18-MONTH OUTLOOK UPDATE:

An Assessment of the Reliability and Operability of the Ontario Electricity System

From April 2009 to September 2010

ieso

Power to Ontario. On Demand.

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Executive Summary

The outlook for the reliability of Ontario's electricity system remains positive for the next 18 months. There is a high confidence that nearly 4,700 megawatts (MW) of new and refurbished supply is scheduled to come into service over this time period. The Ontario transmission system is also expected to be adequate to reliably supply demands. Ontario's import capability is planned to increase by the middle of 2009 with the addition of a new interconnection between Ontario and Québec, which following additional transmission reinforcements in Québec slated for May 2010, will allow transfers up to 1,250 MW.

The capability to move energy away from the Bruce area will increase throughout the Outlook as high voltage shunt capacitors are added and 230 kV transmission uprating is completed, prior to the two refurbished Bruce units coming into operation in Q2 and Q3 of 2010. This will reduce potential constrained generation as units return to service before the proposed 500 kV double-circuit line between Bruce and Milton is available.

The Outlook incorporates known emission reductions from coal powered generation and demonstrates that the limitations should not impact on reliability in 2009. For 2010, initial estimates indicate the same conclusion, though not all information is currently available.

Over the forecast, both peak and energy demand are expected to decline. In the near term, the economy will have a downward impact on demand. In the latter part of the forecast, growth in conservation and embedded generation will nullify the impact of economic recovery. Energy demand is forecast to decrease by 1.6% for 2009 and a further 2.0% in 2010. Peak demands are expected to decline as shown in the following table. The table summarizes the planned scenario's peak demands for the upcoming seasons under the Normal and Extreme weather scenarios.

Season	Normal Weather Peak (MW)	Extreme Weather Peak (MW)
Summer 2009	24,998	27,094
Winter 2009-10	22,758	23,818
Summer 2010	24,501	26,597

The format of this Outlook has been revised to present a more streamlined and concise document. It highlights key changes from the last Outlook. This condensed style will be published in the first and third quarters each year. Longer, more comprehensive documents will be produced twice per year, prior to the summer and winter. A full analytical assessment is however conducted in each of the four reports, and all the results and tables are generated.

Conclusions & Observations

The following conclusions and observations are based on the results of this assessment.

Overall

- The system is positioned to operate reliably over the Outlook period. There will be challenges associated with accommodating outages required to maintain existing equipment, accommodate new facilities and associated with growing surplus baseload generation.

Demand Forecast

- The economy has had a significant negative impact on demand. This will continue into the near term. Though the economy is forecast to improve in the latter half of the Outlook period, Ontario demand is forecast to continue to decline due to conservation initiatives and growing embedded generation.
- Lower energy and peak demand will act to enhance system reliability. High peak demands are likely under extreme weather conditions but should not pose any global reliability concerns.
- Lower minimum demand levels can have operational impacts as they increase the likelihood of surplus base load generation.

Resource Adequacy

- Outages are scheduled for a number of large generating units at several stations during the last two weeks of June when there is a shortfall in reserve above requirement. The IESO may have to reject some of these outages to meet reserve requirements.
- A number of other units are scheduled to return to service from planned outage in May/June period before shortfalls are identified to occur. Meeting these schedules is critical to maintaining adequate reserve levels over the summer season. Delays will have a negative impact to the reliability of the system.
- A program to reduce emissions from coal-powered generation in the province has commenced in 2009. This Outlook demonstrates that these initial limitations should be achievable over the next 18 month period without impacting on reliability, although the complete strategy for 2010 has not been confirmed.
- Resource adequacy assessments look at two different resource scenarios (Planned and Firm) and two different weather scenarios (Normal and Extreme). Results of the resource adequacy assessment are summarized in the matrix below.

	Normal Weather Scenario	Extreme Weather Scenario
Planned Scenario	• Reserves are higher than required for all but four weeks in May, June 2009.	• There are 24 weeks where reserves are lower than required.
Firm Scenario	• There are 18 weeks when reserves are lower than required.	• There are 53 weeks where reserves are lower than required.

- Periods where the forecast reserves are not sufficient to meet requirements may result in reliance on imports, the rejection of planned outages by the IESO, or the use of emergency operating procedures.
- Compared to the 2008 Q4 Outlook, there are a higher number of weeks in this Outlook where reserves may be lower than required. This was expected and relates to the rescheduled commercial operation of the Goreway facility.

Transmission Adequacy

- The Ontario transmission system with the planned system enhancements and transmission outages is expected to be adequate to supply the demand under the extreme and normal weather conditions forecast for the Outlook period**.**
- Several projects relating to local load supply improvements will be placed in service during the timeframe of this Outlook to help relieve loadings of existing transformer stations and provide additional transformer capacity for future load growth.
- The combination of the ongoing forced outage of BP 76 on the New York – Ontario interface at Niagara and additional planned outages will result in the total Ontario - New York import and export scheduling capability to be reduced to zero MW for the March 24th to April 17th 2009 period. The import and export scheduling capability between Ontario and Michigan will also be reduced for the duration of the simultaneous outages on the Ontario - New York interface.
- Transmission outages scheduled in this Outlook period in the Bruce, Niagara, Southwest and West zones will result in reductions to the transfer capability out of the Bruce area for periods of time. The resulting limit reductions along with the increase of available generation in those areas will combine to result in bottled generation capacity in the Bruce and West zones.

Operability

- Though surplus baseload supply situations have occurred infrequently to date, the expected frequency will increase as more baseload generation is added to the system and minimum demand levels continue at low levels due to the combined impacts of current economic conditions and conservation. The IESO will become more active in communicating, managing and addressing potential surplus periods to ensure that any impacts to reliability are managed.

- End of Section -

Caution and Disclaimer

Table of Contents

List of Tables

List of Figures

1.0 Introduction

This Outlook covers the 18-month period from April 2009 to September 2010. It supersedes the last Outlook released December 22, 2008.

The purpose of the 18-Month Outlook is:

- To advise market participants of the resource and transmission reliability of the Ontario electricity system;
- To assess potentially adverse conditions that might be avoided through adjustment or coordination of maintenance plans for generation and transmission equipment; and
- To report on initiatives being put in place to improve reliability within the 18-month timeframe of this Outlook.

The contents of this Outlook focus on the assessment of resource and transmission adequacy. Additional supporting documents are located on the IESO website at http://www.ieso.ca/imoweb/monthsYears/monthsAhead.asp

This Outlook presents an assessment of resource and transmission adequacy based on the stated assumptions, 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 judgment in considering possible future scenarios.

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

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 us at:

- Toll Free: 1-888-448-7777
- Tel: 905-403-6900
- Fax: 905-403-6921
- E-mail: customer.relations@ieso.ca.

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2.0 Updates to This Outlook

There were no methodological changes in derivation of the Outlook. Following the conclusion of recent stakeholdering on this initiative, the format and presentation of the analysis has been modified to make a more streamlined and concise document. Most of the tables and the appendices have been moved to spreadsheets that can be downloaded from the IESO website. Overall, this Outlook presents updated information.

2.1 Updates to Demand Forecast

The demand forecast was based on actual demand, weather and economic data through to the end of December 2008. The economic outlook has been updated based on the most recent data. Actual weather and demand data for January and February has been included in the tables.

2.2 Updates to Resources

Installed capacity has increased by 76 MW since the last Outlook as the following projects became operational:

- Beck 1 Unit 7 return to service as a 60 Hz unit (69 MW)
- Upgrade of TransAlta's Ottawa Health Sciences Centre cogeneration plant by 7 MW

The assessment uses planned generator outages as submitted by market participants to the IESO's Integrated Outage Management System (IOMS). This Outlook is based on submitted generation outage plans as of February 17, 2009.

2.3 Updates to Transmission Outlook

The list of transmission projects, planned transmission outages and actual experience with forced transmission outages have been updated from the previous 18-Month Outlook. For this Outlook, transmission outage plans submitted to the IOMS as of January 23, 2009 were used.

2.4 Updates to Operability Outlook

The IESO has begun to report on system operability issues as they affect reliability. This topic is expected to evolve and grow over time as the new supply mix unfolds.

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3.0 Demand Forecast

The IESO is responsible for forecasting electricity demand on the IESO-controlled grid. This demand forecast covers the period April 2009 to September 2010 and supersedes the previous forecast released December 2008. Tables containing supporting information are contained in the 2009 Q1 Outlook Tables spreadsheet.

Demand is expected to decline over the forecast horizon as the economy contracts and conservation and embedded generation further reduces demand. Ontario's manufacturing sector had been in decline for over two years. However, the financial crisis of 2008 has pitched the whole economy into recession. As the volatility of 2008 passes and the impacts of the various stimulus packages are implemented, the economy is expected to find its equilibrium and start to recover. Despite the eventual economic recovery, demand will continue to decline as the impact of greater levels of conservation combined with growth in embedded generation take effect.

The following table shows the seasonal peaks and annual energy demand over the forecast horizon of the Outlook.

Table 3.1: Forecast Summary

Season	Normal Weather Peak (MW)	Extreme Weather Peak (MW)
Summer 2009	24,998	27,094
Winter 2009-10	22,758	23,818
Summer 2010	24,501	26,597
Year	**Normal Weather Energy (TWh)**	**% Growth in Energy**
2006 Energy	152.3	-1.9%
2007 Energy	151.6	-0.5%
2008 Energy	148.9	-1.8%
2009 Energy (Forecast)	146.6	-1.6%
2010 Energy (Forecast)	143.6	-2.0%

Forecast Details

The following table shows the weekly peak and energy demands for the system. Additional tables in the 2009 Q1 Outlook Tables spreadsheet contain detailed forecast information. The spreadsheet has the following tables:

- Table 3.1.1 has the monthly peak and energy demands for the system
- Table 3.1.2 has the weekly coincident peak demands for the 10 zones
- Table 3.1.3 the weekly energy demand by zone.

Table 3.2: Weekly Energy and Peak Demand

Week Ending	Normal Peak (MW)	Extreme Peak (MW)	Load Forecast Uncertainty (MW)	Normal Energy Demand (GWh)	Week Ending	Normal Peak (MW)	Extreme Peak (MW)	Load Forecast Uncertainty (MW)	Normal Energy Demand (MWh)
05-Apr-09	20,075	21,732	904	2,733	03-Jan-10	21,281	22,382	446	2,809
12-Apr-09	19,394	20,536	608	2,627	10-Jan-10	22,185	23,085	418	2,934
19-Apr-09	19,368	21,790	493	2,651	17-Jan-10	22,190	23,286	456	2,950
26-Apr-09	18,895	21,742	398	2,610	24-Jan-10	22,528	23,505	515	3,009
03-May-09	18,919	21,473	585	2,597	31-Jan-10	22,097	23,228	502	2,953
10-May-09	19,394	22,043	604	2,582	07-Feb-10	22,331	23,373	476	2,966
17-May-09	19,719	21,402	926	2,596	14-Feb-10	21,778	22,772	492	2,948
24-May-09	20,132	22,214	610	2,540	21-Feb-10	21,536	22,427	225	2,922
31-May-09	20,358	23,223	1,044	2,650	28-Feb-10	21,445	22,629	379	2,888
07-Jun-09	20,866	23,888	1,000	2,642	07-Mar-10	21,110	22,030	432	2,876
14-Jun-09	23,160	25,310	1,044	2,734	14-Mar-10	20,615	22,029	768	2,840
21-Jun-09	24,058	26,346	1,238	2,800	21-Mar-10	20,125	21,410	594	2,790
28-Jun-09	23,570	25,994	1,400	2,845	28-Mar-10	19,776	20,801	554	2,739
05-Jul-09	22,779	24,684	911	2,837	04-Apr-10	19,270	20,708	791	2,604
12-Jul-09	24,507	26,230	990	2,865	11-Apr-10	19,266	20,473	529	2,648
19-Jul-09	24,998	27,094	1,209	2,990	18-Apr-10	18,637	19,843	672	2,605
26-Jul-09	24,187	26,087	879	2,916	25-Apr-10	18,784	21,345	442	2,590
02-Aug-09	23,242	24,878	826	2,915	02-May-10	18,190	21,324	447	2,546
09-Aug-09	24,192	27,028	965	2,891	09-May-10	18,313	21,070	606	2,534
16-Aug-09	23,946	26,283	937	2,923	16-May-10	18,860	21,399	693	2,530
23-Aug-09	23,023	25,511	772	2,856	23-May-10	19,264	20,938	920	2,553
30-Aug-09	23,396	25,566	694	2,870	30-May-10	19,732	21,821	627	2,503
06-Sep-09	22,071	25,390	1,358	2,768	06-Jun-10	20,699	24,482	1,346	2,631
13-Sep-09	21,371	25,177	1,350	2,612	13-Jun-10	21,107	23,623	1,066	2,609
20-Sep-09	20,588	24,439	1,202	2,657	20-Jun-10	22,724	24,875	1,044	2,758
27-Sep-09	20,042	22,947	303	2,600	27-Jun-10	23,447	25,735	1,238	2,803
04-Oct-09	19,257	23,323	403	2,604	04-Jul-10	22,823	25,246	1,400	2,784
11-Oct-09	19,301	19,875	302	2,637	11-Jul-10	23,262	24,934	832	2,878
18-Oct-09	19,594	20,442	347	2,614	18-Jul-10	23,872	25,595	990	2,854
25-Oct-09	19,954	20,707	574	2,736	25-Jul-10	24,501	26,597	1,209	2,989
01-Nov-09	21,098	21,736	503	2,740	01-Aug-10	23,662	25,562	879	2,909
08-Nov-09	20,831	21,485	303	2,769	08-Aug-10	22,978	25,657	950	2,849
15-Nov-09	21,139	22,164	533	2,828	15-Aug-10	23,775	26,561	965	2,893
22-Nov-09	21,783	22,687	491	2,878	22-Aug-10	23,480	25,817	937	2,856
29-Nov-09	21,745	23,140	545	2,900	29-Aug-10	22,564	25,052	772	2,823
06-Dec-09	22,660	23,732	434	2,983	05-Sep-10	22,306	24,956	1,201	2,788
13-Dec-09	22,758	23,818	502	2,959	12-Sep-10	21,729	25,033	1,351	2,666
20-Dec-09	22,687	23,602	460	2,993	19-Sep-10	20,944	24,749	1,348	2,614
27-Dec-09	21,949	22,806	385	2,816	26-Sep-10	20,338	24,011	1,024	2,603

3.1 Actual Weather and Demand

Since the last forecast the actual demand and weather data for January and February has been recorded.

- January was cold with daily highs in the -10°C to -20°C for a number of days. Overall, the month ranked as the 10th coldest since 1970. The peak demand temperature was slightly colder than normal. Peak demand was a rather weak 22,900 MW. Energy demand was 12.6 GWh or 12.2 GWh weather-corrected. This is the lowest January energy demand since 2001.
- February was milder than normal with an average monthly temperature of -1°C. This is slightly warmer than the average (-2.6 °C) for the last 31 years. The peak occurred on February 4th when temperatures reached -12°C. This is the normal peak temperature. Despite the weather, economic factors continue to lead to much lower demand figures. The peak demand of 20,980 MW and energy demand of 10.8 GWh represent the lowest February levels since market opening.

Wholesale customer consumption has continued to decline. Many industries took a prolonged shutdown in December and since the financial crisis last fall their consumption is down over 13% compared to a year earlier. The majority of the declines have come from the steel, mining and pulp & paper sectors. In the 2009 Q1 Outlook Tables spreadsheet there are several tables containing historical data. They are:

- Table 3.3.1 has the weekly weather and demand history since market opening
- Table 3.3.2 has the monthly weather and demand history since market opening
- Table 3.3.3 has the monthly demand data by Market Participant role.

3.2 Forecast Drivers

Economic Outlook

The economy is currently in a period of retrenchment. As the stimulus packages launched by the federal, provincial and U.S. governments work their way into the economy, conditions are expected to stabilize and recover though that recovery is not expected until the later timeframe of this Outlook.

- Table 3.3.4 has the economic assumptions for the demand forecast

Weather Scenarios

For the purpose of forecasting the IESO uses weather scenarios to produce demand forecasts. These scenarios include Normal and Extreme weather, along with a measure of uncertainty in demand due to weather volatility. This measure is called Load Forecast Uncertainty.

- Table 3.3.5 of the 2009 Q1 Outlook Tables spreadsheet has the weekly weather data for the forecast period.

Conservation and Demand Management

This forecast assumes that conservation will continue to grow based on information provided by the OPA. The demand forecast is decremented for the impacts of conservation and embedded generation.

Demand measures (dispatchable loads, demand response programs, contracted loads) are not decremented from the demand forecast but instead are treated as a resource in the assessment. Therefore the effects of demand measures are added back into the demand history and the forecast is produced prior to these impacts. That total demand measure capacity is discounted – based on historical and contract data - to reflect the reliably available capacity.

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4.0 Resource Adequacy Assessment

This section provides an assessment of the adequacy of resources to meet the forecast demand. The key messages are:

- When reserves are below required levels and can adversely affect the reliability of the grid, the IESO has the authority to reject outages based on their order of precedence.
- Conversely, an opportunity exists for additional outages when reserves are above required levels

These actions address shortages and surpluses of reserves to a large extent.

In recognition of the uncertainty that exists regarding the future availability of resources, two resource scenarios are described in this section: the Firm Scenario and the Planned Scenario

Over the course of the Outlook period nearly 4,700 MW of new and refurbished supply is scheduled to come into service. Most of the new supply projects have started their commissioning phase or are in the construction phase. Additionally, the new interconnection with Québec will increase transfer capabilities by the middle of 2009.

The existing installed generating capacity is summarized in Table 4.1. This excludes capacity that is commissioning.

Table 4.1 Existing Installed Generation Resources as of February 10, 2009

Fuel Type	Total Capacity (MW)	Number of Stations	Change in Capacity (MW)	Change in Stations
Nuclear	11,426	5	0	0
Hydroelectric	7,823	69	69	0
Coal	6,434	4	0	0
Oil / Gas	6,659	24	7	0
Wind	704	6	0	0
Biomass / Landfill Gas	75	5	0	0
Total	33,121	113	76	0

4.1 Committed and Contracted Generation Resources

Table 4.2 summarizes generation that is scheduled to come into service, be upgraded or retired within the Outlook period. This includes generation projects in the IESO's Connection Assessment and Approval Process (CAA) that are under construction and projects contracted by the OPA. Details regarding the IESO's CAA process and the status of all projects in the CAA queue can be found on the IESO's web site at http://www.ieso.ca/imoweb/connassess/ca.asp.

The estimated effective date in Table 4.2 indicates the date on which additional capacity is assumed to be available to meet Ontario demand. For projects that are under contract, the estimated effective date is the best estimate of the date when the contract requires the additional capacity to be available. If a project is delayed the estimated effective date will be the best estimate of the commercial in-service date for the project.

Table 4.2 Committed and Contracted Generation Resources

Proponent/Project Name	Zone	Fuel Type	Estimated Effective Date	Change	Project Status	Capacity Considered in Scenario (MW)	
						Firm (MW)	Planned (MW)
Return of Unit 7 at Beck 1 as a 60 Hz unit	Niagara	Water	2009-Q1	On-line	In-Service		
Lac Seul Hydroelectric Project	Northwest	Water	2009-Q1		Commissioning	13	13
Portlands Energy Centre Combined Cycle Operation	Toronto	Gas	2009-Q1		Commissioning	245	245
LaSalle Recreation Centre	West	Oil	2009-Q1	New Project	Commissioning	1	1
St. Clair Energy Centre	West	Gas	2009-Q1		Commissioning	577	577
Enbridge Ontario Wind Farm (formerly Underwood WGS or Leader Wind Power Projects)	Southwest	Wind	2009-Q2	Delayed	Commissioning	182	182
Algoma Energy Cogeneration Facility	Northeast	By-Product Gas	2009-Q2		Construction	63	63
Goreway Station Project	Toronto	Gas	2009-Q2	Delayed	Commissioning	839	839
Wolfe Island Wind Project	East	Wind	2009-Q3	Delayed	Construction		198
Nuclear Upgrade	N/A	Uranium	2009-Q3		Construction	27	27
East Windsor Cogeneration Centre	West	Gas	2009-Q3		Construction		84
Retirement of Lower Wawaitin 25 Hz	Northeast	Water	2010-Q1		Connection Assessment	-11	-11
Bruce Unit 2	Bruce	Uranium	2010-Q2		Construction		750
Thorold Cogeneration Project	Niagara	Gas	2010-Q2		Construction		236
Healey Falls	East	Water	2010-Q2	New Project	Construction		16
Bruce Unit 1	Bruce	Uranium	2010-Q3	New Project	Construction		750
Leamington Pollution Control Plant	West	Oil	2010-Q3	New Project	Construction		1
Raleigh Wind Energy Centre	West	Wind	2010-Q3	New Project	Approvals & Permits		78
Halton Hills Generating Station	Southwest	Gas	2010-Q3	Delayed	Construction		632
Total						**1,935**	**4,680**

Notes to Table 4.2:

1. Shading indicates a change from the previous Outlook.
2. The total may not add up due to rounding. Total does not include In-Service facilities.
3. Project status provides an indication of the project progress. The milestones used are:
    a. Connection Assessment - the project is undergoing an IESO system impact assessment
    b. Approvals & Permits - the proponent is acquiring major approvals and permits required to start construction (e.g. environmental assessment, municipal approvals etc)
    c. Construction - the project is under construction
    d. Commissioning - the project is undergoing commissioning tests with the IESO

4.2 Summary of Scenario Assumptions

In order to assess future resource adequacy, the IESO must make assumptions on the amount of available resources. The Outlook considers two scenarios: a Firm Scenario and a Planned Scenario. Both scenarios' starting point is the existing installed resources shown in Table 4.1.

Under both scenarios, all existing resources and resources that are scheduled to come into service are assumed to be available over the study period, except for those units scheduled to retire and those for which the generator has submitted planned outages.

The generation capability assumptions are as follows:

- Hydroelectric capability (including energy and operating reserve) is based on median historical values during weekday peak demand hours from May 2002 to February 2008.
- Thermal generators' capacity and energy contributions are based on market participant submissions, including planned outages, expected forced outage rates and seasonal deratings.
- For wind generation the monthly Wind Capacity Contribution (WCC) values are used at the time of weekday peak, while total energy contribution is assumed to be 30%.

The Firm and Planned Scenarios differ in their assumptions regarding the amount of demand measures and generation capacity. These differences are summarized in the following table.

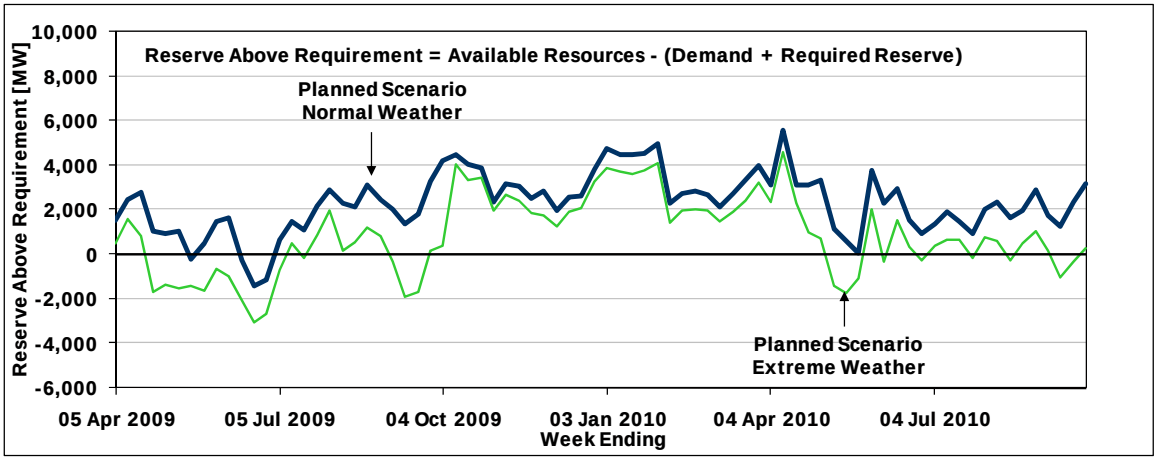
Table 4.3 Summary of Scenario Assumptions

		Planned Scenario	Firm Scenario
Resource Assumptions	Existing Installed Resources	Total Capacity	Total Capacity
		33,121 MW	33,121 MW
	New Generation and Capacity Changes	All	Only Capacity Changes, Commissioning Generators and Generators starting in the first 3 months
		4,680 MW	1,935 MW
Demand Forecast	Conservation	Incremental growth of 1,000 MW on peak	Existing
	Embedded Generation	Incremental growth of 500 MW on peak	Existing
	Demand Measures	Incremental	Existing
		542 MW	378 MW

4.3 Planned Scenario with Normal and Extreme Weather

Reserve Above Requirement levels, which represent the difference between Available Resources and Required Resources, are shown in Figure 4.1.

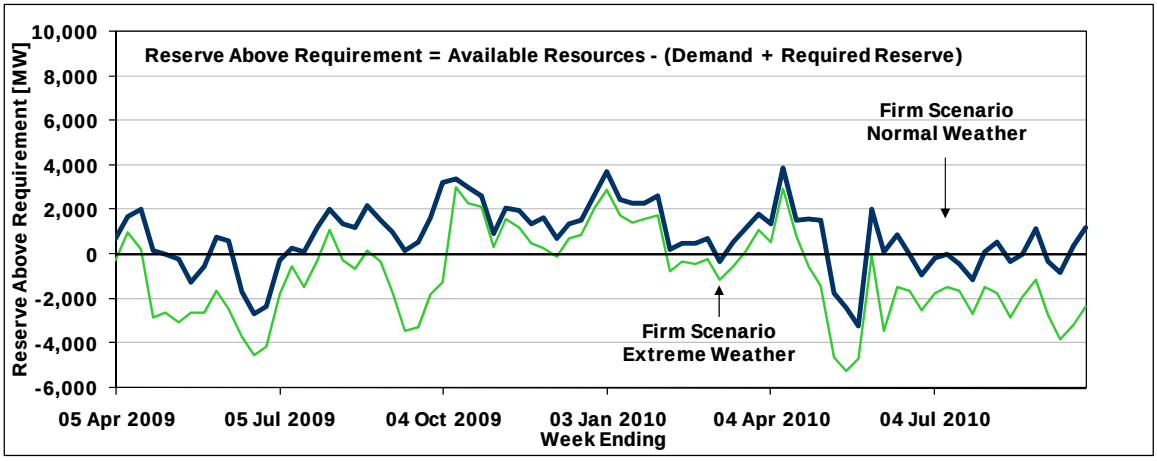
Figure 4.1 Reserve Above Requirement: Planned Scenario with Normal vs. Extreme Weather



4.4 Firm Scenario with Normal and Extreme Weather

Reserve Above Requirement levels, which represent the difference between Available Resources and Required Resources, are shown in Figure 5.2.

Figure 4.2 Reserve Above Requirement: Firm Scenario with Normal vs. Extreme Weather



4.5 Comparison of Resource Scenarios

Table 4.4 shows a snapshot of the forecast available resources, under the two scenarios, at the time of the summer and winter peak demands during the Outlook.

The monthly forecast of energy production capability, as provided by market participants, is included in Appendix A, Table A7.

Table 4.4 Summary of Available Resources

Notes	Description	Summer Peak 2009		Winter Peak 2010		Summer Peak 2010	
		Firm Scenario	Planned Scenario	Firm Scenario	Planned Scenario	Firm Scenario	Planned Scenario
1	Installed Resources (MW)	35,040	35,238	35,067	35,349	35,056	37,168
2	Imports (MW)	0	0	0	0	0	0
3	Total Resources (MW)	35,040	35,238	35,067	35,349	35,056	37,168
4	Total Reductions in Resources (MW)	5,886	5,934	5,611	5,776	6,977	8,781
5	Demand Measures (MW)	375	516	375	624	375	647
6	Available Resources (MW)	29,529	29,820	29,831	30,197	28,454	29,034

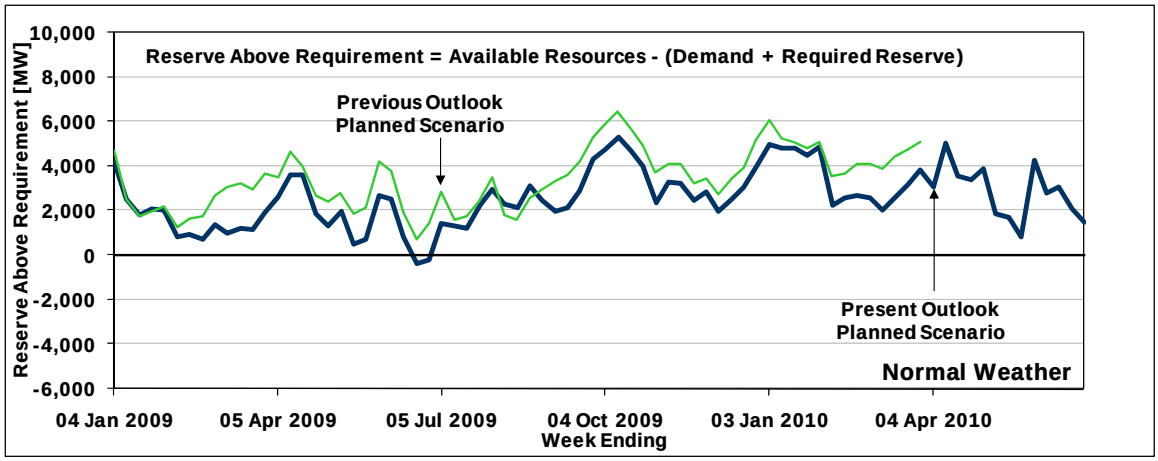
Notes to Table 4.4:

1. Installed Resources: This is the total generation capacity assumed to be installed at the time of the summer and winter peaks.
2. Imports: The amount of external capacity considered to be delivered to Ontario.
3. Total Resources: The sum of Installed Resources (line 1) and Imports (line 2).
4. Total Reductions in Resources: Represent the sum of deratings, planned outages, limitations due to transmission constraints, generation constraints due to transmission outages/limitations and allowance for capability levels below rated installed capacity.
5. Demand Measures: The amount of demand available to be reduced.
6. Available Resources: Equals Total Resources (line 3) minus Total Reductions in Resources (line 4) plus Demand Measures (line 5).

Comparison of the Weekly Adequacy Assessments for the Planned Scenario

Figure 4.3 provides a comparison between the forecast Reserve Above Requirement values in the present Outlook and the forecast Reserve Above Requirement values in the previous Outlook published on December 22, 2008. The difference is mainly due to the changes to generator outages and the change in the demand forecast.

Figure 4.3 Reserve Above Requirement: Planned Scenario with Present Outlook vs. Previous Outlook



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5.0 Transmission Reliability Assessment

This section provides an assessment of the reliability of the transmission system for the Outlook period. The transmission reliability assessment has three key objectives:

- To identify all major transmission and load supply projects that are planned for completion during the Outlook period and to present their reliability benefits.
- To forecast any reduction in transmission capacity brought about by specific transmission outages.
- To identify equipment outage events on the grid that could require contingency planning by market participants or by the IESO by reviewing planned transmission outages in conjunction with major planned resource outages and the scheduled completion of new generation and transmission projects to identify transmission reliability risks.

5.1 Transmission and Load Supply Projects

Demand growth over the last decade has resulted in some area loads reaching or exceeding the capability of the local transmission system. Transmitters and distributors have initiated plans to address this problem and provide additional transmission capacity for future load growth.

Several transmission reinforcements are currently under or about to begin construction and are planned for service during the Outlook period. Major transmission and load supply projects planned to be in service in the Outlook period are shown in Appendix B.

5.2 Transmission Outages

The assessment of transmission outages is limited to those with a scheduled duration of greater than five days or to those outages that are part of a project where the combined scheduled duration is greater than five days. The IESO's assessment of the transmission outage plans is shown in Appendix C, Tables C1 to C10.

This Outlook contains transmission outage plans submitted to the IESO as of January 23, 2009.

In addition to the outages presented in Appendix C, the IESO has been informed about outages associated with the Ontario to New York interconnection circuits at Niagara, planned to occur between Mar 24, 2009 and April 17, 2009. The combination of the ongoing forced outage and the new planned outages on the interconnection will result in the total Ontario-New York import and export scheduling capability to be reduced to zero MW for the planned outage duration. The import and export scheduling capability between Ontario and Michigan will be reduced to 844 MW and 655 MW respectively for the duration of the simultaneous outages on the Ontario-New York interface.

Hydro One has prepared a construction plan for the proposed 500 kV line from Bruce to Milton. The related equipment outages are expected to start in the second quarter of 2009 and continue beyond this outlook. These outages may impact the availability of existing transmission facilities and reduce some transmission interface limits in addition to the reductions presented in Appendix C.

5.3 Transmission System Adequacy

The Ontario transmission system with the planned system enhancements and known transmission outages is expected to be adequate to supply the demand under the extreme and normal weather conditions forecast for the Outlook period.

5.3.1 Toronto and Surrounding Area

The projected loadings on the Trafalgar, Claireville, Parkway and Cherrywood autotransformers are expected to be within their continuous capability with all transmission facilities and resources in the GTA in service. The presence of the Goreway Station and completion of Portlands Energy Centre will reduce the loadings of all GTA autotransformers and thereby, increase their spare capability.

Under summer 2009 normal and extreme weather conditions, loadings on the autotransformers are not expected to exceed their long term emergency capability following either the forced outages of any one GTA autotransformer and two Pickering units, or the forced outages of one Pickering unit and any two autotransformers. However, the presence of Sithe Goreway is critical, as it provides significant loading relief to Claireville in the case of multiple autotransformer outages.

Subsequent autotransformer or generation outages or deratings could result in loadings of remaining GTA autotransformers exceeding their long term emergency limits and mitigating measures would be required.

To be able to serve the load growth in the York Region, the new Holland transformer station is planned to be in service by mid 2009. This will be followed by the addition of a new generation resource in the area in 2011 that was recently announced by the OPA.

5.3.2 Bruce and Southwest Zones

Planned refurbishments at the Bruce generation station and new wind power resources in southwestern Ontario will increase generation capacity in the Bruce and Southwest zones. In the near term, transmission reinforcements that will increase the transfer capability out of Bruce include the up-rating of the Hanover to Orangeville 230 kV circuits and the installation of seven additional high voltage shunt capacitors at Buchanan, Middleport and Nanticoke. These near term reinforcements are part of the plan to reduce potential constrained generation for the time when Bruce is operated with seven and eight units before the proposed 500 kV double-circuit line between Bruce and Milton is available.

5.3.3 Niagara Zone and the New York Interconnection

The completion date for transmission reinforcement from Niagara region into the Hamilton-Burlington area continues to be delayed and to affect the use of both the available Ontario generation in the Niagara area and imports into the province, particularly during hot weather and high demand periods. The forced outage to the circuit BP76 on the Ontario-New York interconnection at Niagara continues to reduce the total Ontario-New York import and export capability until its scheduled return to service in Q3 of 2010.

5.3.4 East Zone and Ottawa Zone

The new interconnection between Hawthorne transformer station (TS) in Ontario and Outaouais station in Québec is scheduled for service by middle of 2009. The new interconnection is designed for an ultimate capacity of 1,250 MW but for most of the Outlook period the import and export capability could be limited to less than the nominal capacity depending on level of load and generation in the Outaouais region. After the completion of transmission reinforcement work in Québec, anticipated for May 2010, the interconnection will be able to operate up to its nominal capacity.

5.3.5 West Zone and the Michigan Interconnection

With the availability of Greenfield, St Clair and Lambton resources in the second quarter of the 2009, transmission constraints in this zone may restrict resources in southwestern Ontario and imports from Michigan. This is evident in the bottled generation amounts shown for the Bruce and West zones in Tables A3 and A6.

Phase angle regulators (PARs) installed on the Ontario-Michigan interconnection at Lambton TS continue to be idle. The failed PAR located in Michigan on the interconnection between Scott TS and Bunce Creek is scheduled for replacement in 2010.

5.3.6 Northeast and Northwest Zones

For the near–term, the IESO has recommended that the existing Mississagi generation rejection scheme be enhanced as soon as possible to alleviate constrained generation west of Mississagi and to reduce congestion over the North-South transmission corridors. Hydro One is planning to implement the required modifications by the third quarter of 2010.

5.3.7 Ontario 25 Hz System

The gradual retirement of the Niagara 25 Hz system is well underway and expected to be completed in 2009.

In northeastern Ontario, the 25 Hz system will also be retired. It is expected that the remaining facilities will be deregistered by the end of this Outlook period.

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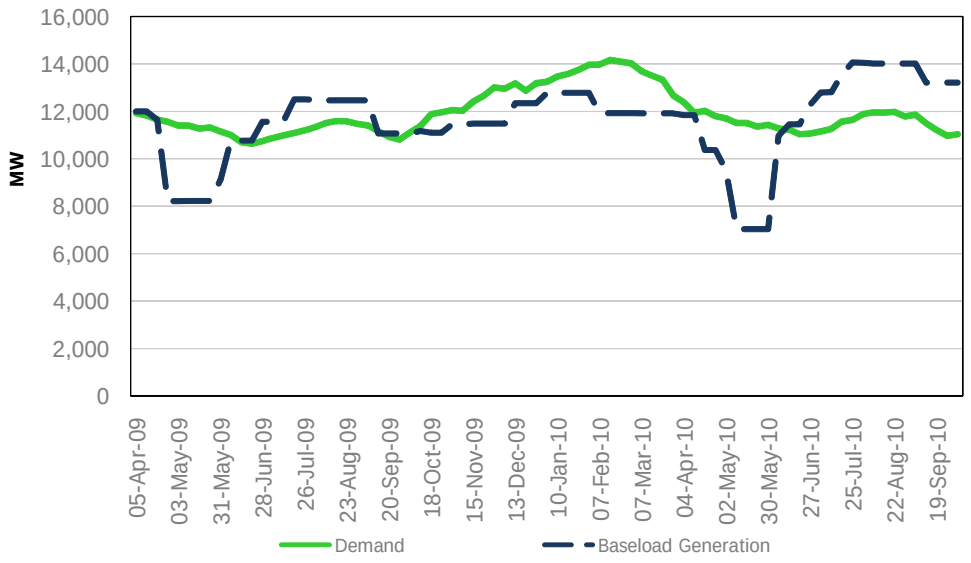
6.0 Operability Assessment

Recent Outlooks have highlighted the growing importance of evaluating reliability risks during low demand periods that occur during overnight and weekend hours. Certain types of generation such as nuclear and some hydroelectric generators must maintain minimum output levels to ensure the generation is available in future high demand hours, or to respect environmental or other operational constraints. At the same time, other generation such as wind generators can also be contributing, as they operate whenever they have the right conditions. With the expected return to service of Bruce nuclear units 1 & 2, in addition to over 1,100 MW of installed wind capacity by summer 2010, periods of surplus baseload generation are expected to increase in this Outlook period.

Through planning and coordination with market participants, the IESO will be addressing the expected periods of surplus generation to mitigate any potential impacts to reliability. Surplus baseload supply situations have occurred infrequently to date, and have always been accompanied by very low energy prices. The low prices not only serve to discourage additional supply in those hours, but also serve to encourage any market price sensitive consumers to shift whatever consumption they can out of higher priced hours into these very low priced periods.

Figure 6.1 shows the projected weekly minimum demand against the expected level of baseload generation. The analysis includes an assumption of 1,000 MW of exports. The graph illustrates that the periods of surplus supply grow towards the end of the Outlook period.

Figure 6.1 Minimum Demand and Baseload Generation



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