for the 2005 Interim Review of Resource Adequacy.

3.4 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.

Under the recently passed Electricity Act, the Ontario Minister of Energy can issue directives with respect to the overall goals of the OPA's long-term planning. Before issuing such directives, the Minister has requested advice from the OPA on the future "supply mix" for Ontario. The OPA has begun this assessment by seeking submissions from all stakeholders by the end of August 2005, with recommendations for fuel mix to be completed before the end of 2005. The IESO submission will identify the numerous operability characteristics required from any future supply mix.

In particular, the IESO has indicated in the submission to the OPA that consideration should be given to providing dual fuel capability at plants which are unable to maintain fuel inventories onsite. This aspect may be necessary for some new gas-fired generation to ensure operational capability during winter peak periods when gas demand and electricity demand peak simultaneously.

The majority of the proposed new generation facilities in Ontario (3,500 to 3,800 MW) are gas-fired. If all of these facilities were built, the volume of gas consumed for electricity generation could more than double. Ontario is particularly well situated with respect to natural gas transmission and storage although some infrastructure development will be required in conjunction with new gas-fired resources. The Ontario Energy Board is currently conducting its Natural Gas Electricity Interface Review (NGEIR) to determine the extent of transportation and storage needs and to address regulatory issues. The IESO is an active participant in that review.

4.0 RESOURCE ADEQUACY ASSESSMENT

This 2005 Interim Review indicates that, for the future years in the study period horizon (2006 to 2008), there is a lower forecast of demands and lower level of resource availability compared to the 2003 Comprehensive Review, Base Scenario. However the new supply identified in this 2005 Interim Review is under contract with the Ontario Power Authority, which was not the case in the 2003 Review. Given the nature of the contracts, there is increased certainty with respect to the completion of these resources than there was in 2003. Compared to the 2003 Comprehensive Review, Sensitivity Scenario, this year's assumed level of resource availability for the period of

summer 2006 through the end of 2008 is higher for all years. This year's Interim Review also has the latest forecast reliability data for new generation that is planned for the subsequent replacement of coal-fired generation. This new generation, once established, is expected to be more reliable than the older coal-fired generation it replaces.

Table 4.1 Forecast Reserves, Normal Weather Summer Peak Base Resource Scenario

Year	Forecast Reserves Summer Peak (July)					
	Median Demand Growth			High Demand Growth		
	2003 Comprehensive	2005 Interim	Difference	2003 Comprehensive	2005 Interim	Difference
2006	5,006	4,566	-441	4,420	4,213	-208
2007	4,726	4,240	-486	4,059	3,785	-274
2008	4,276	3,850	-426	3,530	3,361	-169

Table 4.2 Forecast Reserves, Normal Weather Summer Peak Sensitivity Resource Scenario

Year	Forecast Reserves Summer Peak (July)					
	Median Demand Growth			High Demand Growth		
	2003 Comprehensive	2005 Interim	Difference	2003 Comprehensive	2005 Interim	Difference
2006	3,461	4,566	1,105	2,875	4,213	1,338
2007	3,181	4,240	1,059	2,514	3,785	1,271
2008	2,731	3,850	1,119	1,985	3,361	1,376

When combining all of the new forecast information and comparing them to last year's review, the results indicate that this year's assessment falls within the band of the Sensitivity Case of the 2003 Comprehensive Review: This years forecast shows lower reserves than the 2003 Comprehensive Base Case, and higher reserves than the 2003 Comprehensive Sensitivity Case.

- Under median demand growth assumptions, Ontario does not need to secure additional resources during the timeframe from 2006 through to 2008 in order to meet the NPCC resource adequacy criterion that requires an LOLE value of less than 0.1 day/year.
- Under high demand growth, Ontario would expect to require 440 MW of additional supply prior to the summer of 2008 in order to comply with the NPCC resource adequacy criterion that requires an LOLE value of less than 0.1 day/year. If no additional resources from generation, demand-side initiatives or imports become available, compliance can be achieved by postponing the shutdown of coal-fired units.

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 2005 Interim Review, including the amount of new generating resources available, the amount of demand response, the amount of imports and the amount of generation that may be on planned outage.

In considering future resource additions, the IESO includes only projects which are under construction, or that have secured contracts for construction. There may be additional generation

projects that have made application to IESO to have connection assessments performed that could come into service.

The 10-Year Outlook study which forms the basis for this 2005 Interim Review assumes no imports into Ontario in the assumed available resources, and in the determination of the Reserve Above Requirement levels. However, the coincident interconnection capability is normally in the range of 4,000 MW. Data from market opening through May 2005 reveals that, whenever demand exceeded 23,000 MW, imports averaged about 2,100 MW, and occasionally reached the 4,000 MW import capability level.

Since 2002, on a year by year basis, the IESO has implemented an Emergency Demand Response Program (EDRP). In 2004 approximately 400 MW of load was contracted under this program. The relief from the EDRP has not been modeled in this review because of the year by year nature of the program.

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 which can be expected from this measure can amount to over 2,000 MW during the summer months and more during other periods. Deviation 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.

5.0 CONCLUSIONS

This 2005 Interim Review falls within the band between the Base Case and the Sensitivity Case of the 2003 Comprehensive Review:

- Under median demand growth assumptions, Ontario does not need to secure additional resources during the timeframe from 2006 through to 2008 in order to meet the NPCC resource adequacy criterion that requires an LOLE value of less than 0.1 day/year.
- Under high demand growth, Ontario expects to require 440 MW of additional supply to be available prior to the summer of 2008 in order to comply with the NPCC resource adequacy criterion that requires an LOLE value of less than 0.1 day/year. If no additional resources from new generation, demand-side initiatives or imports become available, compliance can be achieved by postponing the shutdown of coal-fired units.

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