Independent Electricity Market Operator

18-MONTH OUTLOOK:

An Assessment of the Reliability of the Ontario Electricity System

From July 2004 to December 2005

This page intentionally left blank.

Executive Summary

The outlook for the reliability of Ontario's electricity system over the next 18-months continues to be substantially improved compared with the outlook presented one year ago. During the summer of 2004 there are expected to be significantly more resources available compared with the summer of 2003. Three nuclear units have come back to service and the addition of five gas-fuelled generating units is expected to be complete by August 2004. This additional 2800 MW of capacity in a twelve month period significantly improves the overall supply situation.

For 2005, the shutdown of 1150 MW of coal-fired generation at Lakeview Thermal Generating Station (TGS) in Mississauga focuses attention on the importance of completing transmission improvements in the greater Toronto area in a timely manner.

The Ontario government has indicated that it is developing plans to address future electricity supply, and has issued a Request for Qualifications for 300 MW of renewable energy sources. The provincial government also announced that it will soon be issuing a Request for Proposal for up to 2,500 megawatts (MW) of new electrical generation capacity and/or demand-side management initiatives to be developed as early as 2005. New electricity demand/supply projects that may arise from these processes are not yet reflected in this Outlook.

The Independent Electricity Market Operator (IMO) publishes quarterly assessments of the reliability of the Ontario electricity system over the next 18 months. These assessments advise market participants of the resource and transmission reliability of the Ontario electricity system and identify potentially adverse conditions that might be avoided through adjustment or coordination of maintenance plans for generation and transmission equipment.

This report presents the IMO assessment of the 18-month period from July 2004 to December 2005. It is based on the IMO's forecast of electricity demand, information provided by Ontario generators on the supply available and the latest information on the configuration and capability of the transmission system.

Resource Outlook

Since the last quarterly Outlook, the Imperial Oil generator (98MW) has completed commissioning. The accounting for this additional generation appears as a decrease to the Ontario demand, rather than as an increase to available resources, since the generator is not participating directly in the IMO-administered markets. Progress towards completing the Brighton Beach project (625 MW), and the Kirkland Lake project (32 MW) continues without significant delays.

As a result, the resource outlook continues to look substantially better than in previous reports heading into the upcoming summer. With the expected additional resources, the forecast available resources exceed the planning requirements in all but two weeks of the next 18 months.

Under extreme weather conditions, significant imports may be required into the IMO-administered markets and the IMO may need to cancel generation maintenance to ensure that Ontario demand is met during peak periods.

Transmission Outlook

The Outlook related to transmission continues to be similar to previous Outlooks. The transmission system is expected to be adequate to supply demand under the forecast conditions studied in this Outlook. Lakeview, Nanticoke, Pickering and Darlington units are required to provide reactive capability to maintain adequate voltage levels, especially during summer peak demand periods.

Lakeview TGS will cease operations as a coal-fired generating station by April 30, 2005 in accordance with Ontario Regulation 396/01. Since the last publication of the Outlook, firm plans have been put in place to address the reliability impacts associated with the shutdown of Lakeview TGS. Hydro One is progressing with development of Parkway Transformer Station to address transformer overload concerns, with this facility expected to be in service by the spring of 2005. The remaining voltage support requirements are expected to be addressed by the installation of additional shunt capacitors and related transformer controls by Hydro One. Accordingly, the initial work to prepare Lakeview units for operation as synchronous condensers has been discontinued.

Ontario Demand Forecast

The IMO demand forecast has been updated to reflect actual economic, demand and weather data through to the end of April 2004. The updated economic forecast has a slightly lower growth rate in 2004 and similar growth in 2005 compared to the previous economic outlook. As of this spring, the Imperial Oil embedded generator (98MW) started producing electricity with the direct impact of lowering apparent demand on the IMO controlled grid. The combined impact of the lower economic forecast and the embedded generator will moderate the growth in energy and peak demand.

Normal weather peak demand for this summer is forecasted to be 23,558 MW, an increase of 1.7% over the previous summer. The normal weather winter 2005 peak is forecast to be 23,734 MW. In addition to these weather-normal peaks, the expected seasonal and extreme weather peaks forecast for the forthcoming seasons are set out in the following table.

Season	Normal Weather Peak (MW)	Expected Seasonal Peak (MW)	Extreme Weather Peak (MW)
Summer 2004	23,558	25,210	26,238
Winter 2005	23,734	24,700	25,501
Summer 2005	23,828	25,581	26,649

- End of Section -

Caution and Disclaimer

The contents of these materials are for discussion and information purposes and are provided "as is" without representation or warranty of any kind, including without limitation, accuracy, completeness or fitness for any particular purpose. The Independent Electricity Market Operator (IMO) assumes no responsibility to you or any third party for the consequences of any errors or omissions. The IMO may revise these materials at any time in its sole discretion without notice to you. Although every effort will be made by the IMO to update these materials to incorporate any such revisions it is up to you to ensure you are using the most recent version

This page intentionally left blank.

Table of Contents

List of Tables

List of Figures

1.0 Introduction

This Outlook covers the 18-month period from July 1, 2004 to December 31, 2005. It supersedes the report titled "An Assessment of the Reliability of the Ontario Electricity System from April 2004 to September 2005", dated March 25, 2004. Its purpose is to advise market participants of the resource and transmission reliability of the Ontario electricity system, and to assess potentially adverse conditions that might be avoided through adjustment or coordination of maintenance plans for generation and transmission equipment.

Section 2 identifies the resources expected to be available during the study period and Section 3 presents an assessment of the adequacy of these resources under the current generation outage program. An assessment of the reliability of the transmission system is presented in Section 4. Overall observations, findings and conclusions are contained in Section 5.

This Outlook presents an assessment of resource and transmission adequacy based on the stated assumptions, and using the described methodology. Readers may envision other possible scenarios, recognizing the uncertainties associated with various input assumptions, and are encouraged to use their own judgement in considering possible future scenarios. This Outlook provides a base upon which updates in assumptions can be considered. The tables contained in the document can be downloaded from the Independent Market Operator (IMO) web site in MS Excel format.

In addition to the comprehensive Outlook, the IMO publishes Interim Updates to the 18-Month Outlook during each month for which a full Outlook is not issued. These updates consist of a spreadsheet which reflects changes to Total Resources, Total Reductions to Resources, and Reserve Above Requirement values for the Planned Resource Scenario. Similar to the full Outlooks, the Interim Updates are posted on the IMO web site. These updates provide Outlook information on a more frequent basis to allow market participants to better adjust their operational plans and outage schedules.

The reader should be aware that Security and Adequacy Assessments are published on the IMO web site on a weekly and daily basis that progressively supersede information presented in this report.

The contents of this Outlook document focus on the assessment of resource and transmission adequacy. Other supporting information and forecasts are contained in separate documents. These documents will be updated as required.

- The document entitled "Ontario Demand Forecast from July 2004 to December 2005" (IMO_REP_0171) (found on the IMO web site at http://www.theimo.com/imoweb/pubs/marketReports/18Month_ODF_2004jun.pdf describes in detail the 18-month forecast of electricity demand for the Ontario Market used in this Outlook. The demand forecast document identifies the assumptions used to determine the forecast and identifies the details regarding peak and energy demand forecasts for the Ontario market and parts thereof. It also contains information regarding variations in demand due to weather, economic growth and calendar day types. Data from the demand forecast document can be downloaded in MS Excel format from the IMO web site.

- The document entitled "Methodology to Perform Long Term Assessments" (IMO_REP_0044) (found on the IMO web site at http://www.theimo.com/imoweb/pubs/marketReports/Methodology_RTAA_2004jun.pdf) contains information regarding the methodology used to perform the demand forecasts, resource adequacy assessments and transmission reliability assessments in this Outlook.
- The document entitled "Ontario Transmission System" (IMO_REP_0045) (found on the IMO web site at www.theimo.com/imoweb/pubs/marketReports/OntTxSystem_2004mar.pdf) provides specific details on the transmission system, including the major internal transmission interfaces and interconnections with neighbouring jurisdictions.

Readers are invited to provide comments on this Outlook report or to give suggestions as to the content of future reports. To do so, please contact the IMO Help Centre:

- Toll Free: 1-888-448-7777
- Tel: 905-403-6900
- Fax: 905-403-6921
- E-mail: helpcentre@theIMO.com.

Updates from Previous Outlook

Updates to Forecast Demands

The forecast of demand has been updated to reflect recent actual demands and an updated economic outlook. In addition, there have been a number of methodological changes that have had an impact on the demand forecast's weekly profile.

As part of the regular updating process, the forecasting models' equations are re-estimated based on recent economic, weather and demand data. Actual peak demand continues to be lower than expected and that recent experience has been incorporated into the model coefficients. Energy demand has been fairly close to expected and therefore has had little impact on the energy demand model. The economic outlook has also been updated to reflect the current consensus. The expectations for 2004 are lower than previously forecasted while the economic forecast for 2005 remains unchanged.

A number of methodological changes have been implemented in this demand forecast. First, the range of history over which the equations are estimated has been expanded to include data for the period January 1990 to December 1994. This historical data was previously incompatible with the model. Second, the specification for the Christmas and Canada Day weeks was modified to provide a better representation of the impacts of those holidays. Third, the weather variables were changed from being seasonally dependent to being temperature driven. This has smoothed the weekly profiles going into and coming out of the shoulder months. Lastly, the addition of a 100 MW embedded generator has led to a reduction in the demand for electricity on the IMO-controlled grid.

In summary, the impacts of the inclusion of recent actuals, an updated economic outlook and the methodological changes have lowered the peak and energy demand forecasts for the remainder of 2004 and all of 2005.

Updates to Resources

Imperial Oil's Sarnia generation project is no longer included in the Installed Resources quantity, since the generator is not registered in the IMO-administered markets. Instead, the demand forecast has been adjusted to account for the reduction in load due to this new embedded generator.

ATCO's Brighton Beach generation project is under commissioning tests and is expected to be in service in July 2004.

Northland Power's Kirkland Lake generation project has started construction and is expected to be in service in August 2004.

None of the three shutdown Pickering A nuclear units is scheduled to return to service within the timeframe of this report. These units are not considered to be part of the Existing Installed Generation Resources shown in Table 2.1.

There have been substantial updates to the generator outages submitted by market participants.

Updates to Transmission Outlook

The return to service date for 230 kV circuit B3N has been updated from September 30, 2004, to December 31, 2004. This is considered to be the earliest possible date, with a high likelihood that this date will be extended. The 230 kV PS3 phase angle regulator (PAR) on circuit B3N in Michigan is now identified as being unavailable until December 31, 2006.

The list of transmission projects and planned and forced transmission outages has been updated from the previous 18-Month Outlook.

- End of Section -

This page intentionally left blank.

2.0 Resources

This section describes the generation resources that were considered in this Outlook based on information available to the IMO.

2.1 Existing Generation Resources Included in the Study

The existing installed generating capacity within Ontario is summarized in Table 2.1. This includes nuclear, coal, oil, gas, hydroelectric, wood and waste-fuelled generation, and results in a total capacity of 30,520 MW.

The capacity of installed generation resources in Table 2.1 does not include Pickering A Units 1 to 3, which are not scheduled to return to service within the timeframe of this report.

In accordance with Ontario Regulation 396/01, the four units at Lakeview Thermal Generating Station (TGS) will stop producing power by the end of April 2005, which will then decrease the installed generation resources by 1,148 MW.

Table 2.1 Existing Installed Generation Resources[1]

Fuel Type	Total Capacity (MW)	Number of Stations
Nuclear	10,850	5
Coal	7,564	5
Oil / Gas	4,364	22
Hydroelectric	7,676	61
Miscellaneous	66	2
Total	30,520	95

2.2 Potential Generation Resource Additions

Table 2.2 summarizes the significant new generation projects in the IMO's Connection Assessment and Approval (CAA) process that are under construction and are scheduled to be placed in-service within the 18-month study period. Generator owners or operators have provided the information regarding the status of their projects and the in-service dates listed in Table 2.2.

[1] In Table 2.1, the number of coal stations will decrease to four with the retirement of the Lakeview TGS.

Table 2.2 Potential Generation Resource Additions in Ontario

Proponent/Project Name	Zone	Fuel Type	Capacity MW	Connection Applicant's Estimated I/S Date
ATCO - Brighton Beach	West	Gas	625	July 2004
Northland Power - Kirkland Lake	Northeast	Gas	32	August 2004
Total			657	

Details regarding the IMO's CAA process and the status of all projects in the queue, including copies of available Preliminary Assessment and System Impact Assessment Reports, can be found on the IMO's web site www.theIMO.com under the "Services - Connection Assessments" link.

2.3 Summary of Generation Resource Scenarios

In assessing future resource adequacy, it is necessary to make a number of assumptions regarding the magnitude of generation resources expected to be available for operation. Two resource scenarios were considered in this Outlook: an Existing Resource Scenario and a Planned Resource Scenario. Both resource scenarios were established starting from the existing installed resources shown in Table 2.1.

Under the **Existing Resource Scenario,** Ontario generation resources identified in Table 2.1 were assumed to be in-service for the duration of the study period with the exception of the four coal-fired units (1,148 MW) at the Lakeview TGS which were assumed to cease operation as generators by April 30, 2005 in accordance with Ontario Regulation 396/01. This resource scenario assumed that none of the additional generation resources listed in Table 2.2 would be placed in service over the study period.

Under the **Planned Resource Scenario** existing Ontario generation resources were assumed to be in-service for the duration of the study period with the exception of the four coal-fired units (1,148 MW) at the Lakeview TGS which were assumed to cease operation by April 30, 2005. Additionally, all potential generation additions listed in Table 2.2 were included in this scenario, as well as an amount of 300 MW of price-responsive demand. This scenario is considered more likely to occur than the Existing Resource Scenario

Forecasts of available resources were derived for each of the two resource scenarios described above, using information regarding generator output capabilities, planned outages, allowances for hydroelectric generation production below rated capacity, assumptions for the amount of price-responsive demand, and major transmission interface limitations.

Table 2.3 shows a snapshot of the forecast available resources, under the two scenarios, at the time of the seasonal peak demands over the study period. The installed resources in Table 2.3 start with the values listed in Table 2.1 and are decreased by the size of Lakeview TGS at the end of April 2005. For the Planned Resource Scenario only, resources are incremented by the generation additions listed in Table 2.2. The total reductions to resources include generator deratings, generator planned outages under each resource scenario, capacity limitations due to

transmission interface constraints and allowances for hydroelectric generation production below rated capacity. The total reductions were subtracted and the price-responsive demand was added to the total resources, to obtain the available resources. In this Outlook, an amount of 300 MW of price-responsive demand was assumed to be available only under the Planned Resource Scenario, as shown in Table 2.3.

Table 2.3 Summary of Available Resources

Notes	Description \ Year	Summer Peak 2004		Winter Peak 2005		Summer Peak 2005	
		Existing Resource Scenario	Planned Resource Scenario	Existing Resource Scenario	Planned Resource Scenario	Existing Resource Scenario	Planned Resource Scenario
1	Installed Resources (MW)	30,520	30,520	30,545	31,202	29,441	30,098
2	Imports (MW)	0	0	0	0	0	0
3	Total Resources (MW)	30,520	30,520	30,545	31,202	29,441	30,098
4	Total Reductions in Resources (MW)	3,827	3,827	2,104	2,143	2,530	2,623
5	Price-responsive Demand (MW)	0	300	0	300	0	300
6	Available Resources (MW)	26,693	26,993	28,441	29,359	26,911	27,775

Notes to Table 2.3:

1. Installed Resources (MW): This is the total capacity of the generation resources in Ontario assumed to be installed at the time of the summer and winter peaks in the 18-month time span. Initially, this value includes all generators registered to participate in the IMO-administered markets at the beginning of the 18-month period. It also reflects minor unit re-ratings resulting from equipment upgrades that occurred prior to the publication of this Outlook. Only one of the four Pickering A nuclear units is included in the existing installed generation resources. Additional generation capacity that was assumed under the applicable resource scenario is progressively included, according to the estimated in-service dates.

2. Imports (MW): Represents the amount of external capacity considered to be delivered to Ontario.

3. Total Resources (MW): This is the sum of Installed Resources (line 1) and Imports (line 2).

4. Total Reductions in Resources (MW): These reductions represent, under each of the two scenarios, the sum of generator deratings, generator planned outages under each resource scenario, generation limitations due to transmission interface constraints and allowances for hydroelectric generation production below rated capacity.

5. Price-responsive Demand: This is the amount of price-responsive demand assumed under each resource scenario.

6. Available Resources (MW): This equals Total Resources (line 3) minus Total Reductions in Resources (line 4) plus Price-responsive Demand (line 5).

2.4 Energy Production Capability Forecast

The monthly forecast of energy production capability, as provided by market participants, is included in Appendix A, Table A6.

- End of Section -

This page intentionally left blank.

3.0 Resource Adequacy Assessment

This section provides an assessment of the adequacy of the resources described in Section 2 to meet the forecast demand. The purpose of the two resource scenarios described in Section 2.3 is to present a range of possible outcomes, in recognition of the uncertainty which exists regarding the future availability of resources. The Existing Resource Scenario, which assumes no generation resource additions and no price-responsive demand, represents the lower boundary of the range, considering the potential for delays to the in-service dates of additional generation capacity. The Planned Resource Scenario, which assumes 300 MW of price-responsive demand and capacity additions based on project status and in-service date estimates, represents the higher boundary of the outcome range.

As mentioned in Section 1, the methodology used to carry out this assessment is described in detail in the document titled "Methodology to Perform Long Term Assessments" (IMO_REP_0044). Results of the adequacy assessment, as well as an analysis of risk factors, are described in Sections 3.1 through 3.5. Observations, findings and conclusions are provided in Section 5, and detailed tables of results can be found in Appendix A of this document.

3.1 Weekly Adequacy Assessment

The assessment of weekly adequacy takes into consideration a range of forecast demands based on a probability distribution of historical weather data. Reserve Above Requirement levels have been calculated assuming both normal weather (with an allowance for the probability of experiencing extreme weather) and assuming extreme weather (with no further allowance for weather uncertainty). Figure 3.1 shows the normal and extreme weather demands assumed for each week in the study period.

Figure 3.1 Demand Forecast Range

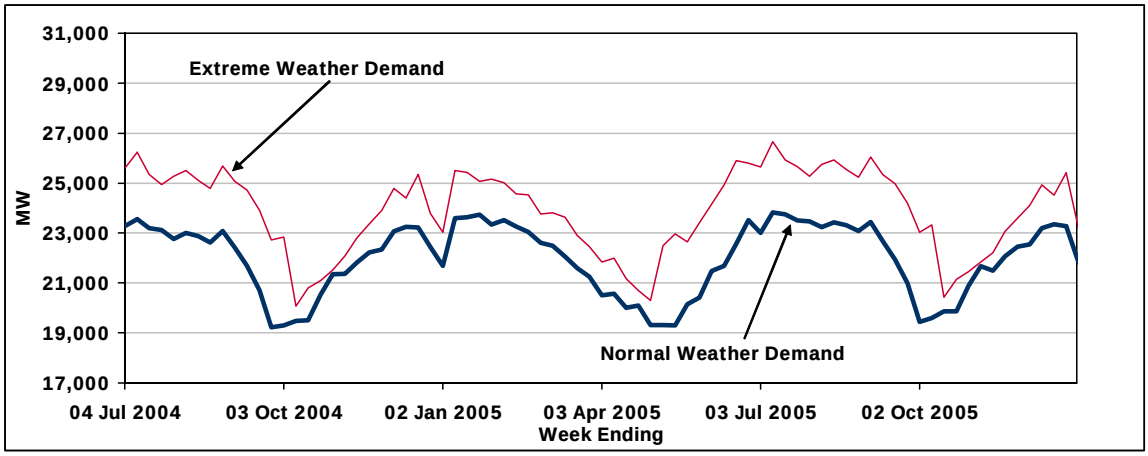


Figure 3.2 shows the Total Reductions in Resources used in the calculation of the Available Resources (as described in Section 2.3).

Figure 3.2 Total Reductions in Resources

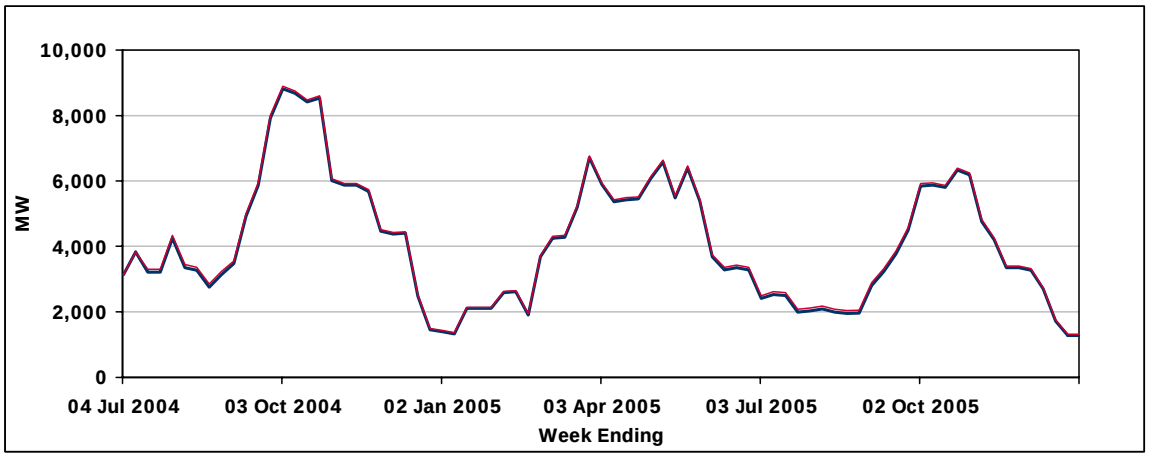


Figure 3.3 provides a comparison between Available Resources, and Required Resources for each week, for the Existing Resource Scenario. The latter quantity is the sum of Demand and Required Reserve, and is based on a probabilistic calculation, which takes into account load forecast uncertainty due to weather and random generator forced outages. Figure 3.4 provides a similar comparison for the Planned Resource Scenario.

Figure 3.3 Available vs. Required Resources: Existing Resource Scenario

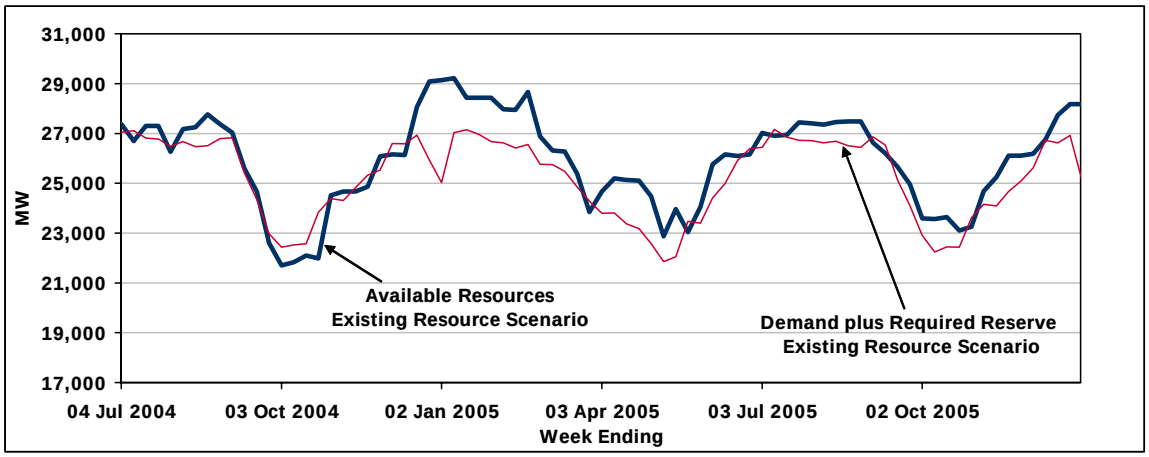
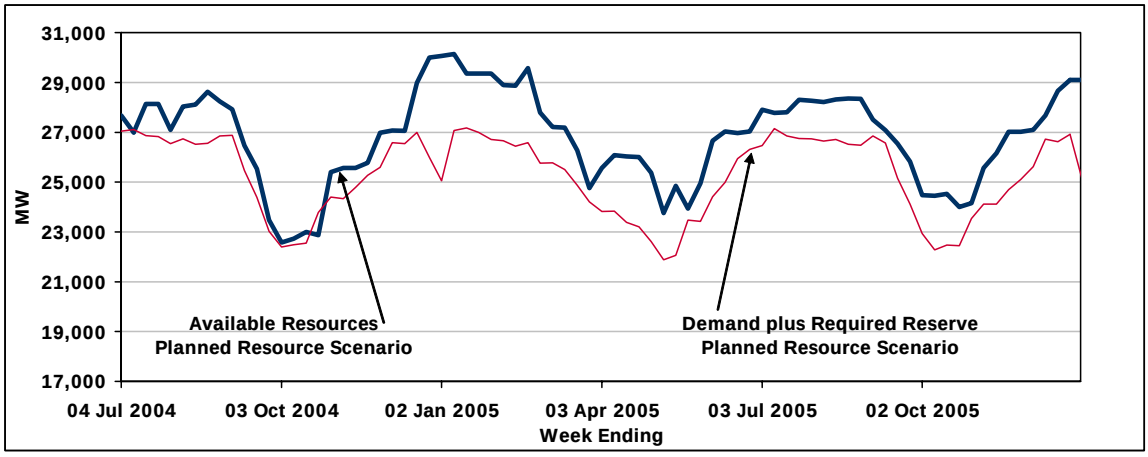
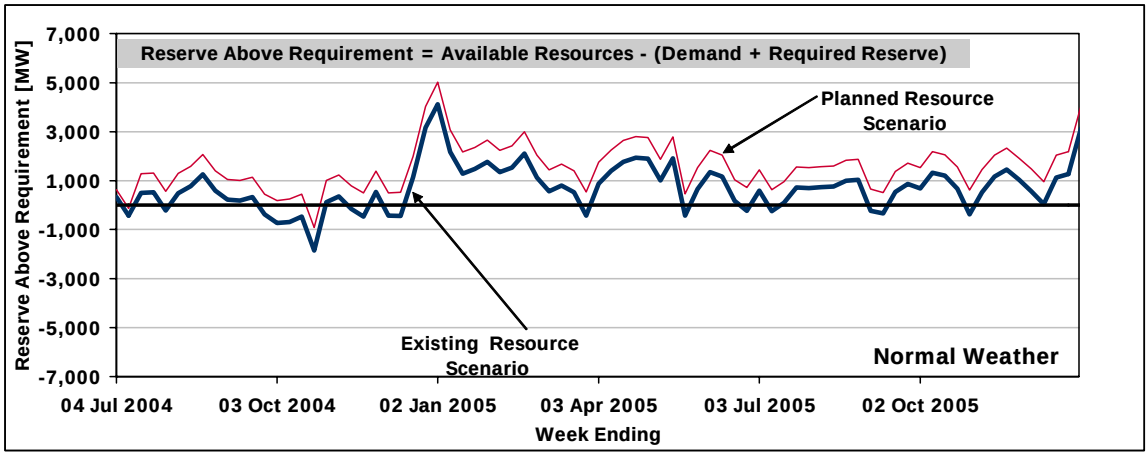


Figure 3.4 Available vs. Required Resources: Planned Resource Scenario



Reserve Above Requirement levels, which represent the difference between Available Resources and Required Resources, are shown in Figure 3.5 for each resource scenario studied.

Figure 3.5 Reserve Above Requirement: Existing Resource Scenario and Planned Resource Scenario



Under the **Existing Resource Scenario**, the forecast reserves are generally adequate for the study period. Some reserves are forecast to be below requirements, particularly during the fall of 2004 when there are significant resource reductions due to generator maintenance outages. During these weeks some planned generator outages are at risk of cancellation by the IMO for reliability purposes depending on their priority and the resource adequacy situation at the time their approval is being sought.

The results above must be assessed considering the risk factors described in Section 3.3 and the probability of this scenario occurring. During most of the study period, a combination of high demand levels under extreme weather conditions and lower than forecast levels of available resources could lead to significant reliance on imports and upward pressure on the wholesale market prices.

Under the more likely **Planned Resource Scenario**, the resource adequacy situation is further improved over the Existing Resource Scenario. For all but two weeks of the Outlook timeframe, the forecast available resources exceed the planning requirements. To the extent this scenario materializes, opportunities will exist for additional planned generator maintenance and exports. Again, the risk factors described in Section 3.3 must be considered.

Figures 3.6 and 3.7 provide a comparison between the forecast Reserve Above Requirement values in the present Outlook and the forecast reserve above requirement values in the previous Outlook published on March 25, 2004. Under both the Existing Resource Scenario and the Planned Resource Scenario, the changes in forecast demands and generator planned outages yield a generally better resource outlook when compared to the previous 18-Month Outlook.

Figure 3.6 Reserve Above Requirement: Existing Resource Scenario vs. Previous Existing Resource Scenario

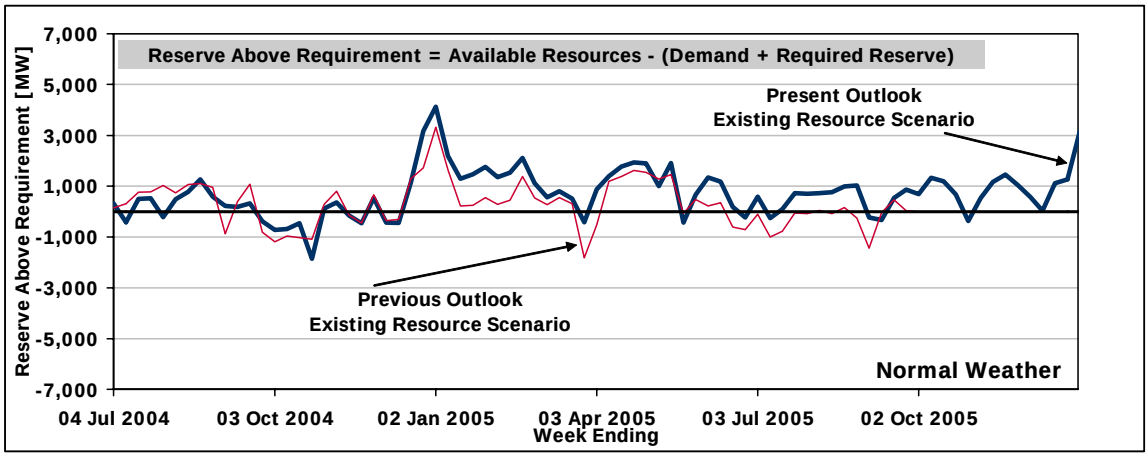
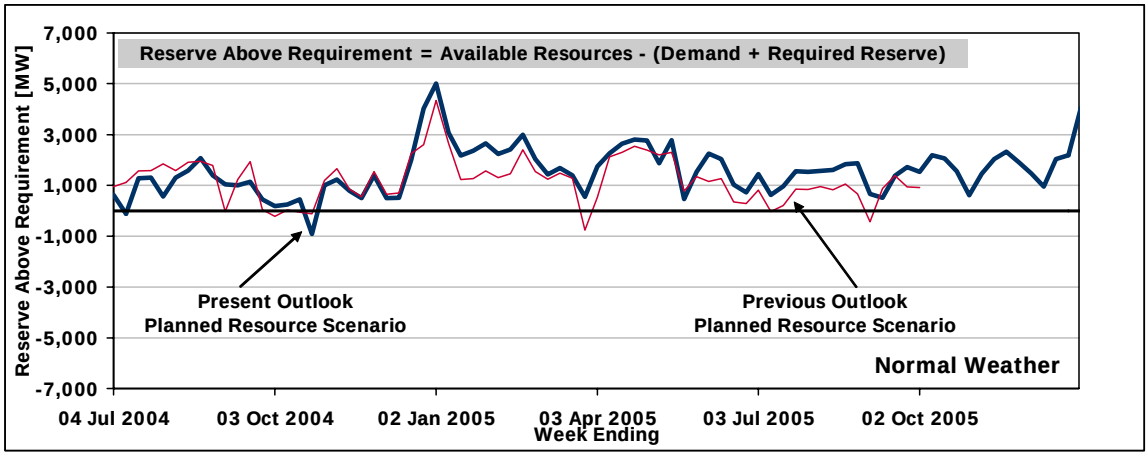


Figure 3.7 Reserve Above Requirement: Planned Resource Scenario vs. Previous Planned Resource Scenario



3.2 Loss of Load Expectation

A number of simulations were performed to calculate the Loss of Load Expectation (LOLE) during the study period. The simulations started from the two resource scenarios described in Section 2.3 and used the methodology described in Section 2.3 of the document "Methodology to

Perform Long Term Assessments" (IMO_REP_0044). The calculations were performed in two steps. In the first step, the resource availability was consistent with the calculations described in Section 3.1. In the second step, additional resources were made available to Ontario, with the purpose of reducing the LOLE value to the target level of an annual LOLE of 0.1 days/year. The modeling of additional resources was carried out in accordance with the NPCC resource adequacy criterion, which allows for supplemental capacity in the form of interconnection assistance, outage rescheduling and implementation of emergency operating procedures.

Simulation results indicate that, in order to achieve the target LOLE, additional resources would be required, approximately to the level necessary to offset the reserve deficiencies under each of the two resource scenarios, shown in Tables A1 and A2 in Appendix A.

3.3 Resource Adequacy Risks

The forecast reserve levels for both the Existing Resource Scenario and the Planned Resource Scenario should be assessed bearing in mind the risks discussed below. Each of these risks, whether considered alone or in combination with the others, could result in lower than forecast reserve levels and the need for higher levels of imports or curtailment of planned outages.

3.3.1 Extreme Weather

The Existing Resource Scenario and the Planned Resource Scenario are based on the assumption of normal (average) weather. However, peak demands in both summer and winter typically occur during periods of extreme weather. Unfortunately, the occurrence and timing of extreme weather is impossible to accurately forecast far in advance. As a result, the impact of extreme weather is modeled probabilistically in the calculation of the required resources for each week of the study period. The impact of extreme weather was demonstrated in August 2002, when Ontario established an all-time peak demand of 25,414 MW. Approximately 1,700 MW of this demand was due to the higher than average heat and humidity.

In order to illustrate the impact of extreme weather on forecast reserve levels during the Outlook period, both the Existing Resource Scenario and the Planned Resource Scenario were re-calculated assuming extreme weather in each week instead of normal weather. The probability of this occurring in every week is infinitesimally small; however the probability of an occurrence in any given week is greater (about 2.5 percent). When one looks at the summer or winter periods, the expectation of at least one occurrence of extreme weather becomes considerably higher. Results for extreme weather are shown in Figures 3.8, 3.9, and 3.10.

The magnitude of resource deficiencies, under extreme weather, clearly illustrates there are circumstances under which reliance on interconnected supply would become significant. This emphasizes the continued need for reliable supply and demand responses within Ontario.

Figure 3.8 Available vs. Required Resources: Existing Resource Scenario Extreme Weather Demand

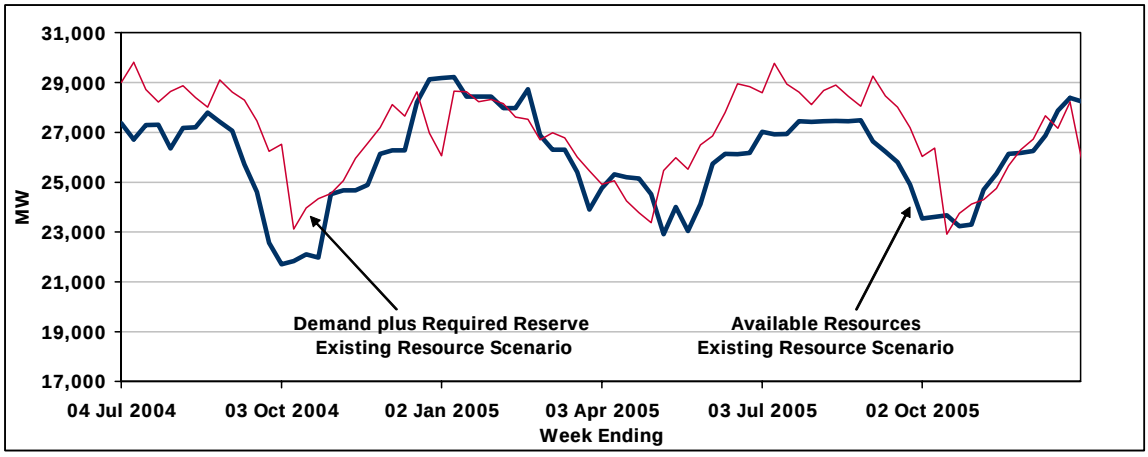


Figure 3.9 Available vs. Required Resources: Planned Resource Scenario Extreme Weather Demand

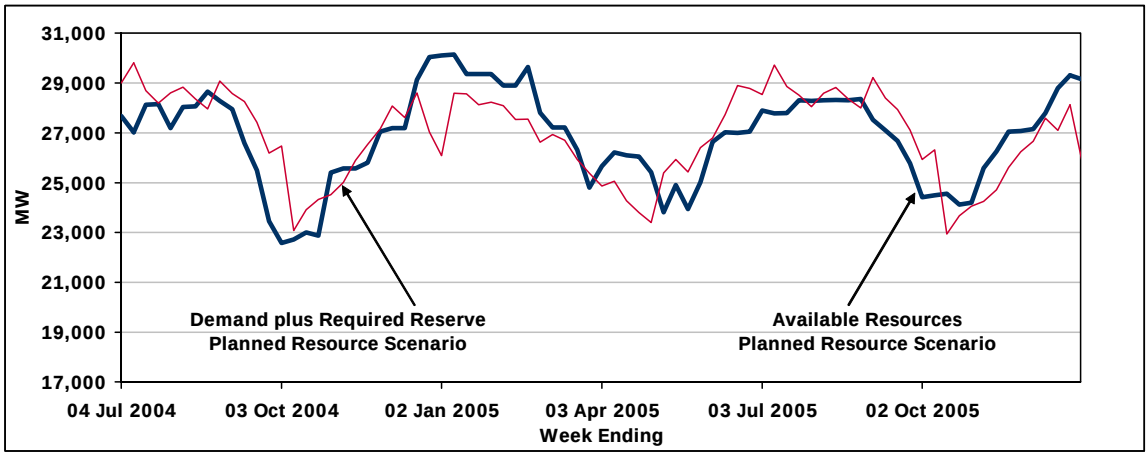
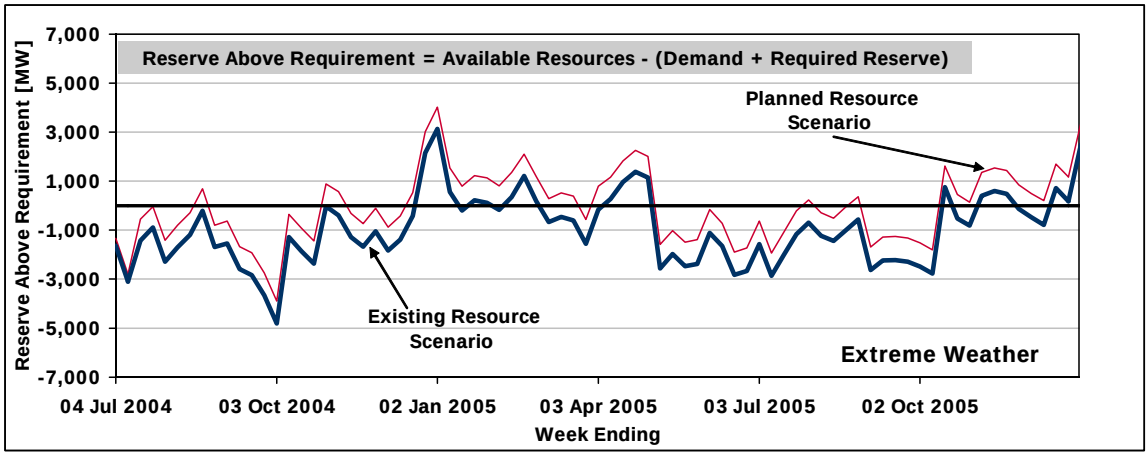


Figure 3.10 Reserve Above Requirement: Existing Resource Scenario and Planned Resource Scenario, Extreme Weather Demand



3.3.2 New Generation In-Service Risks

For the 18-month period under study, the improved demand-supply situation for the Planned Resource Scenario is dependent on the new generation projects coming into service on schedule. Toward the end of the study period, some potential exists for additional resources to be available as a consequence of the provincial government's RFPs. It is too early to estimate the magnitude of this potential outcome.

3.3.3 Extensions to Generator Planned Outages

A number of large generating units are scheduled to return to service from outage at the beginning of summer 2004, with numerous others scheduled to return from future planned outages prior to winter 2004/05 and summer 2005. Meeting these schedules is critical to maintaining adequate reserve levels. Delays in returning generators to service from maintenance outages could lead to reliance on imports.

3.3.4 Higher than Forecast Generator Unavailability

IMO resource adequacy assessments include a probabilistic allowance for random generator forced outages based on generator reliability information provided by market participants, or on industry-wide data for similar facilities. Along with weather-related demand impacts, the impact of generator forced outages is included in the determination of required resources.

It should be noted that the reduced flexibility in scheduling maintenance outages, which could happen under the Existing Resource Scenario, would have a negative impact on the long-term reliability of affected generating units, and could increase the number of forced outage occurrences. If the actual amount of generator forced outages is higher than the forecast allowance, actual reserve levels could be lower than forecast.

3.3.5 Lower than Forecast Hydroelectric Resources

IMO resource adequacy assessments include forecast amounts of hydroelectric generation provided by market participants. The amount of available hydroelectric generation is greatly influenced both by water-flow conditions on the respective river systems and by the way in which water is utilized.

Water-flow conditions are primarily influenced by the amount of precipitation received. To accurately forecast precipitation amounts so far in advance is impossible. Drought conditions over some or all of the study period would lower the amount of generation available from hydroelectric resources.

Experience over the summer of 2002 has also shown that even when sufficient capacity is available, its use can be limited because of a lack of energy due to scheduling decisions. An example of this occurs when peaking hydroelectric generation is operated extensively during the early portion of a week in response to market signals and, as a result, there is insufficient water available in storage reservoirs to support required levels of operation later in the week.

3.4 External Resources

An analysis of historical power flows on Ontario's interconnections for the five years prior to 2002 shows that, outside of summer peak demand periods, up to 1,800 MW of external generation resources might be expected to be available to Ontario. During Ontario's summer peak demand periods of July and August opportunities for imports still exist and imports are still expected to be available despite the fact that many neighbouring systems are often experiencing their peak demand. This is mainly due to the availability of spare capacity from systems that are not summer peaking. From the same analysis, up to 1,400 MW would be expected to be available based on observations during summer peak months in recent years prior to 2002.

The actual hourly import levels experienced from market opening in May 2002 up to February 24, 2004 indicates an average import level of 1,164 MW for all hours. During the 3,044 hours when Ontario demand exceeded 20,000 MW the average import level was 1,544 MW. During the 338 hours when Ontario demand exceeded 23,000 MW the average import level was 2,293 MW, and occasionally reached the Ontario coincident import capability of approximately 4,000 MW.

Future levels of imports into Ontario will vary depending on several factors, including the availability and willingness of resources in external jurisdictions to supply the Ontario market, and the availability of required transmission capacity either within or outside of Ontario.

3.5 Energy Conservation and Peak Reduction through Price-Responsive Demands

The IMO has been identifying the suitability of demand-side initiatives as part of the supply picture for several years and believes demand reductions and demand shifting should be vigorously pursued in Ontario, as clean and potentially less expensive ways to reduce future supply requirements. The application of such conservation measures is virtually unrestricted in location.

Programs would improve the supply-demand balance in two main ways:

- Demand reduction through technological or process efficiency improvements would have beneficial effects on the environment and reduce the need for generation capacity additions through years.
- Shifting the time of use from peak to off-peak periods through demand-response programs would achieve peak demand reductions, influencing electricity prices downward and improving utilization rates of generation resources.

- End of Section -

This page intentionally left blank.

4.0 Transmission Reliability Assessment

This section provides an assessment of the reliability of the Ontario transmission system.

4.1 Transmission Projects

Committed transmission projects, summarized in Appendix B by transmission zone, represent a subset of the transmission projects in the Connection Assessments and Approval queue. Only those projects that have a significant impact and that have an estimated in-service date within the 18-month period under study are listed.

4.2 Planned Transmission Outages

The principal purpose of the transmission reliability assessment is to forecast any reduction in transmission capacity brought about by specific transmission outages. For a major transmission interface or interconnection, the reduction in transmission capacity due to an outage condition can be expressed as a change in the base flow limit associated with the interface or interconnection. Another purpose of the transmission reliability assessment is to identify the possibility of any security-related events on the IMO controlled grid that could require contingency planning by market participants or by the IMO. As a result, the transmission outages are reviewed to identify transmission system reliability concerns and to highlight those outages that should be rescheduled or changed. As an example, a change in an outage may include reducing the scheduled duration or recall time.

The assessment of transmission outages will also identify any resources that are forecast to be constrained due to transmission outage conditions. The identification of a constrained resource is generally not reflected in the assessment of weekly resource adequacy, which is detailed in Section 3.1, since there is typically sufficient outage scheduling flexibility to avoid constraining off resources when such resources are needed for reliability. Transmitters and generators are expected to have a mutual interest in developing an ongoing arrangement to coordinate their outage planning activities. Transmission outages that may affect generation access to the IMO-controlled grid should be coordinated with the generator operators involved, especially at times when the forecast of reserve is deficient. Under the Market Rules, where the scheduling of planned outages by different market participant's conflicts such that both or all outages cannot be approved by the IMO, the IMO will inform the affected market participants and request that they resolve the conflict. If the conflict remains unresolved, the IMO shall determine which of the planned outages can be approved according to the priority of each planned outage as determined by the Market Rules detailed in Chapter 5, Sections 6.4.13 to 6.4.18.

For this Outlook, transmission outage plans as of the beginning of May 2004 were used.

The IMO's assessment of the impact of the transmission outage plans is shown in Appendix C, Tables C1 to C10. In these tables, each element is assessed individually by indicating the possible impacts and the reduction in transmission interface and/or interconnection limits. The methodology used to assess the transmission outage plans is described in the IMO document titled "Methodology to Perform Long Term Assessments" (IMO_REP_0044).

Generally, only a few of the planned outages will potentially impact transmission system reliability and available resources. The outages with the highest potential impact are listed below:

East Zone

Several outages on transmission lines impact the transfer capability between Ontario and Quebec during the period from August, 2004, through November, 2004. The impacts range from a 120 MW reduction in export capability to a 400 MW reduction in import capability.

Northeast Zone

There are several outages related to work on the Anjigami line that may reduce the limit on the east-west tie by up to 75 MW. This work is in progress and continues through December, 2004.

The assessment of transmission outages for this Outlook has been limited to those outages with a scheduled duration of greater than five days or to those outages associated with a project where at least one outage has a scheduled duration of greater than five days. The IMO recognizes that there are expected to be additional outage requirements and/or changes as time approaches the Outlook study period and that transmission capacity will be impacted by outages with a scheduled duration of five days or less. Prior to approving and releasing an outage, the IMO will reassess the outage for potential system impacts, taking into account all current and forecasted conditions.

4.3 System Voltage, Thermal Limits and Supply Reliability

As in previous Outlooks, low system voltage concerns in certain sub-areas of the province may limit some generation and transmission outages from being planned during summer peak demand periods. The various system voltage concerns are described below.

In the Windsor area, load growth will continue to stress the capability of the existing system under extreme-weather, summer peak conditions, such that voltages are expected to be near the low end of the acceptable range even with most static reactive sources in-service. Planned outages to generating units and/or transmission circuits during peak load conditions with coincident purchases from Michigan will require special control actions to prevent post-contingency thermal overloading of transmission facilities. The special control actions could include the arming of the Windsor overload protection scheme to split the Windsor 115 kV local area and arming of the Kingsville under-voltage load rejection scheme. Splitting the Windsor area will result in some Windsor 115 kV loads being served by a single supply. Avoiding planned outages in this area during peak load conditions is desired. The reactive power supply provided by the addition of the ATCO-Brighton Beach generators improves the voltage profile in this area.

When peak demands exceeded 25,000 MW in August 2001 and July, August, and September 2002, pre-contingency voltage levels in the Toronto zone were acceptable but with little margin for contingencies. The reactive requirement to maintain voltage levels at or above the minimum required levels was very high. Most static reactive resources and transmission elements were required in-service and the Lakeview, Pickering and Darlington units had to supply higher than normal amounts of reactive power. The high demand for reactive power left

significantly lower than normal reactive margin for contingencies. The performance of these units in providing reactive power to maintain acceptable voltage levels in the Toronto zone during summer peak periods is extremely important. Planned outages and restrictions on the use of the reactive capability of the Lakeview, Pickering and Darlington units should be avoided during the summer of 2004. In the summer of 2005, with Lakeview shutdown, reactive support from Nanticoke units will become more important as described in Section 4.3.1. The recent addition of a 125 Mvar, 115 kV capacitor at the Hearn Switching Station and the planned addition of a 125 Mvar, 115 kV capacitor at the Leaside Transformer Station by 2004-Q2 will improve the voltage profile in this area under summer peak conditions.

Under 2002 summer peak conditions, loadings on the 230/115 kV Burlington autotransformers in the Southwest zone were also high. For a contingency involving the loss of one autotransformer, the post-contingency loading on the remaining three autotransformers would have been at levels near the 10-Day Limited Time Ratings. The planned addition by Hydro One of a 125 Mvar, 115 kV capacitor bank at Burlington TS by 2004-Q2 will help alleviate this concern and provide additional voltage support in the area.

In the Northwest zone at least one of the two generators at Thunder Bay, in combination with the synchronous condenser, have been required in-service, most of the time at winter peak load conditions, to maintain minimum voltages in the area. Coincident planned generator outages had also been a concern since the condenser, in service by itself, may not have been able to maintain minimum voltage requirements. In addition, on loss of the condenser, the Thunder Bay G2 unit was required in service in order to restore the condenser to service. Recently however, with the addition of an 80 Mvar shunt capacitor at Birch TS, the need for the Thunder Bay generating and condensing units to maintain voltage levels has reduced.

4.3.1 Impact of Lakeview Thermal Generating Station (TGS) Shutdown

The IMO has been notified by Ontario Power Generation that, in accordance with Ontario Regulation 396/01, the Lakeview TGS will stop producing power by the end of April 2005. The 1,148 MW Lakeview facility currently has four units in service.

A number of generation and transmission proposals have been identified to address potential reliability impacts associated with the shutdown of Lakeview.

These reliability impacts include potential loss of load associated with overloading of transformers at the Claireville Transformer Station, and lower than acceptable voltages in the western portion of the Greater Toronto Area (GTA) during heavy load conditions with all transmission elements in service. These load levels could occur as early as June 2005. The risk to supply reliability increases significantly for contingency conditions or when transmission elements are out of service.

Hydro One has received approval from the OEB to construct a new Parkway Transformer Station (TS) to address some of the initial reliability impacts associated with the shutdown of Lakeview. To address the overloading of transformers at Claireville, Hydro One plans to install an initial 500/230 kV autotransformer at Parkway TS by May 1, 2005. However, this autotransformer will not address the reactive power support required to maintain an acceptable voltage profile throughout the western portion of the GTA.

To help address the voltage support concerns, Hydro One plans to install shunt capacitors with a reactive power capability of approximately 800 Mvar at Burlington, Richview and John TS's before 2005. In addition a 300 Mvar shunt capacitor bank is to be installed on the 230 kV system at Trafalgar TS by May 2005. These capacitors will address reactive power needs under extreme weather loads with up to four generating units unavailable at Nanticoke TGS, Pickering Nuclear Generating Station (NGS) and Darlington NGS.

It is critical that all of the work above be completed by April 30, 2005, to improve the reliability of the GTA during the summer of 2005. As the summer progresses, the probability of experiencing higher temperatures and higher demands increases, along with the likelihood of requiring all available reactive resources.

In the event that all reactive resources are not available, due to delays or outages, it is considered prudent to have possible control actions ready to be taken, to help maintain the required voltage profile on the high voltage transmission network. Therefore, procedures that would avoid automatic low voltage control are being examined for possible implementation during times when all reactive resources are not available, and peak demands are forecast.

4.4 Forced Outages

Due to a forced outage, 230 kV circuit B3N (Scott Transformer Station x Bunce Creek, Michigan) is presently identified to be unavailable until December 31, 2004. This is considered to be the earliest possible date, with a high likelihood that this date will be extended. The B3N outage increases the upper limit of the Ontario – Michigan import limit by 200 MW in the summer and by 300 MW in the winter. The Ontario – Michigan export limit decreases by approximately 500 MW in the summer and in the winter. The 230 kV PS3 phase angle regulator (PAR) on circuit B3N in Michigan is identified as being unavailable until December 31, 2006.

The PS4 PAR on circuit L4D is unavailable until September 30, 2004 but does not affect the import and export limits of the Ontario – Michigan interconnection.

- End of Section -

5.0 Overall Observations, Findings and Conclusions

The following findings and conclusions are based on the results of the assessment carried out for this Outlook.

Resource Adequacy

- Under the **Existing Resource Scenario**, forecast reserves are generally adequate for the study period. Some reserves are forecast to be below requirements, particularly during the fall of 2004 when there are significant resource reductions due to generator maintenance outages. During these weeks some planned generator outages are at risk of cancellation by the IMO for reliability purposes depending on their priority and the resource adequacy situation at the time their approval is being sought.
- Under the more likely **Planned Resource Scenario**, the resource adequacy situation is further improved over the Existing Resource Scenario. For all but two weeks of the Outlook timeframe, the forecast available resources exceed the planning requirements. To the extent this scenario materializes, opportunities will exist for additional planned generator maintenance and exports.
- Results of the resource adequacy assessment are summarized in the matrix below. The different shadings are intended to suggest the degree of concern regarding the supply/demand situation under each resource-weather scenario combination.

	Normal Weather Scenario	Extreme Weather Scenario
Existing Resource Scenario	**- some planned outages at risk - imports potentially required during some peak periods**	**- most planned outages at risk - significant imports required during many peak periods - risk of insufficient supply**
Planned Resource Scenario	**- opportunities for additional outages/exports exist in most weeks - two weeks when reserves are lower than required**	**- many planned outages at risk - imports potentially required during many weekly peak periods**

- The magnitude of resource deficiencies under extreme weather emphasizes the continued need for reliable supply and price-responsive demand within Ontario.
- For the 18-month period under study, the improved demand-supply situation for the Planned Resource Scenario is dependent on the new generation projects coming into service on schedule.
- A number of large generating units are scheduled to return to service from outage at the beginning of summer 2004, with numerous others scheduled to return from planned outages prior to winter 2004/05 and summer 2005. Meeting these schedules is critical to maintaining adequate reserve levels.

- High generator unavailability, whether caused by higher forced outage rates, delays in commissioning new units or returning generators to service, could lead to extensive reliance on imports. Under these circumstances, opportunities for planned outages, especially during the summer period, would be very limited.
- Lower than forecast amounts of hydroelectric resources, due to drought conditions over some or all of the study period, or due to scheduling decisions, would reduce the available resource levels and increase the risk of energy shortages.
- Over the 18-month period under study, accounting for the availability of imported regional supply, the Northeast Power Coordinating Council resource adequacy criterion is expected to be met.

Transmission Adequacy

- Some transmission outages will be difficult to schedule without reliability impacts or may be recalled on short notice.
- Avoiding planned outages and maximizing the reactive capability of the Lakeview, Nanticoke, Pickering and Darlington units is required to maintain voltage levels above the minimum required levels in the Toronto zone during summer peak conditions.
- Restricting planned outages to transmission facilities in the Windsor area will assist in maintaining adequate voltage levels during summer peak periods
- The addition of the new capacitor bank at Birch TS significantly reduces the need for rotating reactive resources in the Thunder Bay area to address local voltage concerns.
- Lakeview TGS will cease operations as a coal-fired generating station by April 30, 2005 in accordance with Ontario Regulation 396/01. Since the last publication of the Outlook, firm plans have been put in place to address the reliability impacts associated with the shutdown of Lakeview TGS. Hydro One is progressing with development of Parkway Transformer Station to address transformer overload concerns, with this facility expected to be in service by the spring of 2005. The remaining voltage support requirements are expected to be addressed by the installation of additional shunt capacitors and related transformer controls by Hydro One. Accordingly, the initial work to prepare Lakeview units for operation as synchronous condensers has been discontinued.

- End of Section -

Appendix A Resource Adequacy Assessment Details

Table A1 Assessment of Resource Adequacy: Existing Resource Scenario

Week Ending Day	Total Resources MW	Total Reductions in Resources MW	Price-Responsive Demand MW	Available Resources MW	Required Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Above Requirement MW
04-Jul-04	30,520	3,139	0	27,381	27,051	17.6	4,106	16.2	3,776	330
11-Jul-04	30,520	3,827	0	26,693	27,119	13.3	3,135	15.1	3,561	-426
18-Jul-04	30,520	3,216	0	27,304	26,809	17.7	4,106	15.6	3,611	495
25-Jul-04	30,520	3,216	0	27,304	26,779	18.1	4,175	15.8	3,650	525
01-Aug-04	30,520	4,253	0	26,267	26,488	15.4	3,499	16.3	3,720	-221
08-Aug-04	30,520	3,351	0	27,169	26,682	18.1	4,169	16.0	3,682	487
15-Aug-04	30,520	3,270	0	27,250	26,473	19.1	4,374	15.7	3,597	777
22-Aug-04	30,520	2,758	0	27,762	26,502	22.7	5,131	17.1	3,871	1,260
29-Aug-04	30,520	3,136	0	27,384	26,793	18.7	4,307	16.1	3,716	591
05-Sep-04	30,520	3,477	0	27,043	26,822	20.7	4,628	19.7	4,407	221
12-Sep-04	30,520	4,925	0	25,595	25,415	18.0	3,902	17.2	3,722	180
19-Sep-04	30,520	5,863	0	24,657	24,336	19.0	3,943	17.5	3,622	321
26-Sep-04	30,520	7,923	0	22,597	22,974	17.5	3,365	19.5	3,742	-377
03-Oct-04	30,520	8,817	0	21,703	22,430	12.5	2,404	16.2	3,131	-727
10-Oct-04	30,520	8,686	0	21,834	22,526	12.1	2,350	15.6	3,042	-692
17-Oct-04	30,520	8,414	0	22,106	22,571	13.3	2,597	15.7	3,062	-465
24-Oct-04	30,520	8,540	0	21,980	23,835	7.1	1,447	16.1	3,302	-1,855
31-Oct-04	30,520	6,009	0	24,511	24,392	14.8	3,160	14.2	3,041	119
07-Nov-04	30,545	5,875	0	24,670	24,315	15.5	3,309	13.8	2,954	355
14-Nov-04	30,545	5,875	0	24,670	24,830	13.0	2,844	13.8	3,004	-160
21-Nov-04	30,545	5,682	0	24,863	25,328	11.8	2,632	13.9	3,097	-465
28-Nov-04	30,545	4,469	0	26,076	25,534	16.7	3,735	14.3	3,193	542
05-Dec-04	30,545	4,383	0	26,162	26,596	13.4	3,093	15.3	3,527	-434
12-Dec-04	30,545	4,407	0	26,138	26,582	12.4	2,890	14.3	3,334	-444
19-Dec-04	30,545	2,479	0	28,066	26,931	20.9	4,850	16.0	3,715	1,135
26-Dec-04	30,545	1,459	0	29,086	25,923	29.6	6,644	15.5	3,481	3,163
02-Jan-05	30,545	1,398	0	29,147	25,023	34.4	7,464	15.4	3,340	4,124
09-Jan-05	30,545	1,326	0	29,219	27,040	23.8	5,619	14.6	3,440	2,179
16-Jan-05	30,545	2,104	0	28,441	27,153	20.3	4,800	14.9	3,512	1,288
23-Jan-05	30,545	2,104	0	28,441	26,970	19.8	4,707	13.6	3,236	1,471
30-Jan-05	30,545	2,104	0	28,441	26,678	21.8	5,097	14.3	3,334	1,763
06-Feb-05	30,564	2,590	0	27,974	26,623	18.9	4,450	13.2	3,099	1,351
13-Feb-05	30,564	2,613	0	27,951	26,420	20.2	4,689	13.6	3,158	1,531
20-Feb-05	30,564	1,903	0	28,661	26,555	24.4	5,622	15.3	3,516	2,106
27-Feb-05	30,564	3,688	0	26,876	25,753	18.9	4,270	13.9	3,147	1,123
06-Mar-05	30,564	4,256	0	26,308	25,747	17.0	3,821	14.5	3,260	561
13-Mar-05	30,564	4,286	0	26,278	25,479	19.1	4,214	15.5	3,415	799
20-Mar-05	30,564	5,195	0	25,369	24,852	17.4	3,765	15.0	3,248	517
27-Mar-05	30,564	6,715	0	23,849	24,277	12.3	2,603	14.3	3,031	-428

Note: The reader should be aware that Security and Adequacy Assessments are published on the IMO web site on a weekly and daily basis that progressively supersede information presented in this report.

(Table A1 continued)

Week Ending Day	Total Resources MW	Total Reductions in Resources MW	Price-Responsive Demand MW	Available Resources MW	Required Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Above Requirement MW
03-Apr-05	30,564	5,895	0	24,669	23,798	20.3	4,155	16.0	3,284	871
10-Apr-05	30,564	5,367	0	25,197	23,804	22.5	4,632	15.8	3,239	1,393
17-Apr-05	30,564	5,430	0	25,134	23,364	25.6	5,118	16.7	3,348	1,770
24-Apr-05	30,564	5,453	0	25,111	23,176	24.9	5,012	15.3	3,077	1,935
01-May-05	30,564	6,081	0	24,483	22,584	26.8	5,170	16.9	3,271	1,899
08-May-05	29,441	6,575	0	22,866	21,856	18.4	3,550	13.2	2,540	1,010
15-May-05	29,441	5,486	0	23,955	22,042	24.1	4,646	14.2	2,733	1,913
22-May-05	29,441	6,398	0	23,043	23,479	14.4	2,902	16.6	3,338	-436
29-May-05	29,441	5,383	0	24,058	23,400	17.9	3,644	14.6	2,986	658
05-Jun-05	29,441	3,682	0	25,759	24,413	19.9	4,277	13.6	2,931	1,346
12-Jun-05	29,441	3,283	0	26,158	24,987	20.6	4,463	15.2	3,292	1,171
19-Jun-05	29,441	3,347	0	26,094	25,917	15.6	3,521	14.8	3,344	177
26-Jun-05	29,441	3,284	0	26,157	26,394	11.2	2,635	12.2	2,872	-237
03-Jul-05	29,441	2,413	0	27,028	26,438	17.5	4,019	14.9	3,429	590
10-Jul-05	29,441	2,530	0	26,911	27,161	12.9	3,083	14.0	3,333	-250
17-Jul-05	29,441	2,501	0	26,940	26,846	13.4	3,190	13.0	3,096	94
24-Jul-05	29,441	1,993	0	27,448	26,729	16.8	3,945	13.7	3,226	719
31-Jul-05	29,441	2,032	0	27,409	26,715	16.8	3,948	13.9	3,254	694
07-Aug-05	29,441	2,088	0	27,353	26,622	17.7	4,114	14.6	3,383	731
14-Aug-05	29,441	1,987	0	27,454	26,690	17.2	4,027	13.9	3,263	764
21-Aug-05	29,441	1,951	0	27,490	26,504	17.9	4,171	13.7	3,185	986
28-Aug-05	29,441	1,962	0	27,479	26,448	19.1	4,400	14.6	3,369	1,031
04-Sep-05	29,441	2,810	0	26,631	26,860	13.6	3,193	14.6	3,422	-229
11-Sep-05	29,441	3,236	0	26,205	26,536	15.6	3,531	17.0	3,862	-331
18-Sep-05	29,441	3,776	0	25,665	25,132	17.0	3,720	14.5	3,187	533
25-Sep-05	29,441	4,492	0	24,949	24,088	18.8	3,952	14.7	3,091	861
02-Oct-05	29,441	5,848	0	23,593	22,912	21.3	4,147	17.8	3,466	681
09-Oct-05	29,441	5,877	0	23,564	22,242	20.2	3,965	13.5	2,643	1,322
16-Oct-05	29,441	5,802	0	23,639	22,442	19.0	3,774	13.0	2,577	1,197
23-Oct-05	29,441	6,333	0	23,108	22,437	16.3	3,241	12.9	2,570	671
30-Oct-05	29,441	6,187	0	23,254	23,622	11.3	2,363	13.1	2,731	-368
06-Nov-05	29,441	4,764	0	24,677	24,147	13.8	3,001	11.4	2,471	530
13-Nov-05	29,460	4,209	0	25,251	24,087	17.5	3,756	12.1	2,592	1,164
20-Nov-05	29,460	3,347	0	26,113	24,664	18.3	4,035	11.7	2,586	1,449
27-Nov-05	29,460	3,346	0	26,114	25,081	16.3	3,654	11.7	2,621	1,033
04-Dec-05	29,460	3,271	0	26,189	25,622	16.2	3,647	13.7	3,080	567
11-Dec-05	29,460	2,702	0	26,758	26,722	15.3	3,553	15.2	3,517	36
18-Dec-05	29,460	1,716	0	27,744	26,621	18.8	4,388	14.0	3,265	1,123
25-Dec-05	29,460	1,278	0	28,182	26,915	21.1	4,903	15.6	3,636	1,267
01-Jan-06	29,460	1,278	0	28,182	25,059	29.2	6,367	14.9	3,244	3,123

Table A2 Assessment of Resource Adequacy: Planned Resource Scenario

Week Ending Day	Total Resources MW	Total Reductions in Resources MW	Price-Responsive Demand MW	Available Resources MW	Required Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Above Requirement MW
04-Jul-04	30,520	3,139	300	27,681	27,051	18.9	4,406	16.2	3,776	630
11-Jul-04	30,520	3,827	300	26,993	27,119	14.6	3,435	15.1	3,561	-126
18-Jul-04	31,145	3,307	300	28,138	26,861	21.3	4,940	15.8	3,663	1,277
25-Jul-04	31,145	3,307	300	28,138	26,831	21.7	5,009	16.0	3,702	1,307
01-Aug-04	31,145	4,344	300	27,101	26,540	19.0	4,333	16.6	3,772	561
08-Aug-04	31,177	3,444	300	28,033	26,736	21.9	5,033	16.2	3,736	1,297
15-Aug-04	31,177	3,363	300	28,114	26,528	22.9	5,238	16.0	3,652	1,586
22-Aug-04	31,177	2,851	300	28,626	26,557	26.5	5,995	17.4	3,926	2,069
29-Aug-04	31,177	3,229	300	28,248	26,847	22.4	5,171	16.3	3,770	1,401
05-Sep-04	31,177	3,556	300	27,921	26,877	24.6	5,506	19.9	4,462	1,044
12-Sep-04	31,177	5,004	300	26,473	25,470	22.0	4,780	17.4	3,777	1,003
19-Sep-04	31,177	5,942	300	25,535	24,392	23.3	4,821	17.8	3,678	1,143
26-Sep-04	31,177	8,002	300	23,475	23,029	22.1	4,243	19.7	3,797	446
03-Oct-04	31,177	8,896	300	22,581	22,395	17.0	3,282	16.0	3,096	186
10-Oct-04	31,177	8,749	300	22,728	22,481	16.7	3,244	15.4	2,997	247
17-Oct-04	31,177	8,477	300	23,000	22,548	17.9	3,491	15.6	3,039	452
24-Oct-04	31,177	8,603	300	22,874	23,786	11.4	2,341	15.8	3,253	-912
31-Oct-04	31,177	6,072	300	25,405	24,400	19.0	4,054	14.3	3,049	1,005
07-Nov-04	31,202	5,926	300	25,576	24,345	19.7	4,215	14.0	2,984	1,231
14-Nov-04	31,202	5,926	300	25,576	24,788	17.2	3,750	13.6	2,962	788
21-Nov-04	31,202	5,733	300	25,769	25,276	15.9	3,538	13.7	3,045	493
28-Nov-04	31,202	4,520	300	26,982	25,594	20.8	4,641	14.6	3,253	1,388
05-Dec-04	31,202	4,422	300	27,080	26,586	17.4	4,011	15.3	3,517	494
12-Dec-04	31,202	4,446	300	27,056	26,540	16.4	3,808	14.2	3,292	516
19-Dec-04	31,202	2,518	300	28,984	26,991	24.8	5,768	16.3	3,775	1,993
26-Dec-04	31,202	1,498	300	30,004	25,984	33.7	7,562	15.8	3,542	4,020
02-Jan-05	31,202	1,437	300	30,065	25,052	38.7	8,382	15.5	3,369	5,013
09-Jan-05	31,202	1,365	300	30,137	27,070	27.7	6,537	14.7	3,470	3,067
16-Jan-05	31,202	2,143	300	29,359	27,182	24.2	5,718	15.0	3,541	2,177
23-Jan-05	31,202	2,143	300	29,359	27,000	23.7	5,625	13.8	3,266	2,359
30-Jan-05	31,202	2,143	300	29,359	26,708	25.8	6,015	14.4	3,364	2,651
06-Feb-05	31,221	2,629	300	28,892	26,654	22.8	5,368	13.3	3,130	2,238
13-Feb-05	31,221	2,652	300	28,869	26,450	24.1	5,607	13.7	3,188	2,419
20-Feb-05	31,221	1,942	300	29,579	26,584	28.4	6,540	15.4	3,545	2,995
27-Feb-05	31,221	3,727	300	27,794	25,753	23.0	5,188	13.9	3,147	2,041
06-Mar-05	31,221	4,307	300	27,214	25,776	21.0	4,727	14.6	3,289	1,438
13-Mar-05	31,221	4,337	300	27,184	25,508	23.2	5,120	15.6	3,444	1,676
20-Mar-05	31,221	5,246	300	26,275	24,880	21.6	4,671	15.2	3,276	1,395
27-Mar-05	31,221	6,766	300	24,755	24,209	16.5	3,509	14.0	2,963	546

Note: The reader should be aware that Security and Adequacy Assessments are published on the IMO web site on a weekly and daily basis that progressively supersede information presented in this report.

(Table A2 continued)

Week Ending Day	Total Resources MW	Total Reductions in Resources MW	Price-Responsive Demand MW	Available Resources MW	Required Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Above Requirement MW
03-Apr-05	31,221	5,946	300	25,575	23,827	24.7	5,061	16.2	3,313	1,748
10-Apr-05	31,221	5,430	300	26,091	23,833	26.9	5,526	15.9	3,268	2,258
17-Apr-05	31,221	5,493	300	26,028	23,392	30.0	6,012	16.9	3,376	2,636
24-Apr-05	31,221	5,516	300	26,005	23,205	29.4	5,906	15.5	3,106	2,800
01-May-05	31,221	6,144	300	25,377	22,612	31.4	6,064	17.1	3,299	2,765
08-May-05	30,098	6,638	300	23,760	21,885	23.0	4,444	13.3	2,569	1,875
15-May-05	30,098	5,549	300	24,849	22,070	28.7	5,540	14.3	2,761	2,779
22-May-05	30,098	6,461	300	23,937	23,480	18.9	3,796	16.6	3,339	457
29-May-05	30,098	5,446	300	24,952	23,425	22.2	4,538	14.8	3,011	1,527
05-Jun-05	30,098	3,745	300	26,653	24,413	24.1	5,171	13.6	2,931	2,240
12-Jun-05	30,098	3,362	300	27,036	24,996	24.6	5,341	15.2	3,301	2,040
19-Jun-05	30,098	3,426	300	26,972	25,942	19.5	4,399	14.9	3,369	1,030
26-Jun-05	30,098	3,363	300	27,035	26,316	14.9	3,513	11.9	2,794	719
03-Jul-05	30,098	2,492	300	27,906	26,464	21.3	4,897	15.0	3,455	1,442
10-Jul-05	30,098	2,623	300	27,775	27,148	16.6	3,947	13.9	3,320	627
17-Jul-05	30,098	2,594	300	27,804	26,846	17.1	4,054	13.0	3,096	958
24-Jul-05	30,098	2,086	300	28,312	26,753	20.5	4,809	13.8	3,250	1,559
31-Jul-05	30,098	2,125	300	28,273	26,741	20.5	4,812	14.0	3,280	1,532
07-Aug-05	30,098	2,181	300	28,217	26,651	21.4	4,978	14.7	3,412	1,566
14-Aug-05	30,098	2,080	300	28,318	26,716	20.9	4,891	14.0	3,289	1,602
21-Aug-05	30,098	2,044	300	28,354	26,528	21.6	5,035	13.8	3,209	1,826
28-Aug-05	30,098	2,055	300	28,343	26,477	22.8	5,264	14.7	3,398	1,866
04-Sep-05	30,098	2,889	300	27,509	26,852	17.4	4,071	14.6	3,414	657
11-Sep-05	30,098	3,315	300	27,083	26,568	19.5	4,409	17.2	3,894	515
18-Sep-05	30,098	3,855	300	26,543	25,161	21.0	4,598	14.7	3,216	1,382
25-Sep-05	30,098	4,571	300	25,827	24,111	23.0	4,830	14.8	3,114	1,716
02-Oct-05	30,098	5,927	300	24,471	22,938	25.8	5,025	18.0	3,492	1,533
09-Oct-05	30,098	5,940	300	24,458	22,271	24.8	4,859	13.6	2,672	2,187
16-Oct-05	30,098	5,865	300	24,533	22,471	23.5	4,668	13.1	2,606	2,062
23-Oct-05	30,098	6,396	300	24,002	22,447	20.8	4,135	13.0	2,580	1,555
30-Oct-05	30,098	6,250	300	24,148	23,532	15.6	3,257	12.6	2,641	616
06-Nov-05	30,098	4,827	300	25,571	24,119	18.0	3,895	11.3	2,443	1,452
13-Nov-05	30,117	4,260	300	26,157	24,117	21.7	4,662	12.2	2,622	2,040
20-Nov-05	30,117	3,398	300	27,019	24,694	22.4	4,941	11.9	2,616	2,325
27-Nov-05	30,117	3,397	300	27,020	25,111	20.3	4,560	11.8	2,651	1,909
04-Dec-05	30,117	3,322	300	27,095	25,622	20.2	4,553	13.7	3,080	1,473
11-Dec-05	30,117	2,741	300	27,676	26,722	19.3	4,471	15.2	3,517	954
18-Dec-05	30,117	1,755	300	28,662	26,621	22.7	5,306	14.0	3,265	2,041
25-Dec-05	30,117	1,317	300	29,100	26,915	25.0	5,821	15.6	3,636	2,185
01-Jan-06	30,117	1,317	300	29,100	25,059	33.4	7,285	14.9	3,244	4,041

Table A3 Demand Forecast Range For Required Resources Calculation

Week Ending Day	Ontario Demand Normal Weather MW	Ontario Demand Extreme Weather MW
04-Jul-04	23,275	25,598
11-Jul-04	23,558	26,238
18-Jul-04	23,198	25,355
25-Jul-04	23,129	24,939
01-Aug-04	22,768	25,280
08-Aug-04	23,000	25,503
15-Aug-04	22,876	25,107
22-Aug-04	22,631	24,791
29-Aug-04	23,077	25,689
05-Sep-04	22,415	25,074
12-Sep-04	21,693	24,728
19-Sep-04	20,714	23,917
26-Sep-04	19,232	22,725
03-Oct-04	19,299	22,842
10-Oct-04	19,484	20,064
17-Oct-04	19,509	20,793
24-Oct-04	20,533	21,100
31-Oct-04	21,351	21,524
07-Nov-04	21,361	22,082
14-Nov-04	21,826	22,814
21-Nov-04	22,231	23,366
28-Nov-04	22,341	23,904
05-Dec-04	23,069	24,791
12-Dec-04	23,248	24,410
19-Dec-04	23,216	25,353
26-Dec-04	22,442	23,787
02-Jan-05	21,683	23,027
09-Jan-05	23,600	25,501
16-Jan-05	23,641	25,433
23-Jan-05	23,734	25,077
30-Jan-05	23,344	25,157
06-Feb-05	23,524	25,020
13-Feb-05	23,262	24,569
20-Feb-05	23,039	24,527
27-Feb-05	22,606	23,764
06-Mar-05	22,487	23,806
13-Mar-05	22,064	23,629
20-Mar-05	21,604	22,904
27-Mar-05	21,246	22,455

(Table A3 continued)

Week Ending Day	Ontario Demand Normal Weather MW	Ontario Demand Extreme Weather MW
03-Apr-05	20,514	21,842
10-Apr-05	20,565	21,988
17-Apr-05	20,016	21,178
24-Apr-05	20,099	20,704
01-May-05	19,313	20,301
08-May-05	19,316	22,496
15-May-05	19,309	22,965
22-May-05	20,141	22,640
29-May-05	20,414	23,407
05-Jun-05	21,482	24,155
12-Jun-05	21,695	24,929
19-Jun-05	22,573	25,899
26-Jun-05	23,522	25,798
03-Jul-05	23,009	25,642
10-Jul-05	23,828	26,649
17-Jul-05	23,750	25,932
24-Jul-05	23,503	25,661
31-Jul-05	23,461	25,271
07-Aug-05	23,239	25,750
14-Aug-05	23,427	25,930
21-Aug-05	23,319	25,550
28-Aug-05	23,079	25,238
04-Sep-05	23,438	26,050
11-Sep-05	22,674	25,332
18-Sep-05	21,945	24,981
25-Sep-05	20,997	24,200
02-Oct-05	19,446	23,037
09-Oct-05	19,599	23,322
16-Oct-05	19,865	20,437
23-Oct-05	19,867	21,151
30-Oct-05	20,891	21,458
06-Nov-05	21,676	21,849
13-Nov-05	21,495	22,216
20-Nov-05	22,078	23,066
27-Nov-05	22,460	23,595
04-Dec-05	22,542	24,105
11-Dec-05	23,205	24,927
18-Dec-05	23,356	24,518
25-Dec-05	23,279	25,415
01-Jan-06	21,815	23,160

Table A4 Assessment of Resource Adequacy: Extreme Weather, Existing Resource Scenario

Week Ending Day	Total Resources MW	Total Reductions in Resources MW	Price-Responsive Demand MW	Available Resources MW	Required Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Above Requirement MW
04-Jul-04	30,520	3,148	0	27,372	29,006	6.9	1,774	13.3	3,408	-1,634
11-Jul-04	30,520	3,804	0	26,716	29,819	1.8	478	13.7	3,581	-3,103
18-Jul-04	30,520	3,221	0	27,299	28,724	7.7	1,944	13.3	3,369	-1,425
25-Jul-04	30,520	3,207	0	27,313	28,215	9.5	2,374	13.1	3,276	-902
01-Aug-04	30,520	4,165	0	26,355	28,643	4.3	1,075	13.3	3,363	-2,288
08-Aug-04	30,520	3,350	0	27,170	28,872	6.5	1,667	13.2	3,369	-1,702
15-Aug-04	30,520	3,317	0	27,203	28,395	8.4	2,096	13.1	3,288	-1,192
22-Aug-04	30,520	2,732	0	27,788	28,010	12.1	2,997	13.0	3,219	-222
29-Aug-04	30,520	3,101	0	27,419	29,104	6.7	1,730	13.3	3,415	-1,685
05-Sep-04	30,520	3,452	0	27,068	28,618	8.0	1,994	14.1	3,544	-1,550
12-Sep-04	30,520	4,810	0	25,710	28,298	4.0	982	14.4	3,570	-2,588
19-Sep-04	30,520	5,903	0	24,617	27,461	2.9	700	14.8	3,544	-2,844
26-Sep-04	30,520	7,946	0	22,574	26,235	-0.7	-151	15.5	3,510	-3,661
03-Oct-04	30,520	8,817	0	21,703	26,517	-5.0	-1,139	16.1	3,675	-4,814
10-Oct-04	30,520	8,686	0	21,834	23,115	8.8	1,770	15.2	3,051	-1,281
17-Oct-04	30,520	8,414	0	22,106	23,963	6.3	1,313	15.3	3,170	-1,857
24-Oct-04	30,520	8,540	0	21,980	24,344	4.2	880	15.4	3,244	-2,364
31-Oct-04	30,520	6,009	0	24,511	24,545	13.9	2,987	14.0	3,021	-34
07-Nov-04	30,545	5,875	0	24,670	25,061	11.7	2,588	13.5	2,979	-391
14-Nov-04	30,545	5,875	0	24,670	25,948	8.1	1,856	13.7	3,134	-1,278
21-Nov-04	30,545	5,652	0	24,893	26,566	6.5	1,527	13.7	3,200	-1,673
28-Nov-04	30,545	4,401	0	26,144	27,199	9.4	2,240	13.8	3,295	-1,055
05-Dec-04	30,545	4,271	0	26,274	28,112	6.0	1,483	13.4	3,321	-1,838
12-Dec-04	30,545	4,274	0	26,271	27,654	7.6	1,861	13.3	3,244	-1,383
19-Dec-04	30,545	2,331	0	28,214	28,632	11.3	2,861	12.9	3,279	-418
26-Dec-04	30,545	1,416	0	29,129	26,973	22.5	5,342	13.4	3,186	2,156
02-Jan-05	30,545	1,357	0	29,188	26,062	26.8	6,161	13.2	3,035	3,126
09-Jan-05	30,545	1,326	0	29,219	28,658	14.6	3,718	12.4	3,157	561
16-Jan-05	30,545	2,104	0	28,441	28,637	11.8	3,008	12.6	3,204	-196
23-Jan-05	30,545	2,104	0	28,441	28,223	13.4	3,364	12.6	3,146	218
30-Jan-05	30,545	2,104	0	28,441	28,320	13.1	3,284	12.6	3,163	121
06-Feb-05	30,564	2,590	0	27,974	28,157	11.8	2,954	12.5	3,137	-183
13-Feb-05	30,564	2,590	0	27,974	27,619	13.9	3,405	12.4	3,050	355
20-Feb-05	30,564	1,833	0	28,731	27,520	17.1	4,204	12.2	2,993	1,211
27-Feb-05	30,564	3,680	0	26,884	26,703	13.1	3,120	12.4	2,939	181
06-Mar-05	30,564	4,256	0	26,308	26,982	10.5	2,502	13.3	3,176	-674
13-Mar-05	30,564	4,256	0	26,308	26,771	11.3	2,679	13.3	3,142	-463
20-Mar-05	30,564	5,160	0	25,404	26,004	10.9	2,500	13.5	3,100	-600
27-Mar-05	30,564	6,660	0	23,904	25,456	6.5	1,449	13.4	3,001	-1,552

(Table A4 continued)

Week Ending Day	Total Resources MW	Total Reductions in Resources MW	Price-Responsive Demand MW	Available Resources MW	Required Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Above Requirement MW
03-Apr-05	30,564	5,803	0	24,761	24,925	13.4	2,919	14.1	3,083	-164
10-Apr-05	30,564	5,243	0	25,321	25,057	15.2	3,333	14.0	3,069	264
17-Apr-05	30,564	5,359	0	25,205	24,244	19.0	4,027	14.5	3,066	961
24-Apr-05	30,564	5,408	0	25,156	23,770	21.5	4,452	14.8	3,066	1,386
01-May-05	30,564	6,047	0	24,517	23,373	20.8	4,216	15.1	3,072	1,144
08-May-05	29,441	6,528	0	22,913	25,473	1.9	417	13.2	2,977	-2,560
15-May-05	29,441	5,434	0	24,007	25,980	4.5	1,042	13.1	3,015	-1,973
22-May-05	29,441	6,390	0	23,051	25,518	1.8	411	12.7	2,878	-2,467
29-May-05	29,441	5,317	0	24,124	26,497	3.1	717	13.2	3,090	-2,373
05-Jun-05	29,441	3,702	0	25,739	26,860	6.6	1,584	11.2	2,705	-1,121
12-Jun-05	29,441	3,301	0	26,140	27,797	4.9	1,211	11.5	2,868	-1,657
19-Jun-05	29,441	3,317	0	26,124	28,956	0.9	225	11.8	3,057	-2,832
26-Jun-05	29,441	3,266	0	26,175	28,840	1.5	377	11.8	3,042	-2,665
03-Jul-05	29,441	2,424	0	27,017	28,589	5.4	1,375	11.5	2,947	-1,572
10-Jul-05	29,441	2,522	0	26,919	29,775	1.0	270	11.7	3,126	-2,856
17-Jul-05	29,441	2,516	0	26,925	28,931	3.8	993	11.6	2,999	-2,006
24-Jul-05	29,441	1,999	0	27,442	28,607	6.9	1,781	11.5	2,946	-1,165
31-Jul-05	29,441	2,022	0	27,419	28,112	8.5	2,148	11.2	2,841	-693
07-Aug-05	29,441	2,001	0	27,440	28,678	6.6	1,690	11.4	2,928	-1,238
14-Aug-05	29,441	1,987	0	27,454	28,892	5.9	1,524	11.4	2,962	-1,438
21-Aug-05	29,441	1,998	0	27,443	28,450	7.4	1,893	11.4	2,900	-1,007
28-Aug-05	29,441	1,952	0	27,489	28,048	8.9	2,251	11.1	2,810	-559
04-Sep-05	29,441	2,799	0	26,642	29,265	2.3	592	12.3	3,215	-2,623
11-Sep-05	29,441	3,212	0	26,229	28,461	3.5	897	12.4	3,129	-2,232
18-Sep-05	29,441	3,640	0	25,801	28,016	3.3	820	12.2	3,035	-2,215
25-Sep-05	29,441	4,534	0	24,907	27,196	2.9	707	12.4	2,996	-2,289
02-Oct-05	29,441	5,904	0	23,537	26,028	2.2	500	13.0	2,991	-2,491
09-Oct-05	29,441	5,834	0	23,607	26,377	1.2	285	13.1	3,055	-2,770
16-Oct-05	29,441	5,771	0	23,670	22,916	15.8	3,233	12.1	2,479	754
23-Oct-05	29,441	6,211	0	23,230	23,754	9.8	2,079	12.3	2,603	-524
30-Oct-05	29,441	6,142	0	23,299	24,123	8.6	1,841	12.4	2,665	-824
06-Nov-05	29,441	4,741	0	24,700	24,304	13.1	2,851	11.2	2,455	396
13-Nov-05	29,460	4,112	0	25,348	24,751	14.1	3,132	11.4	2,535	597
20-Nov-05	29,460	3,315	0	26,145	25,671	13.4	3,079	11.3	2,605	474
27-Nov-05	29,460	3,287	0	26,173	26,303	10.9	2,578	11.5	2,708	-130
04-Dec-05	29,460	3,205	0	26,255	26,731	8.9	2,150	10.9	2,626	-476
11-Dec-05	29,460	2,587	0	26,873	27,662	7.8	1,946	11.0	2,735	-789
18-Dec-05	29,460	1,584	0	27,876	27,163	13.7	3,358	10.8	2,645	713
25-Dec-05	29,460	1,071	0	28,389	28,215	11.7	2,974	11.0	2,800	174
01-Jan-06	29,460	1,237	0	28,223	25,738	21.9	5,063	11.1	2,578	2,485

Table A5 Assessment of Resource Adequacy: Extreme Weather, Planned Resource Scenario

Week Ending Day	Total Resources MW	Total Reductions in Resources MW	Price-Responsive Demand MW	Available Resources MW	Required Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Above Requirement MW
04-Jul-04	30,520	3,148	300	27,672	29,006	8.1	2,074	13.3	3,408	-1,334
11-Jul-04	30,520	3,804	300	27,016	29,819	3.0	778	13.7	3,581	-2,803
18-Jul-04	31,145	3,312	300	28,133	28,688	11.0	2,778	13.2	3,333	-555
25-Jul-04	31,145	3,298	300	28,147	28,188	12.9	3,208	13.0	3,249	-41
01-Aug-04	31,145	4,256	300	27,189	28,601	7.6	1,909	13.1	3,321	-1,412
08-Aug-04	31,177	3,443	300	28,034	28,838	9.9	2,531	13.1	3,335	-804
15-Aug-04	31,177	3,410	300	28,067	28,356	11.8	2,960	12.9	3,249	-289
22-Aug-04	31,177	2,825	300	28,652	27,961	15.6	3,861	12.8	3,170	691
29-Aug-04	31,177	3,194	300	28,283	29,080	10.1	2,594	13.2	3,391	-797
05-Sep-04	31,177	3,531	300	27,946	28,574	11.5	2,872	14.0	3,500	-628
12-Sep-04	31,177	4,889	300	26,588	28,256	7.5	1,860	14.3	3,528	-1,668
19-Sep-04	31,177	5,982	300	25,495	27,423	6.6	1,578	14.7	3,506	-1,928
26-Sep-04	31,177	8,025	300	23,452	26,191	3.2	727	15.3	3,466	-2,739
03-Oct-04	31,177	8,896	300	22,581	26,468	-1.1	-261	15.9	3,626	-3,887
10-Oct-04	31,177	8,749	300	22,728	23,088	13.3	2,664	15.1	3,024	-360
17-Oct-04	31,177	8,477	300	23,000	23,912	10.6	2,207	15.0	3,119	-912
24-Oct-04	31,177	8,603	300	22,874	24,319	8.4	1,774	15.3	3,219	-1,445
31-Oct-04	31,177	6,072	300	25,405	24,519	18.0	3,881	13.9	2,995	886
07-Nov-04	31,202	5,926	300	25,576	25,007	15.8	3,494	13.3	2,925	569
14-Nov-04	31,202	5,926	300	25,576	25,891	12.1	2,762	13.5	3,077	-315
21-Nov-04	31,202	5,703	300	25,799	26,533	10.4	2,433	13.6	3,167	-734
28-Nov-04	31,202	4,452	300	27,050	27,161	13.2	3,146	13.6	3,257	-111
05-Dec-04	31,202	4,310	300	27,192	28,076	9.7	2,401	13.3	3,285	-884
12-Dec-04	31,202	4,313	300	27,189	27,612	11.4	2,779	13.1	3,202	-423
19-Dec-04	31,202	2,370	300	29,132	28,601	14.9	3,779	12.8	3,248	531
26-Dec-04	31,202	1,455	300	30,047	27,035	26.3	6,260	13.7	3,248	3,012
02-Jan-05	31,202	1,396	300	30,106	26,093	30.7	7,079	13.3	3,066	4,013
09-Jan-05	31,202	1,365	300	30,137	28,596	18.2	4,636	12.1	3,095	1,541
16-Jan-05	31,202	2,143	300	29,359	28,566	15.4	3,926	12.3	3,133	793
23-Jan-05	31,202	2,143	300	29,359	28,135	17.1	4,282	12.2	3,058	1,224
30-Jan-05	31,202	2,143	300	29,359	28,230	16.7	4,202	12.2	3,073	1,129
06-Feb-05	31,221	2,629	300	28,892	28,084	15.5	3,872	12.3	3,064	808
13-Feb-05	31,221	2,629	300	28,892	27,543	17.6	4,323	12.1	2,974	1,349
20-Feb-05	31,221	1,872	300	29,649	27,550	20.9	5,122	12.3	3,023	2,099
27-Feb-05	31,221	3,719	300	27,802	26,618	17.0	4,038	12.0	2,854	1,184
06-Mar-05	31,221	4,307	300	27,214	26,924	14.3	3,408	13.1	3,118	290
13-Mar-05	31,221	4,307	300	27,214	26,699	15.2	3,585	13.0	3,070	515
20-Mar-05	31,221	5,211	300	26,310	25,931	14.9	3,406	13.2	3,027	379
27-Mar-05	31,221	6,711	300	24,810	25,378	10.5	2,355	13.0	2,923	-568

(Table A5 continued)

Week Ending Day	Total Resources MW	Total Reductions in Resources MW	Price-Responsive Demand MW	Available Resources MW	Required Resources MW	Available Reserve %	Available Reserve MW	Required Reserve %	Required Reserve MW	Reserve Above Requirement MW
03-Apr-05	31,221	5,854	300	25,667	24,867	17.5	3,825	13.9	3,025	800
10-Apr-05	31,221	5,306	300	26,215	25,052	19.2	4,227	13.9	3,064	1,163
17-Apr-05	31,221	5,422	300	26,099	24,273	23.2	4,921	14.6	3,095	1,826
24-Apr-05	31,221	5,471	300	26,050	23,799	25.8	5,346	15.0	3,095	2,251
01-May-05	31,221	6,110	300	25,411	23,403	25.2	5,110	15.3	3,102	2,008
08-May-05	30,098	6,591	300	23,807	25,394	5.8	1,311	12.9	2,898	-1,587
15-May-05	30,098	5,497	300	24,901	25,925	8.4	1,936	12.9	2,960	-1,024
22-May-05	30,098	6,453	300	23,945	25,434	5.8	1,305	12.3	2,794	-1,489
29-May-05	30,098	5,380	300	25,018	26,404	6.9	1,611	12.8	2,997	-1,386
05-Jun-05	30,098	3,765	300	26,633	26,787	10.3	2,478	10.9	2,632	-154
12-Jun-05	30,098	3,380	300	27,018	27,734	8.4	2,089	11.3	2,805	-716
19-Jun-05	30,098	3,396	300	27,002	28,900	4.3	1,103	11.6	3,001	-1,898
26-Jun-05	30,098	3,345	300	27,053	28,789	4.9	1,255	11.6	2,991	-1,736
03-Jul-05	30,098	2,503	300	27,895	28,531	8.8	2,253	11.3	2,889	-636
10-Jul-05	30,098	2,615	300	27,783	29,724	4.3	1,134	11.5	3,075	-1,941
17-Jul-05	30,098	2,609	300	27,789	28,859	7.2	1,857	11.3	2,927	-1,070
24-Jul-05	30,098	2,092	300	28,306	28,515	10.3	2,645	11.1	2,854	-209
31-Jul-05	30,098	2,115	300	28,283	28,056	11.9	3,012	11.0	2,785	227
07-Aug-05	30,098	2,094	300	28,304	28,598	9.9	2,554	11.1	2,848	-294
14-Aug-05	30,098	2,080	300	28,318	28,829	9.2	2,388	11.2	2,899	-511
21-Aug-05	30,098	2,091	300	28,307	28,359	10.8	2,757	11.0	2,809	-52
28-Aug-05	30,098	2,045	300	28,353	27,993	12.3	3,115	10.9	2,755	360
04-Sep-05	30,098	2,878	300	27,520	29,215	5.6	1,470	12.2	3,165	-1,695
11-Sep-05	30,098	3,291	300	27,107	28,392	7.0	1,775	12.1	3,060	-1,285
18-Sep-05	30,098	3,719	300	26,679	27,934	6.8	1,698	11.8	2,953	-1,255
25-Sep-05	30,098	4,613	300	25,785	27,109	6.6	1,585	12.0	2,909	-1,324
02-Oct-05	30,098	5,983	300	24,415	25,940	6.0	1,378	12.6	2,903	-1,525
09-Oct-05	30,098	5,897	300	24,501	26,310	5.1	1,179	12.8	2,988	-1,809
16-Oct-05	30,098	5,834	300	24,564	22,943	20.2	4,127	12.3	2,506	1,621
23-Oct-05	30,098	6,274	300	24,124	23,673	14.1	2,973	11.9	2,522	451
30-Oct-05	30,098	6,205	300	24,193	24,061	12.8	2,735	12.1	2,603	132
06-Nov-05	30,098	4,804	300	25,594	24,245	17.1	3,745	11.0	2,396	1,349
13-Nov-05	30,117	4,163	300	26,254	24,712	18.2	4,038	11.2	2,496	1,542
20-Nov-05	30,117	3,366	300	27,051	25,610	17.3	3,985	11.0	2,544	1,441
27-Nov-05	30,117	3,338	300	27,079	26,235	14.8	3,484	11.2	2,640	844
04-Dec-05	30,117	3,256	300	27,161	26,668	12.7	3,056	10.6	2,563	493
11-Dec-05	30,117	2,626	300	27,791	27,585	11.5	2,864	10.7	2,658	206
18-Dec-05	30,117	1,623	300	28,794	27,100	17.4	4,276	10.5	2,582	1,694
25-Dec-05	30,117	1,110	300	29,307	28,136	15.3	3,892	10.7	2,721	1,171
01-Jan-06	30,117	1,276	300	29,141	25,768	25.8	5,981	11.3	2,608	3,373

Table A6 Energy Production Capability Forecast

Month	Forecast Energy Production Capability Existing Resource Scenario (GWh)	Forecast Energy Production Capability Planned Resource Scenario (GWh)
Jul 2004	16,817	17,050
Aug 2004	16,816	17,200
Sep 2004	14,024	14,405
Oct 2004	13,919	14,322
Nov 2004	14,992	15,391
Dec 2004	17,339	17,762
Jan 2005	17,684	18,124
Feb 2005	15,511	15,908
Mar 2005	15,297	15,728
Apr 2005	14,836	15,246
May 2005	15,007	15,430
Jun 2005	16,138	16,538
Jul 2005	16,976	17,379
Aug 2005	16,868	17,271
Sep 2005	14,616	15,015
Oct 2005	14,044	14,467
Nov 2005	15,475	15,891
Dec 2005	17,370	17,809

- End of Section -

This page intentionally left blank.

Appendix B Transmission Projects

East Zone	Projected I/S Date

Essa Zone	Projected I/S Date

Niagara Zone	Projected I/S Date
Bloomsburg TS: New 115/27.6 kV transformer station connected to A1N.	2004-Q3
Kalar TS: New 115/14.2 kV transformer station off lines A36N and A37N.	2004-Q3

Northeast Zone	Projected I/S Date
GLP Transmission Reinforcement Stage1: Remove from service 115 kV circuit No.3 Sault.	2004-Q3

Northwest Zone	Projected I/S Date
North Caribou Lake: Add new supply point.	2005-Q2

Ottawa Zone	Projected I/S Date
Hawthorne TS: Add one 250 MVA 230/115 kV autotransformer and one new double circuit line from Hawthorne to Blackburn Jct.	2004-Q3
Upgrade 115 kV circuit H9A.	2004-Q4

Southwest Zone	Projected I/S Date
Caledonia TS: Add two new 75/125 MVA 230/115 kV autotransformers and re-supply Norfolk TS off these new autotransformers.	2004-Q2
Kitchener: Build new 230/14.2 kV transformer station.	2004-Q3
Trafalgar TS: New 300 MVAR Shunt Capacitor	2005-Q2
Burlington TS: Install 230 kV, 300 Mvar shunt capacitor.	2004-Q4

Toronto Zone	Projected I/S Date
Leaside TS: Install 125 Mvar shunt capacitor.	2004-Q3
Richview TS, John TS : Install, respectively, 230 kV, 412 Mvar and 115 kV, 100 Mvar shunt capacitor banks.	2004-Q4
Leaside TS: Install second 125 Mvar shunt capacitor.	2005-Q2
Mississauga TS: New transformer station.	2005-Q2
Parkway TS - Build new transformer station with one 750 MVA, 500/230 kV autotransformer.	2005-Q2
Vaughan MTS #1: Add new 3rd transformer.	2005-Q2

West Zone	Projected I/S Date
London Highbury TS: Replace low voltage capacitor bank SC2.	2004-Q3
Belle River East DS: Build new 115/27.6 kV distribution station.	2004-Q3
Kent TS: Install new 125 MVA 230/115 kV autotransformer.	2004-Q4

- End of Section -

Appendix C Planned Transmission Outages

The following tables list the planned transmission outages by transmission zone, for transmission outages with an expected duration greater than five days, and/or for those transmission outages associated with a major project.

Table C1 Bruce Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
9/27/04 7:00 AM	11/12/04 3:00 PM	Bruce A TS.AL562	CWW	1 Week	FABC	0 MW

Table C2 East Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
9/20/04 7:30 PM	11/13/04 12:00 PM	Chenaux TS.A1-A2	CWW	Non-Recallable		
1/10/04 11:01 PM	12/31/04 11:59 PM	Chats Falls T20-Q4C	CWW	Non-Recallable	Chats HQ units segregated.	
11/15/04 7:00 AM	11/26/04 5:00 PM	B5D_BEAUHARNOIS	CWW	Non-Recallable	B5D	Quebec to IMO 4 Terminal Mode limit reduced from 800 to 400 MW
10/18/04 7:00 AM	11/5/04 6:00 PM	B31L	CNW	Non-Recallable	B31L	Quebec to IMO 4 Terminal Mode limit reduced from 800 to 400 MW
8/3/04 7:00 AM	8/20/04 6:00 PM	Q4C	CWW	Non-Recallable	Q4C	IMO to Quebec limit reduced from 120 to 0 MW
9/27/04 7:00 AM	11/25/04 6:00 PM	P33C	CWW	2 Week	P33C	Quebec to IMO limit reduced to 0
9/11/04 6:00 PM	9/19/04 7:30 PM	Pembroke TS.6X6-D6 -I/S Chenaux TS.4-X1P 4X1P A1-A2 T4-A T4 R4-S 4X6 R4-T A3-A4	CWW	Non-Recallable	Chenaux units G5-G8 will be isolated.	

Table C3 Essa Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
6/23/04 6:00 PM	9/13/04 6:00 AM	Essa TS.T3-R3	CWW	Non-Recallable	FABC	Up to 100 MW

Table C4 Niagara Zone

No outages to assess.

Table C5 Northeast Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
6/7/04 10:00 AM	7/2/04 2:00 PM	Pinard TS.PL22	CWW	Non-Recallable		
1/23/04 12:01 AM	12/31/04 11:59 PM	Agimak T2 T2-L o/s for SE Convergence	CWW	Non-Recallable		
5/17/04 5:01 AM	11/22/04 11:59 PM	Anjigami TS 813 814 815	CWW	Non-Recallable	EWTE	Up to 75 MW
5/17/04 5:01 AM	11/22/04 11:59 PM	MACKAY TS ANJIGAMI#2	CWW	Non-Recallable	EWTE	Up to 75 MW
5/17/04 5:01 AM	11/22/04 11:59 PM	Anjigami TS 825	CWW	Non-Recallable	EWTE	Up to 75 MW
5/28/03 11:12 AM	12/31/04 11:59 PM	ANJIGAMI LINE #2	CWW	Non-Recallable	EWTE	Up to 75 MW
12/13/03 12:00 AM	12/31/04 11:59 PM	Anjigami Line #1 from Mackay TS to Anjigami TS	CWW	Non-Recallable		
4/18/04 3:37 PM	4/19/05 11:59 PM	Anjigami Line #1 Mackay TS to Anjigami TS	CWW	Non-Recallable		
5/17/04 5:01 AM	11/22/04 11:59 PM	ANJIGAMI-LINE-#1 MACKAY TS	CWW	Non-Recallable		

Table C6 Northwest Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
12/13/04 12:01 AM	12/19/04 11:59 PM	Thunder Bay C1	CWW	Non-Recallable		
5/15/05 12:01 AM	7/24/05 11:59 PM	Thunder Bay C1	CWW	Non-Recallable		
12/12/05 12:01 AM	12/18/05 11:59 PM	Thunder Bay C1	CWW	Non-Recallable		
6/19/06 12:01 AM	6/25/06 11:59 PM	Thunder Bay C1	CWW	Non-Recallable		
12/18/06 12:01 AM	12/24/06 11:59 PM	Thunder Bay C1	CWW	Non-Recallable		
3/28/03 10:02 PM	12/31/04 6:00 PM	Port Arthur TS #2.T1	CWW	30 Day		
10/24/03 9:00 AM	12/31/04 3:00 PM	Birch TS.SC1 .SC1A	CWW	2 Week		
10/24/03 9:00 AM	12/31/04 3:00 PM	Birch TS.SC1A	CWW	2 Week		
10/24/03 9:00 AM	12/31/04 3:00 PM	Birch TS.SC1	CWW	2 Week		

Table C7 Ottawa Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
8/9/03 5:00 PM	12/31/04 11:59 PM	Masson-HQ CGS H9A-L	CWW	Non-Recallable		
6/20/04 5:00 AM	7/4/04 4:00 PM	Riverdale JCT.4803MSO-36	CWW	Non-Recallable		
9/13/04 5:00 AM	10/22/04 3:00 PM	Hawthorne TS.SC11	CWW	Non-Recallable		
9/20/04 5:00 AM	10/1/04 6:00 PM	Merivale TS.D1L10	CWW	Non-Recallable		
10/4/04 5:00 AM	10/22/04 6:00 PM	Merivale TS.D1L4	CWW	Non-Recallable		

Table C8 Southwest Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
10/27/03 11:43 AM	12/31/04 6:00 PM	Gage TS.T2 T2-P T2Q	CWW	Non-Recallable		
7/5/04 7:00 AM	8/6/04 6:00 PM	L7S_SEAFORTH	CNW	Non-Recallable		
8/3/04 6:00 AM	8/12/04 4:00 PM	St.Marys TS.T1	CWW	Non-Recallable		
7/16/04 8:00 AM	8/26/04 4:00 PM	St.Marys TS.T2	CWW	Non-Recallable		
6/14/04 7:00 AM	8/12/04 6:00 PM	B28S	CNW	Non-Recallable		
6/21/04 6:00 AM	7/8/04 4:00 PM	St.Marys TS.T1	CWW	Non-Recallable		
7/19/04 6:00 AM	7/29/04 4:00 PM	St.Marys TS.SC1Y	CWW	Non-Recallable		

Table C9 Toronto Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
10/4/04 5:00 AM	11/26/04 6:00 PM	Manby West TS.T4 TS.T4Y	CWW	3 Week		
10/7/04 8:00 AM	11/26/04 3:00 PM	Claireville TS.W3L570	CWW	5 Day		
5/10/04 7:00 AM	7/20/04 4:00 PM	Cecil TS.T4	CWW	Non-Recallable		
3/5/02 9:06 PM	12/31/04 4:00 PM	Bramalea TS.SC4	CWW	Non-Recallable		
4/22/04 5:00 AM	12/31/04 6:00 PM	Hearn SS.SC12	CWW	Non-Recallable		

Table C10 West Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
8/9/04 7:00 AM	8/26/04 4:00 PM	Highbury TS.SC2 SC2J	CWW	Non-Recallable		
6/28/04 7:30 AM	7/15/04 4:00 PM	Sarnia Scott TS.HL27	CWW	Non-Recallable		
6/14/04 7:00 AM	8/22/04 5:00 PM	Tillsonburg TS.T3	CWW	Non-Recallable		
10/4/04 7:00 AM	11/30/04 5:00 PM	Tillsonburg TS.T1	CWW	Non-Recallable		
10/4/04 7:00 AM	11/7/04 5:00 PM	Tillsonburg TS.T1-LC TS.T1	CWW	Non-Recallable		
12/1/04 7:00 AM	12/17/04 5:00 PM	Tillsonburg TS T2Y T2-L T2 T2-LC	CWW	Non-Recallable		

- End of Document -