Independent Electricity Market Operator

18-Month Outlook:

An Assessment of the Reliability of the Ontario Electricity System from January 2003 to June 2004

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Executive Summary

The Independent Electricity Market Operator (IMO) publishes on a quarterly basis an assessment of the reliability of the Ontario electricity system over the next 18 months. This report presents the IMO assessment of the 18-month period from January 2003 to June 2004. This assessment 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.

Changes since the last report

There are several changes in this Outlook from the one published in September. The forecast for energy demand and peak demand has increased modestly. The summer months' peaks have increased more than the other seasons' peaks as a result of incorporating the experiences of the past summer into the forecasting model. Although economic activity is forecast to be slightly lower than anticipated in the previous Outlook, higher sensitivity to economic drivers results in a slightly higher energy forecast.

More significant than the demand changes are the delays announced in October to the restart of the shutdown Pickering A nuclear units. These delays have reduced available generation substantially over the entire Outlook period. Recent issues may affect the restart dates of two laid-up Bruce A nuclear units, however they are still planned to be available before the summer. If the Pickering and Bruce nuclear units do not return to service as scheduled before next summer, supply will continue to be stretched thin.

There has also been a large change in the generator maintenance outage program since the last report making more generation available in the spring of 2003 and less in the fall of 2003.

In addition, the IMO has begun implementing regulations around the market changes first announced by the Provincial Government in November, including a fixed 4.3 cents per kWh commodity price for low-volume and designated Ontario consumers.

Continued reliance on electricity imports

The 18-month assessment continues to highlight the importance of electricity imports into the Ontario marketplace, particularly if generation is not returned to service. The reliance on imported power was demonstrated during the past summer, when hot, humid weather conditions helped produce a record peak demand of 25,414 MW. Approximately 1,650 MW of this demand was due to the higher than average heat and humidity. Compounding the high demand was the unanticipated shortage of Ontario-based generation over periods of the summer. The extremely hot conditions limited the amount of energy that could be produced from hydroelectric generating stations and sometimes restricted the amount of energy that could be delivered over the transmission system.

Going forward, delays in commissioning new units or returning generators to service, whether from lay-up or maintenance outages could once again lead to extensive reliance on imports.

Benefits of the wholesale market

The price responsiveness of the wholesale market was key to attracting the Ontario generators and the imports necessary to maintain the reliability of the electricity system during the summer. The higher market prices during tight supply periods provided a valuable incentive for generators outside the province to supply power to meet Ontario's high demands. During certain peak periods, Ontario was importing 4,000 MW of electricity from other jurisdictions, more than 1,000 MW higher than the previous summer when the market was not open to competition. The increased capability to import power, as compared to 2001, is attributed to the ability of a competitive wholesale marketplace to attract power from other jurisdictions on short notice to meet critical demands.

Wholesale market participants' reaction to the price signals also contributed to the reliability of the system during the summer months. Large wholesale market customers reduced their demand in response to market price signals. Without the support of external suppliers and price-responsive demand, the reliability of supply to Ontario consumers would have been in jeopardy and both measures will continue to play critical roles in meeting demand over the next 18 months.

Even with the 4.3 cents price freeze for certain customers, price-responsiveness on the wholesale market can continue to make a difference in addressing reliability concerns.

Weather impact

Extreme weather conditions are also addressed in the Outlook. If Ontario experiences extremely hot and humid weather conditions again next summer, with no increase in generation availability, there will be an even greater requirement for electricity imports and increased concern over the reliability of supply. Under these conditions, reliance on interconnected supply could at times reach the limits of the transmission system.

The risk of not being able to meet demand, even if for short duration, emphasises the need for new generating capacity and price responsiveness of the wholesale market participants to ensure continued reliability.

Two resource scenarios are considered in this Outlook – an Existing Resource Scenario and a Planned Resource Scenario. These are discussed more fully below.

Existing Resource Scenario

The Existing Resource Scenario assumes:

- existing generation in Ontario will be available consistent with the information provided by market participants;
- no additional generation in Ontario will be placed in service during the Outlook period, including new generation projects and nuclear generation returning to service;
- planned outages of generators and transmitters will take place consistent with information provided by market participants; and
- forecast Ontario Demand based on normal (average) weather over the past thirty years.

To assess reliability, the IMO uses this information to determine whether available resources are adequate to supply Ontario's anticipated demands and to accommodate circumstances that cannot be accurately predicted - such as weather variations and unforeseen generator outages.

Under the Existing Resource Scenario, reserve margins are forecast to be less than required for most of the study period, with only a few exceptions. Due to significant changes in the generator outage program since the last Outlook published on September 24, 2002, forecast reserve margins are generally improved for the first half of 2003 – but are still negative for several weeks in January, February, March, May, and all of June. They are generally lower in the second half of the year, particularly from mid-October through the end of 2003. Forecast reserve margins in the first half of 2004 are mostly negative.

Negative reserve margins throughout the Outlook period indicate that forecast reserve levels are below planning requirements. As such, planned generator outages during negative margin weeks 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. Given the large number of negative margin weeks in this Scenario, to the extent this Scenario materializes, opportunities for planned generator maintenance would be limited and substantial imports would be necessary.

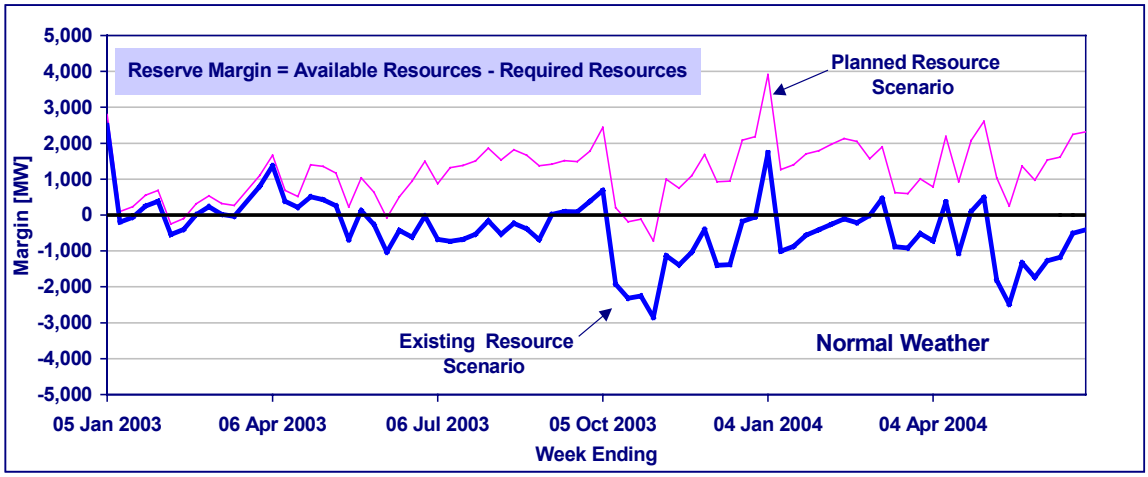
The above results must be assessed bearing in mind the risk factors described in the report under the heading "Resource Adequacy Risks". During most of the study period, a combination of high demand levels under extreme weather conditions and lower than forecast levels of available resources could lead to extensive reliance on imports and upward pressure on wholesale market prices. During this past summer, under such conditions, import levels reached the Ontario coincident import capability of approximately 4,000 MW.

Planned Resource Scenario

The Planned Resource Scenario is identical to the Existing Resource Scenario except that it includes approximately 2,500 MW of additional generation resources that are scheduled to be placed in-service during the Outlook period and 300 MW of price-responsive demand which was not included in the Existing Resource Scenario. The generation resources consist of new facilities currently under construction and laid-up nuclear units returning to service, each assumed to be available on the dates provided by market participants.

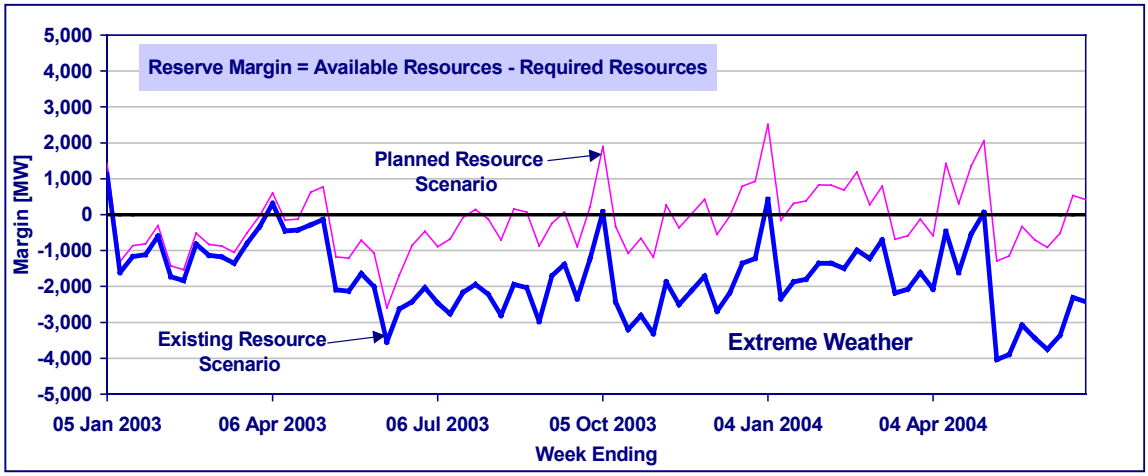
Under the Planned Resource Scenario, the resource adequacy situation for the winter of 2002/2003 is about the same as for the Existing Resource Scenario described above, and the same concerns and risks apply. For the remainder of the Outlook timeframe, forecast existing and planned resources exceed requirements with the exception of the period from mid-October 2003 through early November 2003. During this period, some planned outages are at risk of being cancelled, and high levels of imports may be necessary.

The following figure illustrates the weekly resource adequacy situation of the Ontario electricity system for the two resource availability scenarios under normal weather conditions. Reserve margins greater or equal to zero mean adequate resources, while reserve margins less than zero mean resources are below planning target levels.



Under both scenarios, it is anticipated that market participants will focus on periods of positive and negative reserve margins as opportunities to optimize their operational and commercial plans and maximize supply during tight periods.

In order to illustrate the impact of extreme weather on forecast reserve margins 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 of the period is extremely small; however, when one looks at an entire summer or winter period, the expectation of at least one occurrence of extreme weather becomes considerably higher. The results for extreme weather are shown in the chart below.



The magnitude of resource deficiencies, under extreme weather, clearly illustrates there are circumstances under which reliance on interconnected supply would be stretched to the limits of the transmission system.

Ontario Demand Forecast

The IMO demand forecasting model has been updated to reflect actual economic, demand and weather data through the end of September 2002. By incorporating the strong actual demand values for the third quarter of 2002 the model's sensitivity to hot weather and economic activity has increased. Therefore, despite a marginally weaker economic outlook for 2003 and 2004, the forecast for energy and peak demand have increased modestly since the last forecast. The energy demand forecast for 2003 is 152.1 TWh, representing a 0.6% increase over the expected weather corrected total for 2002. The forecasted energy demand for 2003 is 1.1 TWh higher than the previous forecast. The peak demand forecast for both the winter and summer of 2003 are higher than the previous forecast due to the model's increased sensitivity to hot weather and economic activity. The Normal weather peak demand for the winter of 2003 is expected to reach 23,890 MW and the Extreme weather peak demand is expected to exceed 25,600 MW. For the summer of 2003, the forecast Normal weather peak is 23,670 MW and the forecast Extreme weather peak is 26,385 MW.

Transmission Outlook

As in the previous Outlook, the transmission system is expected to be adequate to supply demand under the forecast conditions studied in this Outlook, with some limits on the flexibility for planned outages in the Toronto and Windsor areas. Lakeview, Pickering and Darlington units are required to provide reactive capability to maintain adequate voltage levels during summer peak demand periods.

Without new generation additions, some transmission outages will be difficult to schedule or may be recalled on short notice, as was the case this year.

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1.0 Introduction

This Outlook covers the 18-Month period from January 1, 2003 to June 30, 2004. It supercedes the report titled "An Assessment of the Reliability of the Ontario Electricity System from October 2002 to March 2004", dated September 24, 2002. 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 changes in assumptions can be considered. The tables contained in the document can be downloaded from the IMO web site in MS Excel format.

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 supercede 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 separate document titled "Ontario Demand Forecast from January 2003 to June 2004" (IMO_REP_0093) (found on the IMO web site at www.theimo.com/imoweb/pubs/marketReports/18Month_ODF_2003jan.pdf) describes in detail the 18-month forecast of electricity demand for the Ontario Market used in this Outlook. The demand forecast document also 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 separate document titled "Methodology to Perform Long Term Assessments" (IMO_REP_0044) (found on the IMO web site at www.theimo.com/imoweb/pubs/marketReports/Methodology_RTAA_2003jan.pdf) contains information regarding the methodology used to perform the demand forecasts, resource adequacy assessments and transmission reliability assessments in this Outlook.

- The separate document titled "Ontario Transmission System" (IMO_REP_0045) (found on the IMO web site at www.theimo.com/imoweb/pubs/marketReports/OntTxSystem_2003jan.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.

1.1 Changes from Previous Outlook

Changes to Forecast Demands

The forecast for energy and peak demand has increased modestly since the last forecast. The energy demand forecast for 2003 is 152.1 TWh, representing a 0.6% increase over the expected weather corrected total for 2002 and a 1.2 TWh increase from the previous Outlook. The peak demand forecast for both the winter and summer of 2003 are higher than the previous forecast due to the model's increased sensitivity to hot weather and economic activity.

The economic outlook sees a marginally weaker 2003-2004 as compared to the previous forecast. The increased sensitivity of the model means a higher forecast of peak and energy demand, despite the slightly lower economic outlook.

The peak values are higher overall due to the increased sensitivity to economic activity. However, the increases are not proportional, as the summer months' peaks have increased more than the other seasons. This is a result of incorporating the demand and weather data of the summer of 2002 into the model. The previous forecast predicted a 2003 normal weather winter peak of just over 23,755 MW whereas this forecast predicts a higher peak of 23,891 MW. The current forecast predicts a 2003 normal weather summer peak of 23,672 MW as opposed to the 23,354 MW peak previously forecast. The extreme weather winter peak for 2003 is higher than the previous forecast (25,657 MW vs. 25,470 MW). The extreme weather summer peak for 2003 tops 26,385 MW, up significantly from the 26,000 MW extreme previously forecasted.

Changes to Resources

The list of existing installed generation resources has been updated from the previous 18-Month Outlook, to include all generators that are registered to participate in the IMO-administered markets, the latest generation resource additions and upgrades, and the latest capacity ratings. The list does not include generators that are not registered to participate in the IMO-administered markets.

Another change is that only one Pickering A nuclear unit was identified as returning to service within the 18-month period. The reactivation of this unit was reflected only in the Planned Resource Scenario.

There are also significant changes to the generator outage program, as submitted by market participants. The main change since last Outlook is a shift in timing of the Darlington containment outage from the spring of 2003 to the fall of 2003.

In past Outlooks, 300 MW of price-responsive demand was assumed to be available for the purposes of resource adequacy assessments. In this Outlook, 300 MW of price-responsive demand was assumed to be available only under the Planned Resource Scenario. No price-responsive demand was assumed to be available under the Existing Resource Scenario.

Changes to Transmission Outlook

Transmission projects and planned and forced transmission outages have been updated from the previous 18-Month Outlook.

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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 generation resources within Ontario are summarized in Table 2.1. This includes nuclear, coal, oil, gas, hydroelectric, wood and waste-fuelled generation and results in a total capacity of 30,548 MW. The new TransAlta – Sarnia Regional Cogeneration Project (SRCP) was considered to be part of the existing generation resources, as commissioning tests of this facility were well underway at the time this report was being written.

The capacity of installed generation resources in Table 2.1 does not include Bruce A nuclear units, which are currently in laid-up state. Two of the Bruce A nuclear units, together with other additions to generating capacity identified to the IMO, were progressively added to the installed resources, under the Planned Resource Scenario only, as described in Section 2.4.

The Pickering A nuclear units were included in the list of existing installed generation resources, and three of the four units were assumed to be out-of-service for the study period. Only one Pickering A nuclear unit was identified as returning to service within the 18-month period. The reactivation of this unit was reflected only in the Planned Resource Scenario.

Table 2.1 Existing Installed Generation Resources[1]

Fuel Type	Total Capacity (MW)	Number of Stations
Nuclear	10,836	4
Coal	7,546	5
Oil / Gas	4,485	24
Hydroelectric	7,615	59
Miscellaneous (wind, waste, wood, etc.)	66	2
Total	30,548	94

2.2 External Transactions

A firm purchase of 200 MW was assumed to be delivered to Ontario for the period until October 31, 2003 and was explicitly included in the generation resource scenarios described in Section 2.4. No other firm purchase contracts were identified for the study period. There were no firm sales identified at any point in the study period.

2.3 Potential Generation Resource Additions

Table 2.2 summarizes the 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

[1] In Table 2.1, the number of nuclear stations will increase to five with the operation of the first Bruce A unit.

18-month study period under the Planned Resource Scenario described in Section 2.4. Generator owners or operators have provided the information regarding the status of their projects and the in-service dates listed in Table 2.2.

Table 2.2 Potential Generation Resource Additions in Ontario

Proponent/Project Name	Zone	Fuel Type	Capacity MW	Connection Applicant's Estimated I/S Date
Bruce Power Inc. - Bruce A G4	Bruce	Nuclear	750	April 2003
Bruce Power Inc. - Bruce A G3	Bruce	Nuclear	750	June 2003
ATCO - Brighton Beach	West	Gas	578	March 2004
Imperial Oil	West	Gas	98	April 2004
Total			2,176	

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

2.4 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 with the exception of all of the Pickering A nuclear units, which were assumed to be out-of-service for the duration of the study period. Purchases of 200 MW were assumed available up to the end of October 2003. 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 with the exception of three of the Pickering A nuclear units, which were assumed to be out-of-service for the duration of the study period. One Pickering A nuclear unit was assumed to come into service at the end of the second quarter of 2003, as indicated by the generator owner. A firm purchase of 200 MW was assumed available up to the end of October 2003. Additionally, all potential generation additions listed in Table 2.2 were assumed to be complete on the dates shown.

Forecast 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 regarding 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 values in the table start with the values listed in Table 2.1 and are incremented, for the Planned Resource Scenario, by the generation resource additions listed in Table 2.2. Imports consist of the purchases that were

assumed to be delivered to Ontario as described in Section 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	Winter Peak 2003		Summer Peak 2003		Winter Peak 2004	
		Existing Resource Scenario	Planned Resource Scenario	Existing Resource Scenario	Planned Resource Scenario	Existing Resource Scenario	Planned Resource Scenario
1	Installed Resources (MW)	30,548	30,548	30,548	32,048	30,548	32,048
2	Imports (MW)	200	200	200	200	0	0
3	Total Resources (MW)	30,748	30,748	30,748	32,248	30,548	32,048
4	Total Reductions in Resources (MW)	3,582	3,582	4,084	3,619	4,025	3,496
5	Price-responsive Demand (MW)	0	300	0	300	0	300
6	Available Resources (MW)	27,166	27,466	26,664	28,929	26,523	28,852

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, except Bruce A nuclear units. 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 (line3) minus Total Reductions in Resources (line 4) plus Price-responsive Demand (line 5).

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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 2.4 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 one reasonable boundary of the range, considering the potential for delays to the in-service dates of additional generation capacity, especially from nuclear resources. 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 other reasonable boundary of the outcome range. The resource availability situation over the 18-month period covered by this Outlook is expected to be somewhere within the band of these scenarios.

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 3.4. 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. Margins 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

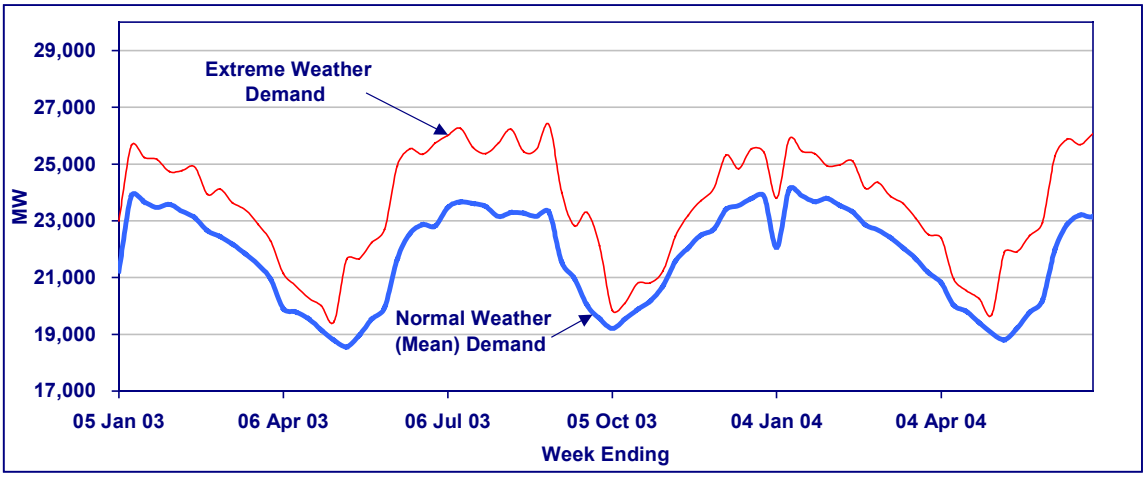


Figure 3.2 shows the Total Reductions in Resources used in the calculation of the Available Resources (as described in Section 2.4).

Figure 3.2 Total Reductions to Resources

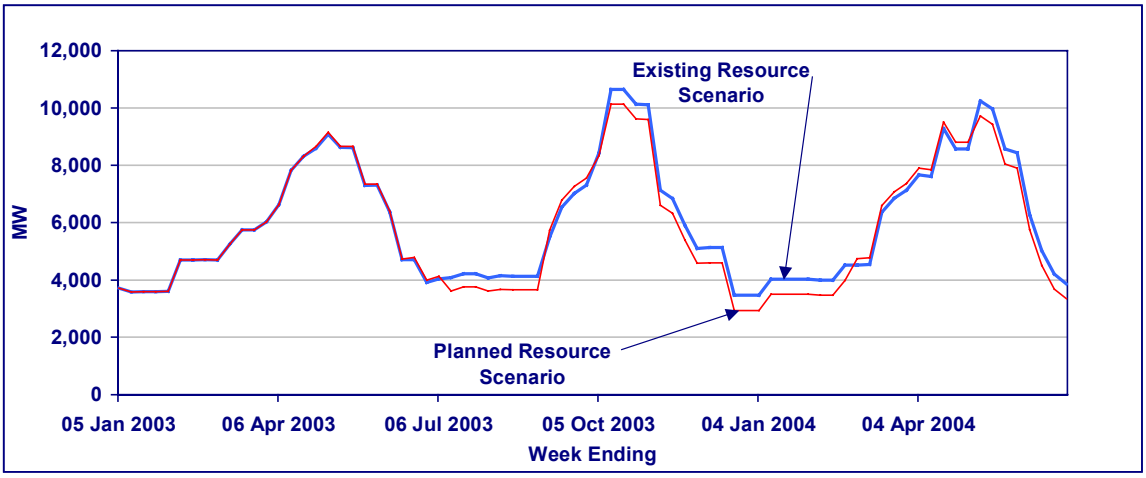


Figure 3.3 provides a comparison between Available Resources, and Required Resources for each week, for the Existing Resource Scenario. The latter quantity is based on a probabilistic calculation, which takes into account load forecast uncertainty due to weather and random generator forced outages. Figure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

Figure 3.3 Available vs. Required Resources: Existing Resource Scenario

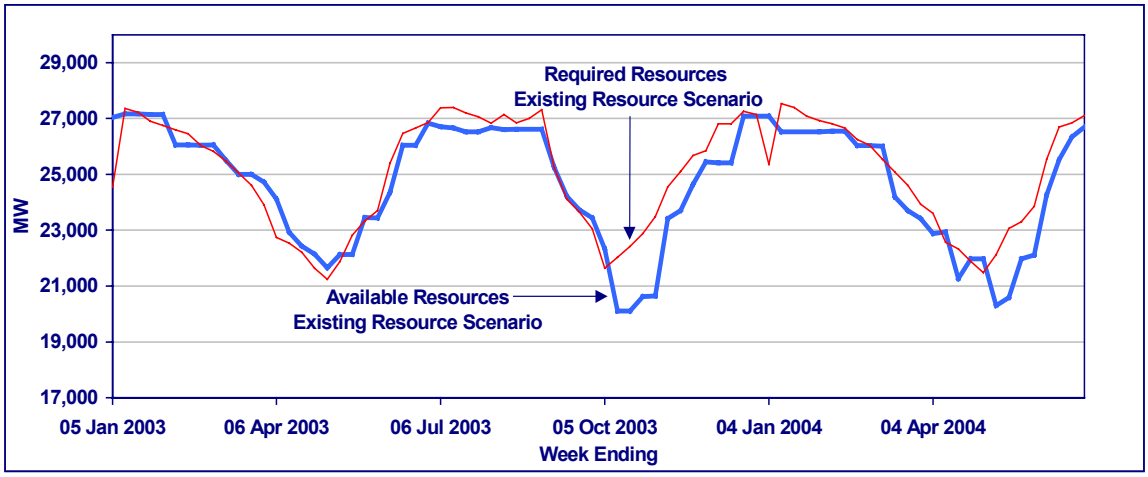
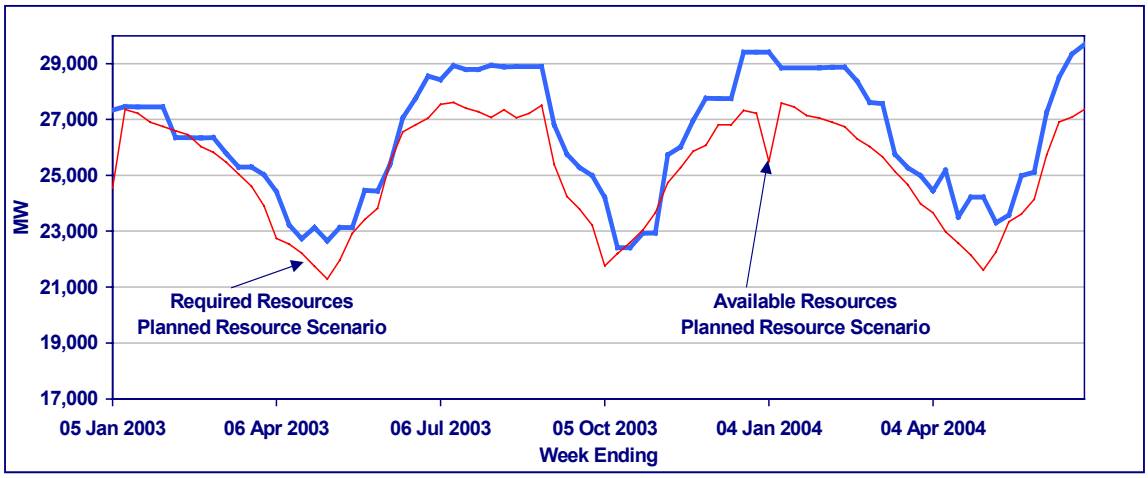
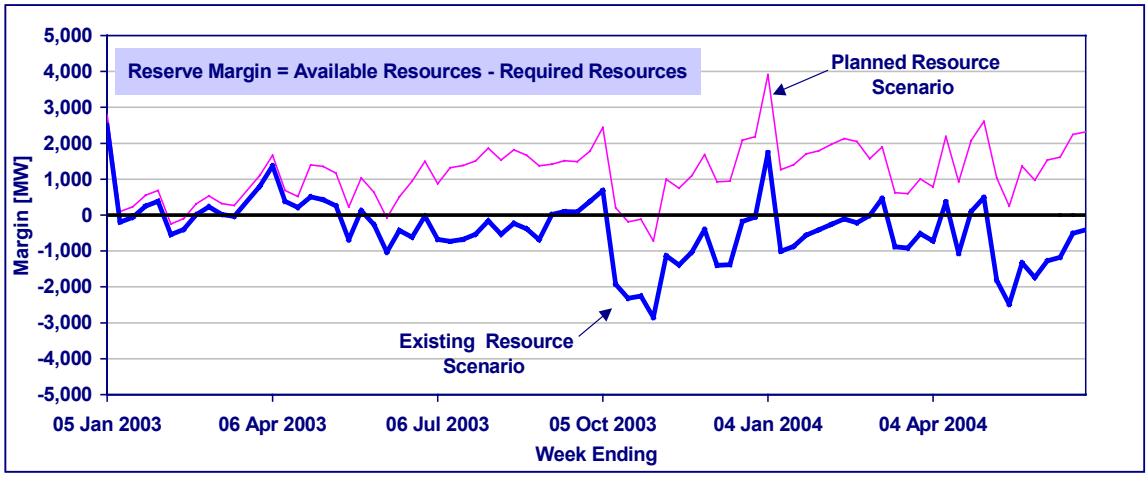


Figure 3.4 Available vs. Required Resources: Planned Resource Scenario



Reserve Margins, 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 Margins: Existing Resource Scenario and Planned Resource Scenario



Under the **Existing Resource Scenario**, reserve margins are forecast to be negative for most of the study period, with only a few exceptions. Due to significant changes in the generator outage program since the last Outlook published on September 24, 2002, forecast reserve margins are generally improved for the first half of 2003 but are still negative for several weeks in January, February, March, May, and all of June. The main change to the generator outage program since last Outlook is a shift in timing of the Darlington containment outage from the spring of 2003 to the fall of 2003. Reserve margins are generally lower in the second half of the year, particularly from mid-October through the end of 2003. Forecast reserve margins in the first half of 2004 continue to be mostly negative. Resource shortfalls are most significant during the fall of 2003 and the spring of 2004, when substantial resource reductions occur due to scheduled generator outages.

Negative reserve margins throughout the Outlook period indicate that forecast resource levels are below planning requirements. As such, planned generator outages during negative margin weeks are at risk of cancellation by the IMO for reliability purposes depending on their time stamp precedence and the resource adequacy situation at the time their approval is being sought. Given the large number of weeks with negative margins in this Scenario, to the extent this Scenario materializes, opportunities for planned generator maintenance would be limited and imports necessary.

The above results must be assessed bearing in mind the risk factors described in Section 3.3. 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 extensive reliance on imports and upward pressure on the wholesale market prices. During this past summer, under such conditions, import levels approached, and occasionally reached, the Ontario coincident import capability of approximately 4,000 MW.

Under the **Planned Resource Scenario**, the resource adequacy situation for the winter of 2002/2003 is about the same as for the Existing Resource Scenario described above, and again the risk factors described in Section 3.3 must be considered. For the remainder of the Outlook timeframe, forecast available resources exceed requirements with the exception of the period from mid-October 2003 through early November 2003. During this period, some planned outages are at risk of being cancelled, and high levels of imports may be necessary.

Figures 3.6 and 3.7 provide a comparison between the forecast reserve margins in the present Outlook and the forecast reserve margins in the previous Outlook. Further details showing weekly values are provided in Appendix A.

Figure 3.6 Reserve Margin: Existing Resource Scenario vs. Previous Delayed Resource Scenario

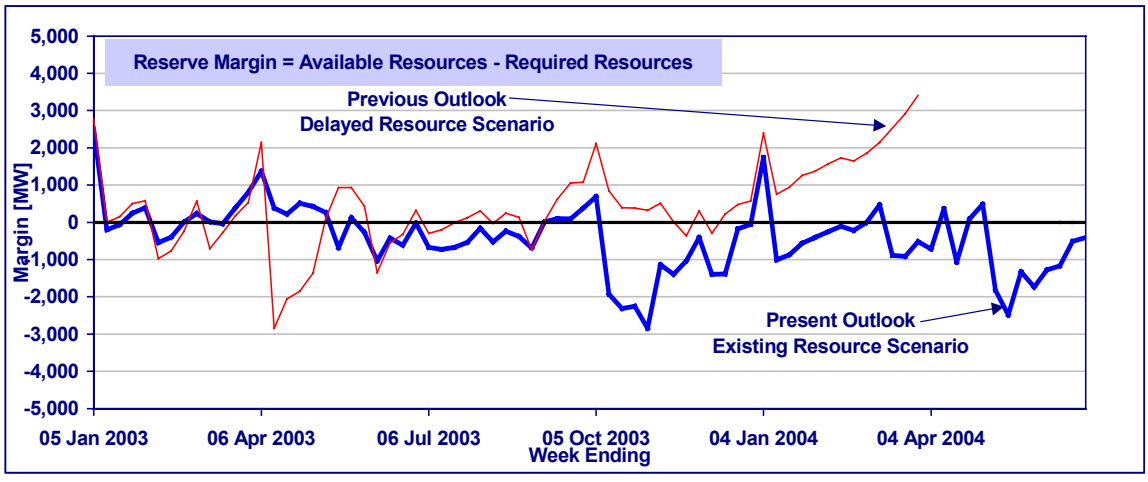
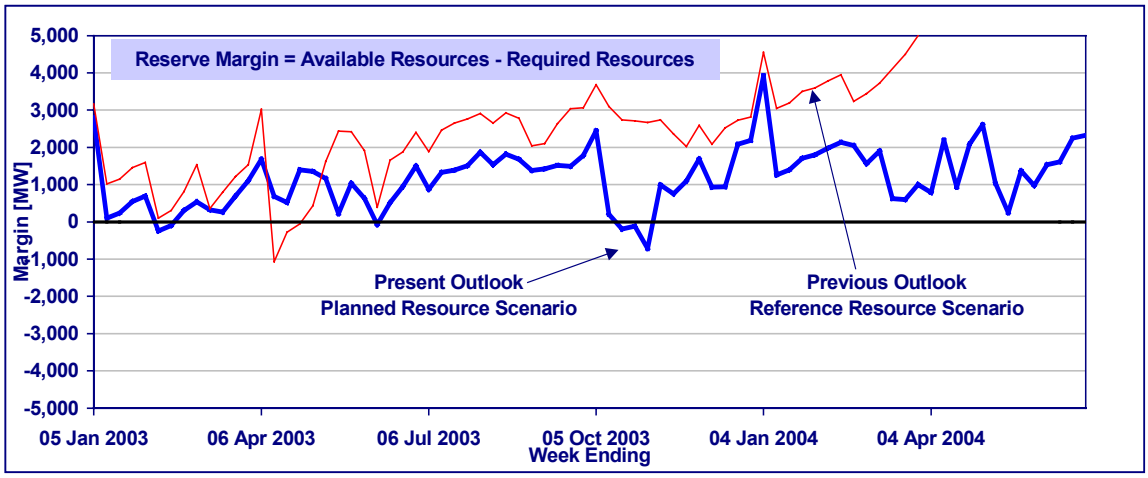


Figure 3.7 Reserve Margin: Planned Resource Scenario vs. Previous Reference Resource Scenario



The IMO will closely monitor the resource situation and implement the necessary control actions, if required, in accordance with the Market Rules. Tight demand/supply balances during periods of negative reserve margins will have several potential market impacts. These include upward pressure on the wholesale market prices and limited opportunities for the IMO to approve the release of generators for planned maintenance. Various responses can be anticipated and would be relied upon in these circumstances, including: for Ontario generators, maximizing their availability to offer into the Ontario market; for marketers, arranging imports to help meet anticipated Ontario requirements; and for consumers, taking measures to reduce their electricity consumption.

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 2.4 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 established based on the same levels that were used in 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. The target LOLE value is equivalent to 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, at least to the level necessary to offset the margin 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 margins 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 margins and the need for high 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 accounted for 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 1,650 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 margins 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 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 be stretched to the limits of the transmission system. The risk of even short-duration inability to meet demand during such conditions emphasizes the need for new supply and price-responsive demand within Ontario.

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

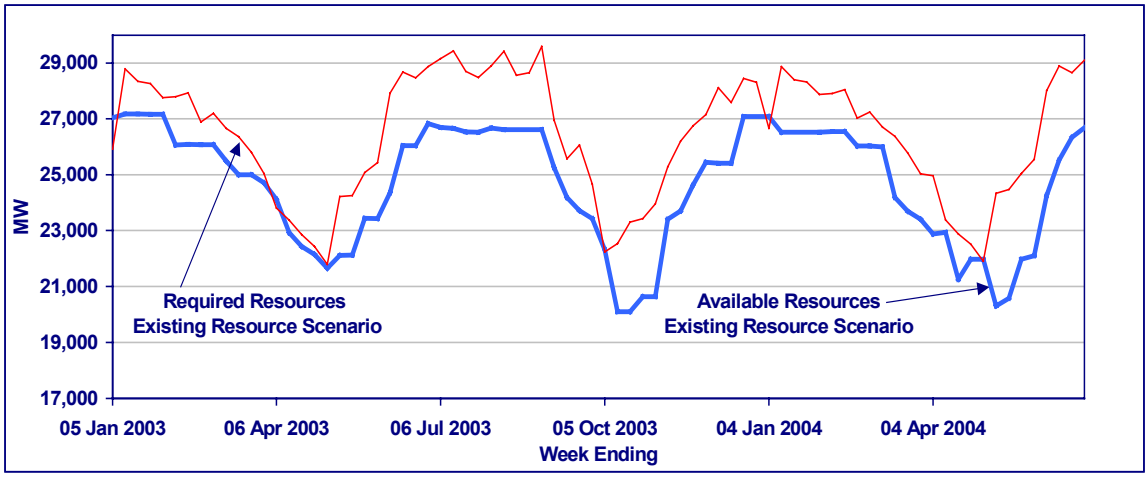


Figure 3.9 Available vs. Required Resources: Planned Resource Scenario Extreme Weather Demand

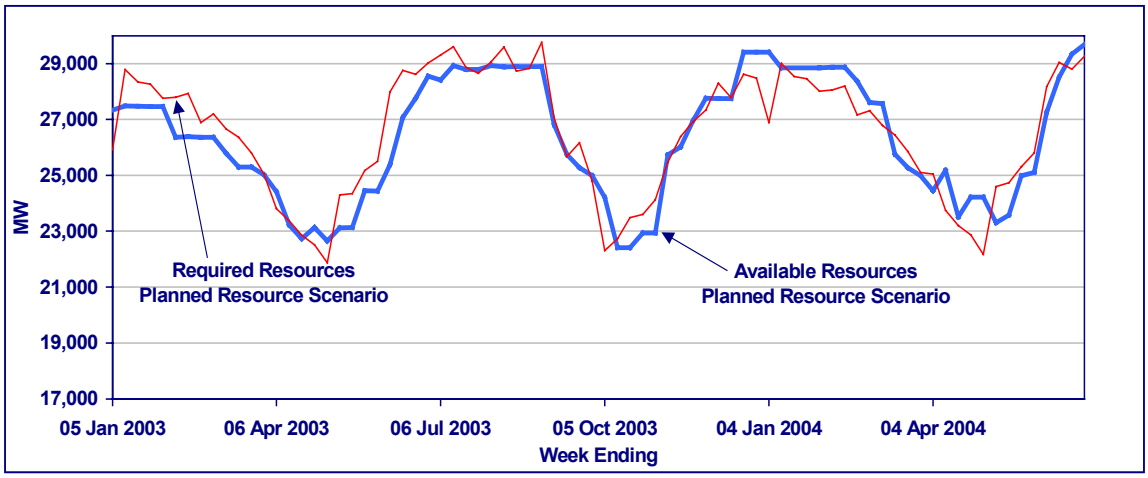
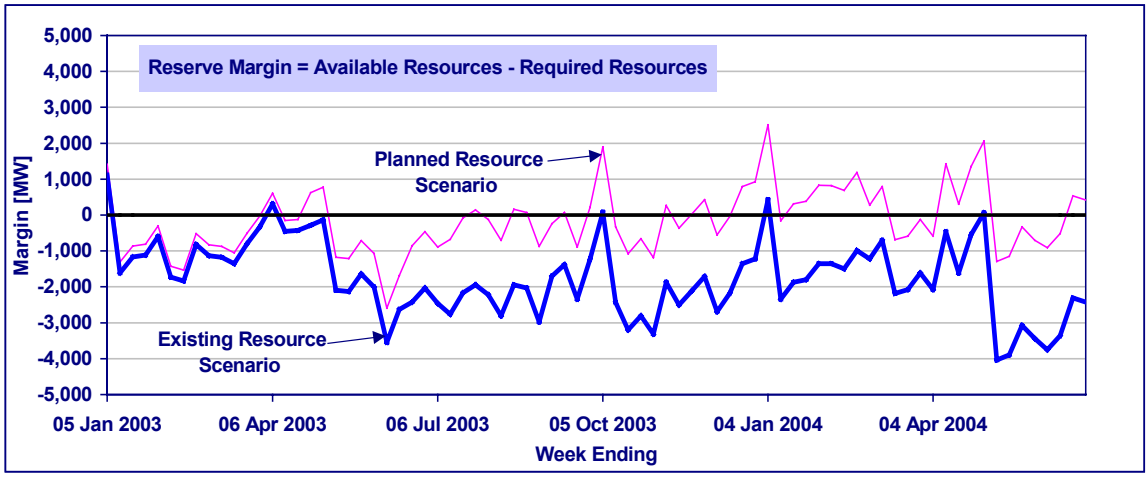


Figure 3.10 Reserve Margin: Existing Resource Scenario and Planned Resource Scenario, Extreme Weather Demand



3.3.2 Generator Return to Service Delays

The majority of additional resources forecast for the study period come from laid-up nuclear units returning to service. The improved demand/supply situation for the Planned Resource Scenario is critically dependent on these units returning to service on schedule. To date, no laid-up nuclear unit has been returned to service in Ontario and there have been recent additional delays in projected return dates. This history suggests a significant risk that some return to service dates will not be met.

3.3.3 Extensions to Generator Planned Outages

A number of large generating units are scheduled to return to service from long duration maintenance outages at the beginning of summer 2003, with others scheduled to return from

similar outages just prior to winter 2003/04. Similar to the return of laid-up nuclear units, meeting these schedules is critical to maintaining positive reserve margins.

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. If the actual amount of generator forced outages is higher than the calculated allowance, reserve margins could be lower than the forecast values.

Delays in commissioning new units or returning generators to service, whether from lay-up or maintenance outages, could once again lead to extensive reliance on imports as has been the case during the summer of 2002 – particularly for the Existing Resource Scenario.

3.3.5 Lower than Forecast Hydroelectric Resources

IMO resource adequacy assessments also include forecast amounts of hydroelectric generation provided by market participants. The amount of available hydroelectric generation is greatly influenced by water-flow conditions on the respective river systems, and 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 past summer 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 is 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 despite the fact that many neighbouring systems are often experiencing their peak demand. This is mainly due to the non-coincidence of the daily peak hours between Ontario and its neighbours and 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 September 3, 2002 indicates an average import level of 773 MW for all hours. During the 584 hours when Ontario demand exceeded 20,000 MW the average import level was 1,725 MW.

During the 172 hours when Ontario demand exceeded 23,000 MW the average import level was 2,394 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.

- End of Section -

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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 CAA queue. Only those projects that materially change a connection and/or an electrical characteristic associated with a connection to the IMO-controlled grid, and that have an estimated in-service date within the 18-month period under study are listed.

By mid-May 2003, it is expected that a new 845 MVA phase angle regulator (PAR) for 230 kV circuit L4D should be in-service. With the placing in-service of this PAR, all tie lines associated with the Ontario – Michigan interconnection will have phase shifting capability. Full phase shifting control of the interconnection can be utilized when the B3N, L4D and L51D PARs are not operated at their neutral tap.

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 could be rescheduled.

The assessment of transmission outages will also identify any resources that are constrained off due to transmission outage conditions. 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 reserve margins are negative. Under the Market Rules, where the scheduling of planned outages by different market participants 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 precedence 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 November 2002 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).

In summary, 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

The IMO is concerned with the March 24, 2003 and March 25, 2003 to March 29, 2003 outages for the Chenaux Project involving the addition of two new 230 kV breakers and the reconnection of transformer T4. These two outages may limit the amount of 115 kV load that can be supported in the Renfrew area. The amount of load that can be supported during these two outages will vary from approximately 55 MW to 115 MW depending on the Chenaux Project outage conditions and the available hydroelectric generation from Chenaux and Quebec. It is estimated the Renfrew area demand could vary from a peak of approximately 110 MW to an off peak value of approximately of 75 MW. In addition, the Renfrew area supply-demand balance required for the duration of these outages may not be met due to energy limitations typically associated with hydroelectric supply. In the approval timeframe of these outages, the IMO may delay or cancel the outages if the hydroelectric production capability is not expected to meet the demand. The IMO also suggests that the transmitter review the March 25, 2003 to March 29, 2003 outage to see if the duration of the outage can be shortened.

As detailed in Table C2, Appendix C, Chenaux generation is constrained off for four of the five Chenaux Project outages.

Northeast Zone

The 115 kV L5H circuit outage from June 2, 2003 to June 20, 2003 will affect the flow limit associated with the Ontario - Quebec North Interconnection. Negative reserve margins are forecast for all weeks in June 2003 under the Existing Resource Scenario, and for one week in June 2003 under the Planned Resource Scenario. In the approval timeframe, if the IMO determines that imports are required on this interconnection to maintain supply reliability and that the outage limits this requirement, the IMO may cancel or defer the outage.

Northwest Zone

The 230 kV K24F circuit outage from October 6, 2003 to November 28, 2003 will reduce the transfer capability between Ontario and Manitoba, and between Ontario and Minnesota. This outage will also reduce the East-West Transfer East (EWTE) capability by 75 MW, further reducing dispatching flexibility in the Northwest zone and requiring more coordination in the planning of generation and other transmission outages. For most weeks during this outage period, negative reserve margins are forecasted. If imports and/or the full capability of the EWTE interface are required to maintain supply reliability, the IMO may defer or cancel the outage.

Toronto Zone

The 115 kV H7L and H11L Hearn x Main circuit outages from September 2, 2003 to December 30, 2003 may, depending on the prevailing load levels, result in the thermal overloading of other 115 kV circuits in the local operating area and high voltage problems at Main TS. The impact of these outages will be reassessed by the IMO at the time their approval is being sought. The IMO will defer or cancel the outages if thermal overloading of other 115 kV

circuits is expected to occur. Given the short recall time associated with these outages, the IMO may also release the outage but recall it for those periods where thermal overloading is a concern.

West Zone

The 230 kV J5D circuit outage from March 27, 2003 to April 5, 2003, and the 23-C21J line switch outage from April 5, 2003 to April 16, 2003 will reduce the FABC interface limit by approximately 100 MW, the BLIP interface limit by approximately 500 MW, and the NBLIP interface limit by approximately 500 MW. The reduction of the FABC limit is not considered to be of concern. However, the impact on the BLIP/NBLIP interface will be reassessed in the approval timeframe, considering the specific demand-supply requirements.

The J5D outage could also reduce the Ontario – Michigan interconnection flow limit by up to 400 MW for imports to Ontario and exports from Ontario. Positive reserve margins are forecasted for the outage period of J5D. However, as described in Section 4.4, Scott upgrade outages are scheduled to start in late March 2003. The Scott upgrade outages may also restrict imports on the Ontario – Michigan interconnection, and may constrain off some generation at Lambton and TransAlta – SRCP. If imports are necessary on J5D to maintain reliability of supply during this period, the IMO will delay or cancel the outage in the approval timeframe.

This Outlook has limited the assessment of transmission outages to those outages with a scheduled duration of six days or more and/or to those transmission outages associated with a major project. 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 and Thermal Limits

As in previous Outlooks, low system voltage concerns in certain sub-areas of the province may limit certain generation and transmission outages that can be 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. In addition, maintaining acceptable voltage levels may require restrictions on the use of the J5D interconnection with Michigan for exports, particularly during summer peak periods. 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 splitting of 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 is desired; however, with the planned upgrade of some local transmission facilities by the transmitter for the incorporation of the Brighton Beach generation Project, outages might not be avoidable during peak load

conditions. The addition of the Brighton Beach generation project by 2004-Q2 will improve 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 summer peak periods. High transmission facility thermal loadings were also observed during the August 2001 and July and August 2002 hot weather conditions. With some local generating facilities operating at less than full output, the 500/230 kV autotransformers located at the Cherrywood Transmission Station in the Toronto zone were operated at power levels near, but below their continuous ratings.

In the Northwest zone at least one of the two generators in combination with the condenser at Thunder Bay is required to be in-service, most of the time, to maintain minimum voltages in the area, at times of peak load. Coincident planned generator outages are a concern since the condenser in-service by itself may not be able to maintain minimum voltage requirements. In addition, on loss of the condenser, the Thunder Bay G2 unit is required in-service in order to restore the condenser back to service. Avoiding planned generator outages during peak load conditions may be required to alleviate this concern. The expected installation of an 80 Mvar shunt capacitor at Birch Transformer Station by 2003-Q4 will result in an improvement of the 115 kV voltage profile in the area and increased reliability in the local peak load supply.

4.4 Forced Outages

Due to a fault level restriction, the Scott Transformer Station (TS) located in the West zone is being operated with a split bus. The split bus is accomplished by opening breakers L21L27, L7L22 and L6L23. A bus split at Scott TS does not materially reduce Michigan to Ontario transfer capability, even with all Lambton and TransAlta – SRCP units in-service. Another option requiring the transmitter to implement an exclusion zone at the station is also available to respect the fault level restriction. The fault level restriction is expected to remain until the transmitter completes equipment upgrades to the station, which are expected to start in late March 2003. The upgrades are expected to be completed by July 2003. Negative reserve margins are forecast for all weeks in June 2003 under the Existing Resource Scenario, and for one week in June 2003 under the Planned Resource Scenario. The IMO is concerned that the outages required for these upgrades may restrict imports from Michigan to Ontario, and may also constrain off some generation at Lambton and TransAlta – SRCP. If imports, or all available Ontario generation, are likely to be necessary to maintain reliability of supply during periods of extreme weather and/or higher than expected levels of unavailable generating capacity within Ontario, the IMO will delay or cancel outages associated with the Scott TS upgrades.

- 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, reserve margins are forecast to be negative for most of the study period, with only a few exceptions. Due to significant changes in the generator outage program since the last Outlook, published on September 24, 2002, forecast reserve margins are generally improved for the first half of 2003 but are still negative for several weeks in January, February, March, May, and all of June. Reserve margins are generally lower in the second half of the year, particularly from mid-October through the end of 2003. Forecast reserve margins in the first half of 2004 continue to be mostly negative.
- Under the Planned Resource Scenario, the resource adequacy situation for the winter of 2002/2003 is about the same as for the Existing Resource Scenario described above. For the remainder of the Outlook timeframe, forecast available resources exceed requirements with the exception of the period from mid-October 2003 through early November 2003.
- 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	Extreme Weather
Existing Resources	**- many planned outages at risk - imports required for much of the study period**	**- most planned outages at risk - imports maximized during peak periods - risk of insufficient supply**
Planned Resources	**- planned outages at risk during fall of 2003 - occasional imports required**	**- many planned outages at risk - imports required during peak periods**

- Tight demand/supply balances during periods of negative reserve margins will have several potential market impacts. These include upward pressure on wholesale market prices during peak demand periods and limited opportunities for the IMO to approve the release of generators for planned maintenance. Various responses can be anticipated and relied upon in these circumstances, including: for Ontario generators, maximizing their availability to offer into the Ontario market; for marketers, arranging imports to help meet anticipated Ontario requirements; and for consumers, taking measures to reduce their electricity consumption.
- The magnitude of resource deficiencies under extreme weather, clearly illustrates there are circumstances under which reliance on interconnected supply would be stretched to the limits of the transmission system. The risk of even short-duration inability to meet demand during

such conditions emphasizes the need for additional supply and price-responsive demand within Ontario.

- The majority of additional resources forecast for the study period come from laid-up nuclear units returning to service. An improved demand/supply situation is critically dependent on these units returning to service on schedule. To date, no laid-up nuclear unit has been returned to service in Ontario and there have been past and recent delays in projected return dates. This history suggests a significant risk that some return to service dates will not be met.
- A number of large generating units are scheduled to return to service from long duration maintenance outages at the beginning of summer 2003, with others scheduled to return from similar outages just prior to winter 2003/04. Similar to the return of laid-up nuclear units, meeting these schedules is critical to maintaining positive reserve margins.
- Higher than forecast generator unavailability, whether caused by higher forced outage rates, delays in commissioning new units or returning generators to service, could once again lead to extensive reliance on imports as was the case during 2002. 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

- There are some planned transmission outages that may reduce transmission capacity during the study period. These outages will be reassessed by the IMO during the approval timeframe.
- Avoiding planned outages and maximizing the reactive capability of the Lakeview, 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
- Rotating reactive resources in the Thunder Bay area will continue to be required to address local voltage concerns.

- 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 Margin MW
05-Jan-03	30,748	3,710	0	27,038	24,539	27.4	5,812	15.6	3,313	2,499
12-Jan-03	30,748	3,582	0	27,166	27,364	13.7	3,275	14.5	3,473	-198
19-Jan-03	30,748	3,592	0	27,156	27,220	14.7	3,488	15.0	3,552	-64
26-Jan-03	30,748	3,600	0	27,148	26,900	15.7	3,677	14.6	3,429	248
02-Feb-03	30,748	3,601	0	27,147	26,757	15.1	3,569	13.5	3,179	390
09-Feb-03	30,748	4,694	0	26,054	26,599	11.7	2,721	14.0	3,266	-545
16-Feb-03	30,748	4,696	0	26,052	26,451	12.7	2,939	14.4	3,338	-399
23-Feb-03	30,748	4,704	0	26,044	26,037	15.0	3,395	15.0	3,388	7
02-Mar-03	30,748	4,697	0	26,051	25,818	16.1	3,609	15.0	3,376	233
09-Mar-03	30,748	5,255	0	25,493	25,475	15.0	3,321	14.9	3,303	18
16-Mar-03	30,748	5,745	0	25,003	25,039	14.5	3,169	14.7	3,205	-36
23-Mar-03	30,748	5,745	0	25,003	24,613	16.6	3,550	14.7	3,160	390
30-Mar-03	30,748	6,029	0	24,719	23,915	18.0	3,772	14.2	2,968	804
06-Apr-03	30,748	6,628	0	24,120	22,745	21.2	4,221	14.3	2,846	1,375
13-Apr-03	30,748	7,823	0	22,925	22,540	15.9	3,139	13.9	2,754	385
20-Apr-03	30,748	8,313	0	22,435	22,216	14.8	2,885	13.6	2,666	219
27-Apr-03	30,748	8,597	0	22,151	21,643	15.6	2,990	13.0	2,482	508
04-May-03	30,748	9,087	0	21,661	21,236	15.3	2,868	13.0	2,443	425
11-May-03	30,748	8,626	0	22,122	21,865	19.2	3,563	17.8	3,306	257
18-May-03	30,748	8,615	0	22,133	22,822	16.7	3,166	20.3	3,855	-689
25-May-03	30,748	7,301	0	23,447	23,322	20.0	3,913	19.4	3,788	125
01-Jun-03	30,748	7,312	0	23,436	23,707	17.5	3,497	18.9	3,768	-271
08-Jun-03	30,748	6,388	0	24,360	25,398	12.5	2,715	17.3	3,753	-1,038
15-Jun-03	30,748	4,708	0	26,040	26,469	15.5	3,501	17.4	3,930	-429
22-Jun-03	30,748	4,705	0	26,043	26,652	13.9	3,179	16.6	3,788	-609
29-Jun-03	30,748	3,912	0	26,836	26,857	17.6	4,021	17.7	4,042	-21
06-Jul-03	30,748	4,043	0	26,705	27,381	13.8	3,237	16.7	3,913	-676
13-Jul-03	30,748	4,084	0	26,664	27,395	12.6	2,992	15.7	3,723	-731
20-Jul-03	30,748	4,223	0	26,525	27,197	12.4	2,922	15.2	3,594	-672
27-Jul-03	30,748	4,221	0	26,527	27,062	12.8	3,018	15.1	3,553	-535
03-Aug-03	30,748	4,074	0	26,674	26,834	15.2	3,524	15.9	3,684	-160
10-Aug-03	30,748	4,142	0	26,606	27,138	14.2	3,316	16.5	3,848	-532
17-Aug-03	30,748	4,134	0	26,614	26,848	14.4	3,345	15.4	3,579	-234
24-Aug-03	30,748	4,130	0	26,618	26,999	15.0	3,465	16.6	3,846	-381
31-Aug-03	30,748	4,130	0	26,618	27,310	14.2	3,312	17.2	4,004	-692
07-Sep-03	30,748	5,489	0	25,259	25,241	17.2	3,714	17.2	3,696	18
14-Sep-03	30,748	6,540	0	24,208	24,110	15.4	3,237	15.0	3,139	98
21-Sep-03	30,748	7,020	0	23,728	23,639	18.5	3,696	18.0	3,607	89
28-Sep-03	30,748	7,310	0	23,438	23,052	19.9	3,886	17.9	3,500	386

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 Margin MW
05-Oct-03	30,748	8,423	0	22,325	21,635	16.3	3,120	12.7	2,430	690
12-Oct-03	30,748	10,646	0	20,102	22,032	2.9	571	12.8	2,501	-1,930
19-Oct-03	30,748	10,646	0	20,102	22,421	1.2	228	12.8	2,547	-2,319
26-Oct-03	30,748	10,130	0	20,618	22,873	2.2	447	13.4	2,702	-2,255
02-Nov-03	30,748	10,110	0	20,638	23,487	-0.3	-64	13.5	2,785	-2,849
09-Nov-03	30,548	7,133	0	23,415	24,550	8.5	1,838	13.8	2,973	-1,135
16-Nov-03	30,548	6,843	0	23,705	25,099	7.5	1,658	13.8	3,052	-1,394
23-Nov-03	30,548	5,906	0	24,642	25,674	9.6	2,150	14.2	3,182	-1,032
30-Nov-03	30,548	5,102	0	25,446	25,849	12.1	2,754	13.9	3,157	-403
07-Dec-03	30,548	5,131	0	25,417	26,813	8.6	2,015	14.6	3,411	-1,396
14-Dec-03	30,548	5,131	0	25,417	26,805	8.0	1,881	13.9	3,269	-1,388
21-Dec-03	30,548	3,462	0	27,086	27,259	13.9	3,295	14.6	3,468	-173
28-Dec-03	30,548	3,462	0	27,086	27,140	13.5	3,226	13.8	3,280	-54
04-Jan-04	30,548	3,462	0	27,086	25,346	22.8	5,028	14.9	3,288	1,740
11-Jan-04	30,548	4,025	0	26,523	27,532	10.0	2,411	14.2	3,420	-1,009
18-Jan-04	30,548	4,025	0	26,523	27,393	11.1	2,646	14.7	3,516	-870
25-Jan-04	30,548	4,025	0	26,523	27,085	12.0	2,846	14.4	3,408	-562
01-Feb-04	30,548	4,025	0	26,523	26,931	11.5	2,737	13.2	3,145	-408
08-Feb-04	30,548	4,000	0	26,548	26,804	12.8	3,010	13.9	3,266	-256
15-Feb-04	30,548	4,000	0	26,548	26,656	13.9	3,230	14.3	3,338	-108
22-Feb-04	30,548	4,516	0	26,032	26,247	13.9	3,173	14.8	3,388	-215
29-Feb-04	30,548	4,516	0	26,032	26,040	14.8	3,356	14.8	3,364	-8
07-Mar-04	30,548	4,545	0	26,003	25,538	16.1	3,603	14.0	3,138	465
14-Mar-04	30,548	6,360	0	24,188	25,076	9.7	2,140	13.7	3,028	-888
21-Mar-04	30,548	6,850	0	23,698	24,611	9.4	2,033	13.6	2,946	-913
28-Mar-04	30,548	7,134	0	23,414	23,932	10.6	2,240	13.0	2,758	-518
04-Apr-04	30,548	7,666	0	22,882	23,603	10.0	2,072	13.4	2,793	-721
11-Apr-04	30,548	7,613	0	22,935	22,565	14.5	2,909	12.7	2,539	370
18-Apr-04	30,548	9,288	0	21,260	22,329	7.3	1,449	12.7	2,518	-1,069
25-Apr-04	30,548	8,572	0	21,976	21,883	13.2	2,566	12.7	2,473	93
02-May-04	30,548	8,572	0	21,976	21,487	15.4	2,932	12.8	2,443	489
09-May-04	30,548	10,251	0	20,297	22,116	7.9	1,487	17.6	3,306	-1,819
16-May-04	30,548	9,967	0	20,581	23,065	7.2	1,373	20.1	3,857	-2,484
23-May-04	30,548	8,570	0	21,978	23,302	11.1	2,203	17.8	3,527	-1,324
30-May-04	30,548	8,436	0	22,112	23,850	9.5	1,926	18.2	3,664	-1,738
06-Jun-04	30,548	6,288	0	24,260	25,534	10.3	2,270	16.1	3,544	-1,274
13-Jun-04	30,548	5,021	0	25,527	26,699	11.6	2,644	16.7	3,816	-1,172
20-Jun-04	30,548	4,203	0	26,345	26,851	13.6	3,145	15.7	3,651	-506
27-Jun-04	30,548	3,860	0	26,688	27,099	15.3	3,537	17.1	3,948	-411
04-Jul-04	30,548	3,713	0	26,835	27,546	13.2	3,124	16.2	3,835	-711

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 Margin MW
05-Jan-03	30,748	3,710	300	27,338	24,539	28.8	6,112	15.6	3,313	2,799
12-Jan-03	30,748	3,582	300	27,466	27,364	15.0	3,575	14.5	3,473	102
19-Jan-03	30,748	3,592	300	27,456	27,220	16.0	3,788	15.0	3,552	236
26-Jan-03	30,748	3,600	300	27,448	26,900	16.9	3,977	14.6	3,429	548
02-Feb-03	30,748	3,601	300	27,447	26,757	16.4	3,869	13.5	3,179	690
09-Feb-03	30,748	4,694	300	26,354	26,599	13.0	3,021	14.0	3,266	-245
16-Feb-03	30,748	4,696	300	26,352	26,451	14.0	3,239	14.4	3,338	-99
23-Feb-03	30,748	4,704	300	26,344	26,037	16.3	3,695	15.0	3,388	307
02-Mar-03	30,748	4,697	300	26,351	25,818	17.4	3,909	15.0	3,376	533
09-Mar-03	30,748	5,255	300	25,793	25,475	16.3	3,621	14.9	3,303	318
16-Mar-03	30,748	5,745	300	25,303	25,039	15.9	3,469	14.7	3,205	264
23-Mar-03	30,748	5,745	300	25,303	24,613	18.0	3,850	14.7	3,160	690
30-Mar-03	30,748	6,029	300	25,019	23,915	19.4	4,072	14.2	2,968	1,104
06-Apr-03	30,748	6,628	300	24,420	22,745	22.7	4,521	14.3	2,846	1,675
13-Apr-03	30,748	7,823	300	23,225	22,540	17.4	3,439	13.9	2,754	685
20-Apr-03	30,748	8,313	300	22,735	22,216	16.3	3,185	13.6	2,666	519
27-Apr-03	31,498	8,657	300	23,141	21,746	20.8	3,980	13.5	2,585	1,395
04-May-03	31,498	9,147	300	22,651	21,295	20.5	3,858	13.3	2,502	1,356
11-May-03	31,498	8,666	300	23,132	21,962	24.6	4,573	18.3	3,403	1,170
18-May-03	31,498	8,655	300	23,143	22,921	22.0	4,176	20.9	3,954	222
25-May-03	31,498	7,341	300	24,457	23,424	25.2	4,923	19.9	3,890	1,033
01-Jun-03	31,498	7,352	300	24,446	23,814	22.6	4,507	19.4	3,875	632
08-Jun-03	31,498	6,408	300	25,390	25,466	17.3	3,745	17.7	3,821	-76
15-Jun-03	31,498	4,728	300	27,070	26,559	20.1	4,531	17.8	4,020	511
22-Jun-03	32,248	4,788	300	27,760	26,816	21.4	4,896	17.3	3,952	944
29-Jun-03	32,248	3,995	300	28,553	27,054	25.2	5,738	18.6	4,239	1,499
06-Jul-03	32,248	4,126	300	28,422	27,545	21.1	4,954	17.4	4,077	877
13-Jul-03	32,248	3,619	300	28,929	27,606	22.2	5,257	16.6	3,934	1,323
20-Jul-03	32,248	3,758	300	28,790	27,408	22.0	5,187	16.1	3,805	1,382
27-Jul-03	32,248	3,756	300	28,792	27,282	22.5	5,283	16.1	3,773	1,510
03-Aug-03	32,248	3,609	300	28,939	27,076	25.0	5,789	17.0	3,926	1,863
10-Aug-03	32,248	3,667	300	28,881	27,347	24.0	5,591	17.4	4,057	1,534
17-Aug-03	32,248	3,659	300	28,889	27,068	24.2	5,620	16.3	3,799	1,821
24-Aug-03	32,248	3,655	300	28,893	27,218	24.8	5,740	17.6	4,065	1,675
31-Aug-03	32,248	3,655	300	28,893	27,517	24.0	5,587	18.1	4,211	1,376
07-Sep-03	32,248	5,732	300	26,816	25,394	24.5	5,271	17.9	3,849	1,422
14-Sep-03	32,248	6,783	300	25,765	24,250	22.9	4,794	15.6	3,279	1,515
21-Sep-03	32,248	7,263	300	25,285	23,794	26.2	5,253	18.8	3,762	1,491
28-Sep-03	32,248	7,553	300	24,995	23,210	27.8	5,443	18.7	3,658	1,785

(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 Margin MW
05-Oct-03	32,248	8,335	300	24,213	21,764	26.1	5,008	13.3	2,559	2,449
12-Oct-03	32,248	10,137	300	22,411	22,211	14.8	2,880	13.7	2,680	200
19-Oct-03	32,248	10,137	300	22,411	22,600	12.8	2,537	13.7	2,726	-189
26-Oct-03	32,248	9,621	300	22,927	23,047	13.7	2,756	14.3	2,876	-120
02-Nov-03	32,248	9,601	300	22,947	23,664	10.8	2,245	14.3	2,962	-717
09-Nov-03	32,048	6,614	300	25,734	24,737	19.3	4,157	14.7	3,160	997
16-Nov-03	32,048	6,324	300	26,024	25,272	18.0	3,977	14.6	3,225	752
23-Nov-03	32,048	5,387	300	26,961	25,867	19.9	4,469	15.0	3,375	1,094
30-Nov-03	32,048	4,583	300	27,765	26,078	22.4	5,073	14.9	3,386	1,687
07-Dec-03	32,048	4,602	300	27,746	26,813	18.6	4,344	14.6	3,411	933
14-Dec-03	32,048	4,602	300	27,746	26,805	17.9	4,210	13.9	3,269	941
21-Dec-03	32,048	2,933	300	29,415	27,329	23.6	5,624	14.9	3,538	2,086
28-Dec-03	32,048	2,933	300	29,415	27,228	23.3	5,555	14.1	3,368	2,187
04-Jan-04	32,048	2,933	300	29,415	25,496	33.4	7,357	15.6	3,438	3,919
11-Jan-04	32,048	3,496	300	28,852	27,592	19.7	4,740	14.4	3,480	1,260
18-Jan-04	32,048	3,496	300	28,852	27,451	20.8	4,975	15.0	3,574	1,401
25-Jan-04	32,048	3,496	300	28,852	27,147	21.9	5,175	14.7	3,470	1,705
01-Feb-04	32,048	3,496	300	28,852	27,054	21.3	5,066	13.7	3,268	1,798
08-Feb-04	32,048	3,471	300	28,877	26,900	22.7	5,339	14.3	3,362	1,977
15-Feb-04	32,048	3,471	300	28,877	26,744	23.8	5,559	14.7	3,426	2,133
22-Feb-04	32,048	3,987	300	28,361	26,311	24.1	5,502	15.1	3,452	2,050
29-Feb-04	32,048	4,744	300	27,604	26,040	21.7	4,928	14.8	3,364	1,564
07-Mar-04	32,048	4,773	300	27,575	25,672	23.1	5,175	14.6	3,272	1,903
14-Mar-04	32,048	6,588	300	25,760	25,139	16.8	3,712	14.0	3,091	621
21-Mar-04	32,048	7,078	300	25,270	24,674	16.6	3,605	13.9	3,009	596
28-Mar-04	32,048	7,362	300	24,986	23,984	18.0	3,812	13.3	2,810	1,002
04-Apr-04	32,048	7,894	300	24,454	23,668	17.5	3,644	13.7	2,858	786
11-Apr-04	32,724	7,841	300	25,183	22,988	25.8	5,157	14.8	2,962	2,195
18-Apr-04	32,724	9,516	300	23,508	22,577	18.7	3,697	14.0	2,766	931
25-Apr-04	32,724	8,800	300	24,224	22,142	24.8	4,814	14.1	2,732	2,082
02-May-04	32,724	8,800	300	24,224	21,614	27.2	5,180	13.5	2,570	2,610
09-May-04	32,724	9,722	300	23,302	22,262	23.9	4,492	18.4	3,452	1,040
16-May-04	32,724	9,438	300	23,586	23,339	22.8	4,378	21.5	4,131	247
23-May-04	32,724	8,041	300	24,983	23,614	26.3	5,208	19.4	3,839	1,369
30-May-04	32,724	7,907	300	25,117	24,141	24.4	4,931	19.6	3,955	976
06-Jun-04	32,724	5,759	300	27,265	25,735	24.0	5,275	17.0	3,745	1,530
13-Jun-04	32,724	4,502	300	28,522	26,909	24.6	5,639	17.6	4,026	1,613
20-Jun-04	32,724	3,684	300	29,340	27,092	26.5	6,140	16.8	3,892	2,248
27-Jun-04	32,724	3,341	300	29,683	27,357	28.2	6,532	18.2	4,206	2,326
04-Jul-04	32,724	3,194	300	29,830	27,777	25.8	6,119	17.2	4,066	2,053

Table A3 Demand Forecast Range For Required Resources Calculation

Week Ending Day	Ontario Demand Normal Weather (Mean) MW	Ontario Demand Extreme Weather MW
05-Jan-03	21,226	22,995
12-Jan-03	23,891	25,657
19-Jan-03	23,668	25,234
26-Jan-03	23,471	25,169
02-Feb-03	23,578	24,734
09-Feb-03	23,333	24,771
16-Feb-03	23,113	24,900
23-Feb-03	22,649	23,932
02-Mar-03	22,442	24,117
09-Mar-03	22,172	23,638
16-Mar-03	21,834	23,389
23-Mar-03	21,453	22,879
30-Mar-03	20,947	22,286
06-Apr-03	19,899	21,135
13-Apr-03	19,786	20,704
20-Apr-03	19,550	20,280
27-Apr-03	19,161	20,007
04-May-03	18,793	19,445
11-May-03	18,559	21,638
18-May-03	18,967	21,665
25-May-03	19,534	22,238
01-Jun-03	19,939	22,688
08-Jun-03	21,645	24,931
15-Jun-03	22,539	25,539
22-Jun-03	22,864	25,347
29-Jun-03	22,815	25,732
06-Jul-03	23,468	26,015
13-Jul-03	23,672	26,262
20-Jul-03	23,603	25,580
27-Jul-03	23,509	25,374
03-Aug-03	23,150	25,737
10-Aug-03	23,290	26,227
17-Aug-03	23,269	25,434
24-Aug-03	23,153	25,517
31-Aug-03	23,306	26,385
07-Sep-03	21,545	23,996
14-Sep-03	20,971	22,827
21-Sep-03	20,032	23,295
28-Sep-03	19,552	22,114

(Table A3 continued)

Week Ending Day	Ontario Demand Normal Weather (Mean) MW	Ontario Demand Extreme Weather MW
05-Oct-03	19,205	19,847
12-Oct-03	19,531	20,092
19-Oct-03	19,874	20,799
26-Oct-03	20,171	20,813
02-Nov-03	20,702	21,226
09-Nov-03	21,577	22,459
16-Nov-03	22,047	23,192
23-Nov-03	22,492	23,703
30-Nov-03	22,692	24,122
07-Dec-03	23,402	25,310
14-Dec-03	23,536	24,831
21-Dec-03	23,791	25,536
28-Dec-03	23,860	25,410
04-Jan-04	22,058	23,803
11-Jan-04	24,112	25,878
18-Jan-04	23,877	25,443
25-Jan-04	23,677	25,375
01-Feb-04	23,786	24,943
08-Feb-04	23,538	24,976
15-Feb-04	23,318	25,105
22-Feb-04	22,859	24,143
29-Feb-04	22,676	24,351
07-Mar-04	22,400	23,865
14-Mar-04	22,048	23,603
21-Mar-04	21,665	23,090
28-Mar-04	21,174	22,513
04-Apr-04	20,810	22,388
11-Apr-04	20,026	20,944
18-Apr-04	19,811	20,541
25-Apr-04	19,410	20,257
02-May-04	19,044	19,697
09-May-04	18,810	21,888
16-May-04	19,208	21,906
23-May-04	19,775	22,479
30-May-04	20,186	22,935
06-Jun-04	21,990	25,276
13-Jun-04	22,883	25,883
20-Jun-04	23,200	25,683
27-Jun-04	23,151	26,067
04-Jul-04	23,711	26,257

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 Margin MW
05-Jan-03	30,748	3,711	0	27,037	25,923	17.6	4,042	12.7	2,928	1,114
12-Jan-03	30,748	3,563	0	27,185	28,800	6.0	1,528	12.3	3,143	-1,615
19-Jan-03	30,748	3,571	0	27,177	28,342	7.7	1,943	12.3	3,108	-1,165
26-Jan-03	30,748	3,583	0	27,165	28,274	7.9	1,996	12.3	3,105	-1,109
02-Feb-03	30,748	3,581	0	27,167	27,768	9.8	2,433	12.3	3,034	-601
09-Feb-03	30,748	4,684	0	26,064	27,794	5.2	1,293	12.2	3,023	-1,730
16-Feb-03	30,748	4,656	0	26,092	27,932	4.8	1,192	12.2	3,032	-1,840
23-Feb-03	30,748	4,678	0	26,070	26,887	8.9	2,138	12.4	2,955	-817
02-Mar-03	30,748	4,678	0	26,070	27,201	8.1	1,953	12.8	3,084	-1,131
09-Mar-03	30,748	5,255	0	25,493	26,666	7.9	1,855	12.8	3,028	-1,173
16-Mar-03	30,748	5,745	0	25,003	26,359	6.9	1,614	12.7	2,970	-1,356
23-Mar-03	30,748	5,745	0	25,003	25,807	9.3	2,124	12.8	2,928	-804
30-Mar-03	30,748	6,029	0	24,719	25,042	10.9	2,433	12.4	2,756	-323
06-Apr-03	30,748	6,628	0	24,120	23,812	14.1	2,985	12.7	2,677	308
13-Apr-03	30,748	7,823	0	22,925	23,379	10.7	2,221	12.9	2,675	-454
20-Apr-03	30,748	8,313	0	22,435	22,860	10.6	2,155	12.7	2,580	-425
27-Apr-03	30,748	8,597	0	22,151	22,440	10.7	2,144	12.2	2,433	-289
04-May-03	30,748	9,087	0	21,661	21,796	11.4	2,216	12.1	2,351	-135
11-May-03	30,748	8,630	0	22,118	24,219	2.2	480	11.9	2,581	-2,101
18-May-03	30,748	8,627	0	22,121	24,256	2.1	456	12.0	2,591	-2,135
25-May-03	30,748	7,304	0	23,444	25,086	5.4	1,206	12.8	2,848	-1,642
01-Jun-03	30,748	7,318	0	23,430	25,434	3.3	742	12.1	2,746	-2,004
08-Jun-03	30,748	6,382	0	24,366	27,914	-2.3	-565	12.0	2,983	-3,548
15-Jun-03	30,748	4,702	0	26,046	28,679	2.0	507	12.3	3,140	-2,633
22-Jun-03	30,748	4,707	0	26,041	28,471	2.7	694	12.3	3,124	-2,430
29-Jun-03	30,748	3,915	0	26,833	28,871	4.3	1,101	12.2	3,139	-2,038
06-Jul-03	30,748	4,047	0	26,701	29,165	2.6	686	12.1	3,150	-2,464
13-Jul-03	30,748	4,082	0	26,666	29,432	1.5	404	12.1	3,170	-2,766
20-Jul-03	30,748	4,216	0	26,532	28,700	3.7	952	12.2	3,120	-2,168
27-Jul-03	30,748	4,220	0	26,528	28,476	4.6	1,154	12.2	3,102	-1,948
03-Aug-03	30,748	4,079	0	26,669	28,893	3.6	932	12.3	3,156	-2,224
10-Aug-03	30,748	4,138	0	26,610	29,424	1.5	383	12.2	3,197	-2,814
17-Aug-03	30,748	4,131	0	26,617	28,566	4.7	1,183	12.3	3,132	-1,949
24-Aug-03	30,748	4,130	0	26,618	28,657	4.3	1,101	12.3	3,140	-2,039
31-Aug-03	30,748	4,130	0	26,618	29,597	0.9	233	12.2	3,212	-2,979
07-Sep-03	30,748	5,494	0	25,254	26,953	5.2	1,258	12.3	2,957	-1,699
14-Sep-03	30,748	6,558	0	24,190	25,573	6.0	1,363	12.0	2,746	-1,383
21-Sep-03	30,748	7,024	0	23,724	26,067	1.8	429	11.9	2,772	-2,343
28-Sep-03	30,748	7,310	0	23,438	24,673	6.0	1,324	11.6	2,559	-1,235

(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 Margin MW
05-Oct-03	30,748	8,423	0	22,325	22,239	12.5	2,478	12.1	2,392	86
12-Oct-03	30,748	10,646	0	20,102	22,537	0.1	10	12.2	2,445	-2,435
19-Oct-03	30,748	10,646	0	20,102	23,303	-3.4	-697	12.0	2,504	-3,201
26-Oct-03	30,748	10,114	0	20,634	23,438	-0.9	-179	12.6	2,625	-2,804
02-Nov-03	30,748	10,110	0	20,638	23,952	-2.8	-588	12.8	2,726	-3,314
09-Nov-03	30,548	7,133	0	23,415	25,289	4.3	956	12.6	2,830	-1,874
16-Nov-03	30,548	6,843	0	23,705	26,212	2.2	513	13.0	3,020	-2,507
23-Nov-03	30,548	5,906	0	24,642	26,751	4.0	939	12.9	3,048	-2,109
30-Nov-03	30,548	5,102	0	25,446	27,157	5.5	1,324	12.6	3,035	-1,711
07-Dec-03	30,548	5,131	0	25,417	28,112	0.4	107	11.1	2,802	-2,695
14-Dec-03	30,548	5,131	0	25,417	27,595	2.4	586	11.1	2,764	-2,178
21-Dec-03	30,548	3,462	0	27,086	28,442	6.1	1,550	11.4	2,906	-1,356
28-Dec-03	30,548	3,462	0	27,086	28,305	6.6	1,676	11.4	2,895	-1,219
04-Jan-04	30,548	3,462	0	27,086	26,659	13.8	3,283	12.0	2,856	427
11-Jan-04	30,548	4,025	0	26,523	28,867	2.5	645	11.6	2,989	-2,344
18-Jan-04	30,548	4,025	0	26,523	28,397	4.2	1,080	11.6	2,954	-1,874
25-Jan-04	30,548	4,025	0	26,523	28,324	4.5	1,148	11.6	2,949	-1,801
01-Feb-04	30,548	4,025	0	26,523	27,874	6.3	1,580	11.8	2,931	-1,351
08-Feb-04	30,548	4,000	0	26,548	27,908	6.3	1,572	11.7	2,932	-1,360
15-Feb-04	30,548	4,000	0	26,548	28,048	5.8	1,443	11.7	2,943	-1,500
22-Feb-04	30,548	4,516	0	26,032	27,021	7.8	1,889	11.9	2,878	-989
29-Feb-04	30,548	4,516	0	26,032	27,249	6.9	1,681	11.9	2,898	-1,217
07-Mar-04	30,548	4,545	0	26,003	26,709	9.0	2,138	11.9	2,844	-706
14-Mar-04	30,548	6,360	0	24,188	26,376	2.5	585	11.8	2,773	-2,188
21-Mar-04	30,548	6,850	0	23,698	25,782	2.6	608	11.7	2,692	-2,084
28-Mar-04	30,548	7,134	0	23,414	25,032	4.0	901	11.2	2,519	-1,618
04-Apr-04	30,548	7,666	0	22,882	24,963	2.2	494	11.5	2,575	-2,081
11-Apr-04	30,548	7,613	0	22,935	23,395	9.5	1,991	11.7	2,451	-460
18-Apr-04	30,548	9,288	0	21,260	22,878	3.5	719	11.4	2,337	-1,618
25-Apr-04	30,548	8,572	0	21,976	22,522	8.5	1,719	11.2	2,265	-546
02-May-04	30,548	8,572	0	21,976	21,915	11.6	2,279	11.3	2,218	61
09-May-04	30,548	10,251	0	20,297	24,336	-7.3	-1,591	11.2	2,448	-4,039
16-May-04	30,548	9,967	0	20,581	24,479	-6.1	-1,325	11.8	2,573	-3,898
23-May-04	30,548	8,570	0	21,978	25,052	-2.2	-501	11.5	2,573	-3,074
30-May-04	30,548	8,449	0	22,099	25,546	-3.7	-836	11.4	2,611	-3,447
06-Jun-04	30,548	6,288	0	24,260	28,014	-4.0	-1,016	10.8	2,738	-3,754
13-Jun-04	30,548	5,021	0	25,527	28,889	-1.4	-356	11.6	3,006	-3,362
20-Jun-04	30,548	4,203	0	26,345	28,651	2.6	662	11.6	2,968	-2,306
27-Jun-04	30,548	3,860	0	26,688	29,110	2.4	621	11.7	3,043	-2,422
04-Jul-04	30,548	3,713	0	26,835	29,309	2.2	578	11.6	3,052	-2,474

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 Margin MW
05-Jan-03	30,748	3,711	300	27,337	25,923	18.9	4,342	12.7	2,928	1,414
12-Jan-03	30,748	3,563	300	27,485	28,800	7.1	1,828	12.3	3,143	-1,315
19-Jan-03	30,748	3,571	300	27,477	28,342	8.9	2,243	12.3	3,108	-865
26-Jan-03	30,748	3,583	300	27,465	28,274	9.1	2,296	12.3	3,105	-809
02-Feb-03	30,748	3,581	300	27,467	27,768	11.1	2,733	12.3	3,034	-301
09-Feb-03	30,748	4,684	300	26,364	27,794	6.4	1,593	12.2	3,023	-1,430
16-Feb-03	30,748	4,656	300	26,392	27,932	6.0	1,492	12.2	3,032	-1,540
23-Feb-03	30,748	4,678	300	26,370	26,887	10.2	2,438	12.4	2,955	-517
02-Mar-03	30,748	4,678	300	26,370	27,201	9.3	2,253	12.8	3,084	-831
09-Mar-03	30,748	5,255	300	25,793	26,666	9.1	2,155	12.8	3,028	-873
16-Mar-03	30,748	5,745	300	25,303	26,359	8.2	1,914	12.7	2,970	-1,056
23-Mar-03	30,748	5,745	300	25,303	25,807	10.6	2,424	12.8	2,928	-504
30-Mar-03	30,748	6,029	300	25,019	25,042	12.3	2,733	12.4	2,756	-23
06-Apr-03	30,748	6,628	300	24,420	23,812	15.5	3,285	12.7	2,677	608
13-Apr-03	30,748	7,823	300	23,225	23,379	12.2	2,521	12.9	2,675	-154
20-Apr-03	30,748	8,313	300	22,735	22,860	12.1	2,455	12.7	2,580	-125
27-Apr-03	31,498	8,657	300	23,141	22,518	15.7	3,134	12.6	2,511	623
04-May-03	31,498	9,147	300	22,651	21,877	16.5	3,206	12.5	2,432	774
11-May-03	31,498	8,670	300	23,128	24,305	6.9	1,490	12.3	2,667	-1,177
18-May-03	31,498	8,667	300	23,131	24,342	6.8	1,466	12.4	2,677	-1,211
25-May-03	31,498	7,344	300	24,454	25,169	10.0	2,216	13.2	2,931	-715
01-Jun-03	31,498	7,358	300	24,440	25,514	7.7	1,752	12.5	2,826	-1,074
08-Jun-03	31,498	6,402	300	25,396	27,993	1.9	465	12.3	3,062	-2,597
15-Jun-03	31,498	4,722	300	27,076	28,761	6.0	1,537	12.6	3,222	-1,685
22-Jun-03	32,248	4,790	300	27,758	28,617	9.5	2,411	12.9	3,270	-859
29-Jun-03	32,248	3,998	300	28,550	29,017	11.0	2,818	12.8	3,285	-467
06-Jul-03	32,248	4,130	300	28,418	29,309	9.2	2,403	12.7	3,294	-891
13-Jul-03	32,248	3,617	300	28,931	29,608	10.2	2,669	12.7	3,346	-677
20-Jul-03	32,248	3,751	300	28,797	28,878	12.6	3,217	12.9	3,298	-81
27-Jul-03	32,248	3,755	300	28,793	28,654	13.5	3,419	12.9	3,280	139
03-Aug-03	32,248	3,614	300	28,934	29,060	12.4	3,197	12.9	3,323	-126
10-Aug-03	32,248	3,663	300	28,885	29,591	10.1	2,658	12.8	3,364	-706
17-Aug-03	32,248	3,656	300	28,892	28,735	13.6	3,458	13.0	3,301	157
24-Aug-03	32,248	3,655	300	28,893	28,825	13.2	3,376	13.0	3,308	68
31-Aug-03	32,248	3,655	300	28,893	29,762	9.5	2,508	12.8	3,377	-869
07-Sep-03	32,248	5,737	300	26,811	27,054	11.7	2,815	12.7	3,058	-243
14-Sep-03	32,248	6,801	300	25,747	25,676	12.8	2,920	12.5	2,849	71
21-Sep-03	32,248	7,267	300	25,281	26,172	8.5	1,986	12.4	2,877	-891
28-Sep-03	32,248	7,553	300	24,995	24,781	13.0	2,881	12.1	2,667	214

(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 Margin MW
05-Oct-03	32,248	8,335	300	24,213	22,313	22.0	4,366	12.4	2,466	1,900
12-Oct-03	32,248	10,137	300	22,411	22,737	11.5	2,319	13.2	2,645	-326
19-Oct-03	32,248	10,137	300	22,411	23,491	7.8	1,612	12.9	2,692	-1,080
26-Oct-03	32,248	9,605	300	22,943	23,606	10.2	2,130	13.4	2,793	-663
02-Nov-03	32,248	9,601	300	22,947	24,135	8.1	1,721	13.7	2,909	-1,188
09-Nov-03	32,048	6,614	300	25,734	25,471	14.6	3,275	13.4	3,012	263
16-Nov-03	32,048	6,324	300	26,024	26,390	12.2	2,832	13.8	3,198	-366
23-Nov-03	32,048	5,387	300	26,961	26,932	13.8	3,258	13.6	3,229	29
30-Nov-03	32,048	4,583	300	27,765	27,337	15.1	3,643	13.3	3,215	428
07-Dec-03	32,048	4,602	300	27,746	28,299	9.6	2,436	11.8	2,989	-553
14-Dec-03	32,048	4,602	300	27,746	27,780	11.7	2,915	11.9	2,949	-34
21-Dec-03	32,048	2,933	300	29,415	28,623	15.2	3,879	12.1	3,087	792
28-Dec-03	32,048	2,933	300	29,415	28,487	15.8	4,005	12.1	3,077	928
04-Jan-04	32,048	2,933	300	29,415	26,896	23.6	5,612	13.0	3,093	2,519
11-Jan-04	32,048	3,496	300	28,852	29,013	11.5	2,974	12.1	3,135	-161
18-Jan-04	32,048	3,496	300	28,852	28,542	13.4	3,409	12.2	3,099	310
25-Jan-04	32,048	3,496	300	28,852	28,468	13.7	3,477	12.2	3,093	384
01-Feb-04	32,048	3,496	300	28,852	28,020	15.7	3,909	12.3	3,077	832
08-Feb-04	32,048	3,471	300	28,877	28,054	15.6	3,901	12.3	3,078	823
15-Feb-04	32,048	3,471	300	28,877	28,193	15.0	3,772	12.3	3,088	684
22-Feb-04	32,048	3,987	300	28,361	27,171	17.5	4,218	12.5	3,028	1,190
29-Feb-04	32,048	4,744	300	27,604	27,322	13.4	3,253	12.2	2,971	282
07-Mar-04	32,048	4,773	300	27,575	26,785	15.6	3,710	12.2	2,920	790
14-Mar-04	32,048	6,588	300	25,760	26,449	9.1	2,157	12.1	2,846	-689
21-Mar-04	32,048	7,078	300	25,270	25,857	9.4	2,180	12.0	2,767	-587
28-Mar-04	32,048	7,362	300	24,986	25,108	11.0	2,473	11.5	2,595	-122
04-Apr-04	32,048	7,894	300	24,454	25,044	9.2	2,066	11.9	2,656	-590
11-Apr-04	32,724	7,841	300	25,183	23,750	20.2	4,239	13.4	2,806	1,433
18-Apr-04	32,724	9,516	300	23,508	23,207	14.4	2,967	13.0	2,666	301
25-Apr-04	32,724	8,800	300	24,224	22,870	19.6	3,967	12.9	2,613	1,354
02-May-04	32,724	8,800	300	24,224	22,165	23.0	4,527	12.5	2,468	2,059
09-May-04	32,724	9,722	300	23,302	24,597	6.5	1,414	12.4	2,709	-1,295
16-May-04	32,724	9,438	300	23,586	24,738	7.7	1,680	12.9	2,832	-1,152
23-May-04	32,724	8,041	300	24,983	25,313	11.1	2,504	12.6	2,834	-330
30-May-04	32,724	7,920	300	25,104	25,806	9.5	2,169	12.5	2,871	-702
06-Jun-04	32,724	5,759	300	27,265	28,172	7.9	1,989	11.5	2,896	-907
13-Jun-04	32,724	4,502	300	28,522	29,041	10.2	2,639	12.2	3,158	-519
20-Jun-04	32,724	3,684	300	29,340	28,802	14.2	3,657	12.1	3,119	538
27-Jun-04	32,724	3,341	300	29,683	29,263	13.9	3,616	12.3	3,196	420
04-Jul-04	32,724	3,194	300	29,830	29,462	13.6	3,573	12.2	3,205	368

- End of Section -

Appendix B Transmission Projects

East Zone - Transmission Projects	Projected I/S Date
Enbridge Cardinal TS: Modify connection facilities at 115 kV station.	2003-Q1

Niagara Zone - Transmission Projects	Projected I/S Date
DeCew GS: Replace T4 & 23T3 transformers with a single unit.	2003-Q1
Murray TS: Install three new feeder breakers.	2003-Q2
Winona TS: New DESN connected to 115 kV circuit Q2AH.	2003-Q2
Norfolk TS: Replace DESN transformers with two 83.3 MVA units.	2003-Q4
Norfolk TS: String second 115 kV circuit on the existing double circuit tower from Vanessa Jct. To Norfolk TS.	2003-Q4
Kalar TS: New DESN on 115 kV lines A36N & A37N.	2004-Q2

Northeast Zone - Transmission Projects	Projected I/S Date
Chenaux TS: Add two new 230 kV breakers. Reconnect T4 transformer.	2003-Q3
Wawa TS: Install reactive compensation; 4 x 40 Mvar.	2003-Q4

Northwest Zone - Transmission Projects	Projected I/S Date
NW Ontario: New 115 kV line to supply the First Nations community.	2003-Q3
Birch TS: Install 80 Mvar shunt capacitor.	2003-Q4

Ottawa Zone - Transmission Projects	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..	2003-Q4

Southwest Zone - Transmission Projects	Projected I/S Date
Dundas TS: New DESN connected to 115 kV double circuit B12/B13.	2003-Q2
Bronte TS: Install two new feeders.	2003-Q2
St. Mary TS: Refurbish 115 kV station.	2003-Q3
St. Mary TS: Add three new feeders.	2003-Q4
Nanticoke TGS: Replace station service transformers.	2003-Q4
Caledonia TS: Add two new 75/125 MVA 230/115 kV autotransformers and re-supply Norfolk TS off these new autotransformers.	2003-Q4
Kitchener: Build new 230/14.2 kV transformer station.	2004-Q2

Toronto Zone - Transmission Projects	Projected I/S Date
Hearn TGS: Install 125 MVar 115 kV capacitor bank.	2003-Q2
Glengrove TS: Replace T2 transformer.	2003-Q4
Glengrove TS: Refurbish 115 kV station.	2003-Q4
Cecil TS: Increase station capacity	2004-Q2
Leaside TS: Install 125 Mvar capacitor bank.	2004-Q2
Pickering A NGS: Refurbish 230 kV switchyard - G1.	2004-Q2

West Zone - Transmission Projects	Projected I/S Date
Scott TS: Install new/upgrade existing facilities for the TransAlta Project	2003-Q3
Kent TS: Install new 125 MVA 230/115 kV autotransformer.	2003-Q4
Belle River TS: Install new 41MVA 115/27.6kV transformer	2004-Q2
Keith TS: Install new/upgrade existing facilities for incorporation of the ATCO Project	2004-Q2
Windsor Area: Enhance Windsor Area Overload Protection Scheme	2004-Q2

- End of Section -

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Appendix C Planned Transmission Outages

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

Table C1 Bruce Zone

No outages to analyze.

Table C2 East Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
02/24/03 07:00 AM	03/02/03 03:00 PM	St.Lawrence TS.D_BUS; St.Lawrence TS.AL31; St.Lawrence TS.49-B31L; St.Lawrence TS.L31L33	CWW	4 Hour	FIO Ontario - Quebec South Interconnection Saunders GS will not be able to export to Quebec.	FIO - 100 MW Quebec to Ontario South Interconnection - 400 MW
03/24/03 07:00 AM	03/24/03 06:00 PM	Chenaux TS.A4_BUS; Chenaux TS.A1A4; Chenaux TS.4X2Y	DNW	Non-Recallable	All Chenaux generation is constrained off. Limits the amount of load that can be supported in the Renfrew area from Des Joachims. Approximately 55 and 75 MW of load can be supplied without and with generation support from Quebec, respectively. Renfrew area demand estimated at a peak of 110 MW to an off peak of 75 MW.	

Table C2 East Zone (continued)

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
03/24/03 07:00 AM	03/29/03 06:00 PM	X1P;Chenaux TS.4X1P; Chenaux TS.4X6; Chenaux TS.A1-A2; Chenaux TS.A3-A4; Chenaux TS.4-X1P	CWW	24 Hour	For March 24: See outage above. For March 25 to March 29: Chenaux G5 to G8 generation is constrained off. Limits the amount of load that can be supported in the Renfrew area from Des Joachims. Approximately 55 and 75 MW of load can be supplied without and with generation support from Quebec, respectively. With no Quebec support, approx. 95 MW can be supplied with generation support from Chenaux G1 to G4. With Quebec and Chenaux support, approx. 115 MW can be supplied. Renfrew area demand estimated at a peak of 110 MW to an off peak of 75 MW. Hydroelectric production capability is a concern.	
03/24/03 07:00 AM	04/25/03 11:00 AM	Chenaux TS.A1-A2	CWW	48 Hour	For March 24 to March 29: See outage above. For March 31 to April 4: See outage below. For March 30 & April 5 to April 24: No impact. For April 25: See outage below	
03/31/03 07:00 AM	04/04/03 06:00 PM	Chenaux TS.A1A4; Chenaux TS.4X2Y; Chenaux TS.A1-A2; Chenaux TS.A3-A4	CWW	24 Hour	Chenaux G1 to G4 generation is constrained off.	
04/25/03 07:00 AM	04/25/03 11:00 AM	Chenaux TS.T4; Chenaux TS.4X6; Chenaux TS.A1-A2	DNW	4 Hour	Chenaux G5 to G8 generation is constrained off.	

Table C3 Essa Zone

No outages to analyze.

Table C4 Niagara Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
01/07/03 05:00 AM	01/20/03 08:00 PM	Allanburg TS: A11N	CWW	2 Day		
01/22/03 05:00 AM	03/11/03 08:00 PM	Allanburg TS: A8N	CWW	2 Day		

Table C5 Northeast Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
12/15/02 07:00 AM	01/02/03 07:00 AM	Neelon Steel CTS: T1	CWW	Non-Recallable		
01/06/03 05:00 AM	02/14/03 06:00 PM	Martindale TS: S22A	CWW	4 Hour		
03/03/03 05:00 AM	03/28/03 06:00 PM	Algoma TS: X27A	CWW	4 Hour		
04/14/03 09:00 AM	05/02/03 05:00 PM	Pinard TS: PL20	CWW	Non-Recallable		
06/02/03 05:00 AM	06/20/03 06:00 PM	L5H_NORTHBAY	CWW	4 Hour	Ontario - Quebec North Interconnection	Mode 2 on H4Z 5 MW Mode 3 on D4Z 15 MW
06/02/03 05:00 AM	06/27/03 06:00 PM	A9K_ANSONVILLE	CWW	4 Hour		
06/30/03 05:00 AM	07/18/03 06:00 PM	A9K_KIRKLANDLAKE	CWW	4 Hour		

Table C6 Northwest Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
01/06/03 05:00 AM	01/31/03 06:00 PM	Port Arthur TS #1: A6P	CWW	4 Hour		
01/06/03 05:00 AM	02/14/03 06:00 PM	K3D_DRYDEN	CWW	4 Hour		
02/17/03 05:00 AM	04/11/03 06:00 PM	K3D_RABBITLAKE	CWW	4 Hour		
04/07/03 05:00 AM	07/18/03 06:00 PM	T1M_TERRACEBAY	CWW	4 Hour		
04/14/03 05:00 AM	04/25/03 06:00 PM	K6F_RABBITLAKE	CWW	4 Hour		
04/28/03 05:00 AM	05/09/03 06:00 PM	Rabbit Lake SS: K7K	CWW	4 Hour		
06/23/03 12:01 AM	06/29/03 11:59 PM	Thunder Bay C1	CWW	Non-Recallable		
10/06/03 05:00 AM	11/28/03 06:00 PM	Kenora TS: K24F	CWW	4 Hour	OMTE OMTW EWTE MPFN	OMTE - 50MW OMTW - 250 MW EWTE - 75 MW MPFN - 25 MW
12/15/03 12:01 AM	12/21/03 11:59 PM	Thunder Bay C1	CWW	Non-Recallable		
06/14/04 12:01 AM	06/27/04 11:59 PM	Thunder Bay C1	CWW	Non-Recallable		

Table C7 Ottawa Zone

No outages to analyze.

Table C8 Southwest Zone

No outages to analyze.

Table C9 Toronto Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
11/12/02 05:00 AM	01/06/03 03:30 PM	Cecil TS.T4	CWW	3 Day		
01/20/03 07:00 AM	01/31/03 04:00 PM	H3L_GERRARD	CWW	12 Hour		
01/27/03 02:00 AM	02/28/03 06:00 PM	Glengrove TS.T1; Glengrove TS.T2; Glengrove TS.T1_115; Glengrove TS.T2_115; Glengrove TS.P1-P2	CWW	3 Week		
02/17/03 05:00 AM	03/14/03 06:00 PM	Lakeview SS.L24CR_Terminal; Lakeview SS.RSS4_BUS; Lakeview SS.T7_230; Lakeview SS.T8_230	CWW	48 Hour		
03/20/03 05:00 AM	05/19/03 06:00 PM	Cecil TS.T3	CWW	35 Hour		
03/31/03 05:00 AM	04/06/03 06:00 PM	Hearn SS.A6_BUS; Hearn SS.A6-P6	CWW	3 Hour		
04/29/03 02:00 AM	05/30/03 06:00 PM	H11L_LEASIDE	CWW	4 Hour		
09/02/03 05:00 AM	12/30/03 06:00 PM	H7L_HEARN; H11L_HEARN	CWW	10 Hour	Depending on load levels, thermal overloading of other Hearn x Leaside 115 kV circuits and high voltage problems at Main TS could occur.	

Table C10 West Zone

Start Date/Time	End Date/Time	Equipment	Outage Type	Recall	Impact	Reduction in Limit
12/13/02 05:00 AM	01/27/03 06:00 PM	Keith TS.T1; Keith TS.T1L3; Keith TS.T1K; Keith TS.L3P	CWW	Non-Recallable		
01/26/03 05:00 AM	01/26/03 06:00 PM	J2N; Keith TS.P_BUS	DWW	8 Hour		
01/26/03 05:00 AM	01/26/03 06:00 PM	Keith TS: J3E	DWW	4 Hour		
01/27/03 05:00 AM	01/27/03 06:00 PM	Keith TS.T1; Keith TS.K_BUS; Keith TS.T1-T; Keith TS.T1L3	DNW	8 Hour		
03/27/03 05:00 AM	04/05/03 06:00 PM	Keith TS: J5D	CWW	24 Hour	FABC BLIP NBLIP Ontario - Michigan Interconnection	FABC - 100 MW BLIP - 500 MW NBLIP - 500 MW Ontario - Michigan Interconnection - Up to 400 MW for imports depending on Lambton and TransAlta - SRCP generation; up to 400 MW for exports
04/05/03 05:00 AM	04/08/03 06:00 PM	Keith TS.C21J_Terminal; Keith TS.T11; Keith TS.T23; Keith TS.AL5	CWW	Non-Recallable	FABC BLIP NBLIP	Covered by outage below.
04/05/03 05:00 AM	04/16/03 06:00 PM	Keith TS.23-C21J	CWW	3 Day	FABC BLIP NBLIP	FABC - 100 MW BLIP - 500 MW NBLIP - 500 MW
04/16/03 05:00 AM	04/16/03 06:00 PM	Keith TS.C21J_Terminal; Keith TS.T11; Keith TS.AL5	DNW	Non-Recallable	FABC BLIP NBLIP	Covered by outage above.

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