18-MONTH OUTLOOK

UPDATE

From March 2011 to August 2012

ieso
Power to Ontario. On Demand.

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

Executive Summary

With a resource portfolio and transmission system adequate to meet expected demands, the period from March 2011 to August 2012 presents no new reliability or adequacy concerns. The anticipated completion of two Bruce nuclear unit refurbishments and the addition of approximately 800 megawatts (MW) of renewable generation are contributing to this positive supply outlook for Ontario over the next 18 months.

The planned removal of two additional Nanticoke units later in 2011 will bring Ontario more than halfway to the Government's goal of eliminating coal. To facilitate the elimination of coal-fired generation by 2014 a number of infrastructure projects, including transmission improvements, are currently underway.

Some periods of surplus baseload generation (SBG) are expected to continue at levels seen in 2009 and 2010, particularly during the summer months. The IESO's SBG outlook has been enhanced to provide a range of the potential SBG periods.

Province-wide demand will be shaped by a number of influences over the forecast horizon. Increased demand will stem from economic expansion, population growth and the proliferation of end-use electrical devices. Conversely, embedded generation, conservation programs and time-of-use rates will act to dampen the underlying growth in energy consumption and peak demand.

Following the global recession of 2008-9, Ontario experienced a modest economic recovery over the course of 2010. Concerns over global debt levels, currency devaluation and weak global economic expansion will persist throughout the forecast, leading to continued modest economic growth expectations for Ontario.

The combined impacts of economic and demographic growth and the offsets of conservation and embedded generation will lead to limited energy demand growth and fairly flat peak demands over the forecast. Energy consumption is expected to grow by 0.7% in 2011 and 1.4% in 2012.

The following table summarizes the seasonal peak demand numbers.

Season	Normal Weather Peak (MW)	Extreme Weather Peak (MW)
Summer 2011	23,561	25,941
Winter 2011-12	22,391	23,588
Summer 2012	23,574	25,968

Conclusions & Observations

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

Demand Forecast

- Over the forecast peak and energy demand will face downward pressure from conservation programs and an increase in the amount of embedded generation.
- Electricity demand is expected to show modest increases in 2011 and 2012. Underlying demand growth will remain weak, reflecting the state of the world economy. Ontario's manufacturing continues to be hampered by a high Canadian dollar and increased competition from lower cost producers.
- Peak demands will remain fairly flat throughout the forecast. Conservation programs targeting peak demand, the growth in embedded generation and time-of-use rates will offset the increases due to population and building stock growth.
- With lower peak demand levels, system reliability will remain robust. Although high peak demands are likely under extreme weather conditions, they are not expected to pose any province-wide reliability concerns.

Resource Adequacy

- Reserve requirements are expected to be met for all weeks in all scenarios.
- The Bruce nuclear unit refurbishments are expected to be complete in Q1 and Q3 of 2012.

	Normal Weather Scenario	Extreme Weather Scenario
Planned Scenario	• There are no weeks where reserve is lower than required	• There are no weeks where reserve is lower than required
Firm Scenario	• There are no weeks where reserve is lower than required	• There are no weeks where reserve is lower than required

Transmission Adequacy

- The Ontario transmission system with the planned system enhancements and scheduled maintenance outages is expected to be adequate to supply the demand under the normal weather conditions forecast for the Outlook period**.**
- The supply reliability under extreme weather conditions, in particular to the GTA, has been further improved with the addition of the Halton Hills Generating Station. A long-term de-rated Trafalgar autotransformer may require minor mitigation measures under extreme weather conditions if additional transmission elements become unavailable. Over the last few years the southwest GTA demand experienced moderate growth, compared to the higher growth in the previous decade, resulting in supply margins still being available. Load growth is continuing, and the IESO, OPA and Hydro One are continuing to work on a transmission solution to maintain reliable supply in the southwest GTA will soon be required.

- Even with the recent recession, some area loads experienced modest growth requiring additional investments in local area transmission systems. Several local area supply improvement projects are underway and will be placed in service during the timeframe of this Outlook. These projects, shown in Appendix B, help relieve loadings of existing transformer stations and provide additional transformer capacity for future load growth.
- Transmission constraints over the 230 kV Sarnia/Windsor to London area may lead to the bottling of some generation resources in southwestern Ontario. This congestion could be further compounded under certain weather conditions and transmission outages.
- In preparation for the planned removal from service of southern Ontario coal-fired units, Hydro One is installing additional reactive compensation in western and southwestern Ontario.
- Managing grid voltages in the Northwest has always required special attention, but with the significantly lower demand, it has been increasingly difficult to maintain an acceptable voltage profile without compromising the security and reliability of the supply. The IESO has contacted Hydro One, and is also in conversations with the OPA, in efforts to examine the short- and long-term solutions to this problem.

Operability

- A risk of SBG conditions is present in both of the summers of 2011 and 2012 at volumes similar to those seen in 2009 and 2010.
- The IESO is currently working to address potential future operability issues associated with the growing amount of renewable resources expected to come into service over the next few years.

Caution and Disclaimer

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

Table of Contents

List of Tables

List of Figures

1.0 Introduction

This Outlook covers the 18-month period from March 2011 to August 2012 and supersedes the last Outlook released in December 2010.

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.

Security and Adequacy Assessments are published on the IESO website on a weekly and daily basis, and progressively supersede 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.

- End of Section -

2.0 Updates to This Outlook

2.1 Updates to Demand Forecast

The demand forecast was based on actual demand, weather and economic data through to the end of November 2010. The economic outlook has been updated based on the most recent data. Actual weather and demand data for December and January have been included in the tables.

2.2 Updates to Resources

The following generators came into service since the previous outlook.

- Hound Chute (10 MW)
- Lower Sturgeon after conversion from 25 Hz to 60 Hz (14 MW)
- Kruger Energy Chatham Wind Project (101 MW)
- Gosfield Wind Project (50 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 January 17, 2011.

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 3, 2011 were used.

2.4 Updates to Operability Outlook

An outlook of surplus baseload generation (SBG) conditions for the next 18 months has been updated with submitted generation outage plans as of January 17, 2011. The expected contribution to baseload from variable resources such as hydroelectric and wind generation has also been updated to reflect the most recent information. Furthermore, figure 6.1 has been revised to better indicate potential SBG conditions by illustrating the range of weekly minimum demands rather than the absolute minimum weekly demand. The average weekly demand has also been included in the figure.

- End of Section -

3.0 Demand Forecast

The IESO is responsible for forecasting electricity demand on the IESO-controlled grid. This demand forecast covers the period March 2011 to August 2012 and supersedes the previous forecast released in December 2010. Tables containing supporting information are contained in the 2011 Q1 Outlook Tables spreadsheet.

Electricity demand is expected to show limited growth over 2011 and 2012. Ontario's energy-intense export industries will continue to be hampered by the low U.S. dollar and the demand for Ontario's commodities will be slowed as China raises rates in an effort to cool their economy. Peak demands are expected to remain fairly flat over the forecast horizon as conservation programs, the growth in embedded generation and time-of-use rates will act to offset underlying growth driven by economic expansion and population growth.

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 2011	23,561	25,941
Winter 2011-12	22,391	23,588
Summer 2012	23,574	25,968
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	140.4	-5.7%
2010 Energy	142.1	1.2%
2011 Energy (Forecast)	143.2	0.7%
2012 Energy (Forecast)	145.2	1.4%

Forecast Details

The following table shows the weekly peak and energy demands for the system. Tables in the 2011 Q1 Outlook Tables spreadsheet contain additional demand information on both the forecast and historical data.

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 (GWh)
06-Mar-11	20,518	21,607	693	2,931	04-Dec-11	20,943	22,280	635	2,856
13-Mar-11	20,245	21,927	667	2,847	11-Dec-11	21,321	22,547	534	2,947
20-Mar-11	19,601	20,974	737	2,759	18-Dec-11	21,437	22,435	188	2,930
27-Mar-11	19,172	20,662	840	2,738	25-Dec-11	21,170	22,340	412	2,910
03-Apr-11	18,785	20,103	789	2,677	01-Jan-12	20,731	22,279	513	2,760
10-Apr-11	18,178	20,041	869	2,610	08-Jan-12	22,156	22,677	581	2,988
17-Apr-11	18,130	19,318	756	2,586	15-Jan-12	22,116	23,371	516	3,043
24-Apr-11	17,755	21,697	688	2,492	22-Jan-12	22,249	23,386	613	3,064
01-May-11	17,344	21,604	777	2,498	29-Jan-12	22,213	23,337	418	3,055
08-May-11	17,309	20,790	857	2,491	05-Feb-12	22,080	23,030	276	3,021
15-May-11	17,846	21,808	582	2,473	12-Feb-12	21,599	22,732	957	3,012
22-May-11	18,076	21,364	814	2,474	19-Feb-12	21,322	22,329	402	3,010
29-May-11	18,460	22,418	1,403	2,417	26-Feb-12	20,995	22,412	427	2,955
05-Jun-11	19,609	24,358	1,614	2,557	04-Mar-12	21,114	21,899	329	2,965
12-Jun-11	19,617	22,854	1,315	2,540	11-Mar-12	20,296	21,832	863	2,860
19-Jun-11	21,436	24,110	1,015	2,676	18-Mar-12	19,731	21,277	706	2,776
26-Jun-11	22,169	24,980	1,442	2,723	25-Mar-12	19,262	20,787	876	2,752
03-Jul-11	21,794	24,416	1,258	2,706	01-Apr-12	18,855	20,545	862	2,715
10-Jul-11	22,253	24,052	1,143	2,804	08-Apr-12	18,337	20,132	784	2,583
17-Jul-11	22,956	24,758	909	2,799	15-Apr-12	17,911	19,364	736	2,593
24-Jul-11	23,481	25,861	1,433	2,927	22-Apr-12	17,762	21,518	663	2,550
31-Jul-11	23,013	24,939	890	2,855	29-Apr-12	17,186	21,352	668	2,497
07-Aug-11	21,905	24,655	1,044	2,783	06-May-12	17,329	20,926	898	2,473
14-Aug-11	22,740	25,790	1,125	2,852	13-May-12	17,406	21,501	756	2,453
21-Aug-11	22,810	25,055	917	2,818	20-May-12	17,512	20,934	866	2,455
28-Aug-11	21,459	24,301	977	2,757	27-May-12	18,148	22,041	1,643	2,396
04-Sep-11	21,435	24,301	1,222	2,701	03-Jun-12	18,727	23,804	1,373	2,541
11-Sep-11	20,335	24,210	1,687	2,577	10-Jun-12	19,553	22,844	1,454	2,568
18-Sep-11	19,586	24,391	1,474	2,557	17-Jun-12	21,574	24,297	949	2,708
25-Sep-11	19,059	23,586	1,414	2,578	24-Jun-12	22,324	25,185	1,480	2,757
02-Oct-11	18,525	22,188	754	2,515	01-Jul-12	22,230	24,901	1,295	2,809
09-Oct-11	17,678	21,978	594	2,509	08-Jul-12	22,020	23,879	1,193	2,763
16-Oct-11	18,422	18,718	463	2,526	15-Jul-12	23,063	24,897	934	2,823
23-Oct-11	18,441	19,011	569	2,616	22-Jul-12	23,180	25,605	1,529	2,944
30-Oct-11	18,891	19,100	683	2,675	29-Jul-12	23,170	25,114	951	2,877
06-Nov-11	19,214	19,628	665	2,707	05-Aug-12	22,037	24,838	1,213	2,854
13-Nov-11	19,890	20,034	777	2,703	12-Aug-12	22,912	25,506	1,259	2,835
20-Nov-11	19,829	20,691	642	2,744	19-Aug-12	22,959	25,230	979	2,846
27-Nov-11	20,154	21,119	707	2,769	26-Aug-12	21,565	24,457	1,014	2,785

3.1 Actual Weather and Demand

Since the last forecast the actual demand and weather data for November, December and January have been recorded.

- November was milder than normal. Weather-corrected energy demand was 11.5 TWh (11.3 TWh actual) which was down slightly from 2009. The monthly peak of 19,970 MW occurred on November 25th, which preceded the coldest day. Wholesale customers' consumption was up 6% compared to November 2009.
- December's weather was colder than normal. Weather-corrected demand peaked at 21,962 MW (22,114 MW actual). Weather-corrected energy demand was 12.5 TWh for the month (12.7 TWh actual). The actual represents a small increase over 2009 but the weather-corrected value is

slightly lower than 2009. Wholesale customers' consumption continued its strong showing, increasing by 9% compared to the previous December.

- January was colder than normal though the coldest weather landed on a weekend. Peak demand was 22,733 MW (22,700 MW weather-corrected) and is a slight increase over the previous January. Energy demand for the month was 13.3 TWh (13.2 TWh weather-corrected) and was basically flat compared to January 2010. Wholesale customers' sustained the growth of the latter part of 2010 by showing a 7.1% over the previous January.

Wholesale customers' consumption in 2010 increased in by 5% over 2009 and finished the year strong. Overall, total weather-corrected energy demand was up 1.2% over the previous year. Demand has rebounded but remains 4.6% below the 2008 level prior to the recession.

The 2011 Q1 Outlook Tables spreadsheet has several tables with historical data. They are:

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

3.2 Forecast Drivers

Economic Outlook

Overall, this is not a typical global recovery period as job growth remains weak, debt levels high and consumers remain cautious.. Looking forward, the prospect is for modest economic growth with a number of challenges. Canada's relatively robust finance sector and public finances should help keep interest rates low. However, the dollar remains high which is a challenge for Ontario's export-oriented manufacturing. Over the forecast, economic growth will come in sectors that are not particularly electrically intensive. Therefore electricity demand growth will lag economic growth..

- Table 3.3.4 of the 2011 Q1 Outlook Tables spreadsheet 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 2011 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 such as dispatchable loads, demand response programs, and contracted loads are not decremented from the demand forecast but instead are treated as resources 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.

- End of Section -

4.0 Resource Adequacy Assessment

This section provides an assessment of the adequacy of resources to meet the forecast demand. When reserves are below required levels, with potentially adverse effects on 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 about 800 MW of new renewable supply and the Bruce G1 and G2 are scheduled to come into service. These new supply projects are currently at various stages of their construction.

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

Table 4.1 Existing Generation Resources as of February 20, 2011

Fuel Type	Total Installed Capacity (MW)	Forecast Capability at Summer Peak* (MW)	Number of Stations	Change in Installed Capacity (MW)	Change in Stations
Nuclear	11,446	10,567	5	0	0
Hydroelectric	7,947	5,852	71	24	1
Coal	4,484	4,267	4	0	0
Oil / Gas	9,497	8,494	28	0	0
Wind	1,235	178	9	151	1
Biomass / Landfill Gas	122	37	6	0	0
Total	34,731	29,395	123	175	2

* Actual Capability may be less as a result of transmission constraints

4.1 Committed and Contracted Generation Resources

Table 4.2 summarizes generation that is scheduled to come into service, be upgraded or shut down 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 these projects can be found on the IESO's website 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 or existing capacity shut down. 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 (Previous Reported Date)	Project Status	Capacity Considered	
						Firm (MW)	Planned (MW)
Raleigh Wind Energy Centre (RES III)	West	Wind	2011-Q1		Commissioning	78	78
Talbot Windfarm (RES III)	Southwest	Wind	2011-Q1		Commissioning	99	99
Leamington Pollution Control Plant	West	Oil	2011-Q2		Approvals & Permits	0	2
Greenwich Wind Farm (RES III)	Northwest	Wind	2011-Q3		Construction	0	99
Becker Cogeneration (CHP III)	Northwest	Biomass	2011-Q3		Construction	0	15
McLean's Mountain Wind Farm 1 (FIT)	Northeast	Wind	2011-Q3		Under Development	0	50
McLean's Mountain Wind Farm 3 (FIT)	Northeast	Wind	2011-Q3		Under Development	0	10
Comber West - C23Z Wind Project (FIT)	West	Wind	2011-Q3		Construction	0	83
Comber East - C24Z Wind Project (FIT)	West	Wind	2011-Q3		Construction	0	83
Pointe Aux Roches Wind (FIT)	West	Wind	2011-Q3		Approvals & Permits	0	49
Nanticoke Capacity Adjustment*	Southwest	Coal	2011-Q4			-980	-980
Conestogo Wind Energy Centre 1 (FIT)	Southwest	Wind	2011-Q4		Approvals & Permits	0	69
Bruce Unit 2	Bruce	Uranium	2012-Q1		Construction	0	750
Summerhaven Wind Energy Centre (FIT)	Southwest	Wind	2012-Q1		Approvals & Permits	0	125
Bow Lake Phase 1 (FIT)	Northeast	Wind	2012-Q2		Approvals & Permits	0	20
Bruce Unit 1	Bruce	Uranium	2012-Q3		Construction	0	750
Total						**-803**	**1,302**

*** 2 Nanticoke units have been notionally removed from the generation resources as of 2011Q4. This is a placeholder, as per Ontario's Ministry of Energy Supply Mix directive, until formal dates have been determined through normal protocols.**

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
    e. Under Development (U/D) – Small-capacity Feed-in Tariff (FIT) projects are not tracked for milestones and therefore indicated as under development

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 as compared in Table 4.3

Both scenarios' starting point is the existing installed resources shown in Table 4.1. The planned scenario assumes that all resources that are scheduled to come into service are available over the study period while the Firm Scenario only assumes those scheduled to come into service over the first three months and generators that have started commissioning. Both scenarios recognize that resources that are in service are not available during times for which the generator has submitted planned outages. What is also considered for both scenarios is generator-planned shutdowns or retirements which have high certainty of happening in the future. The Firm and Planned Scenarios also differ in their assumptions regarding the amount of demand measures.

The generation capability assumptions are as follows:

- The hydroelectric capability (including energy and operating reserve) for the duration of this outlook is based on median historical values during weekday peak demand hours from May 2002 to March 2010.
- 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, which can be found in the Methodology to Perform Long Term Assessments, are used at the time of weekday peak, while total energy contribution is assumed to be 29%.

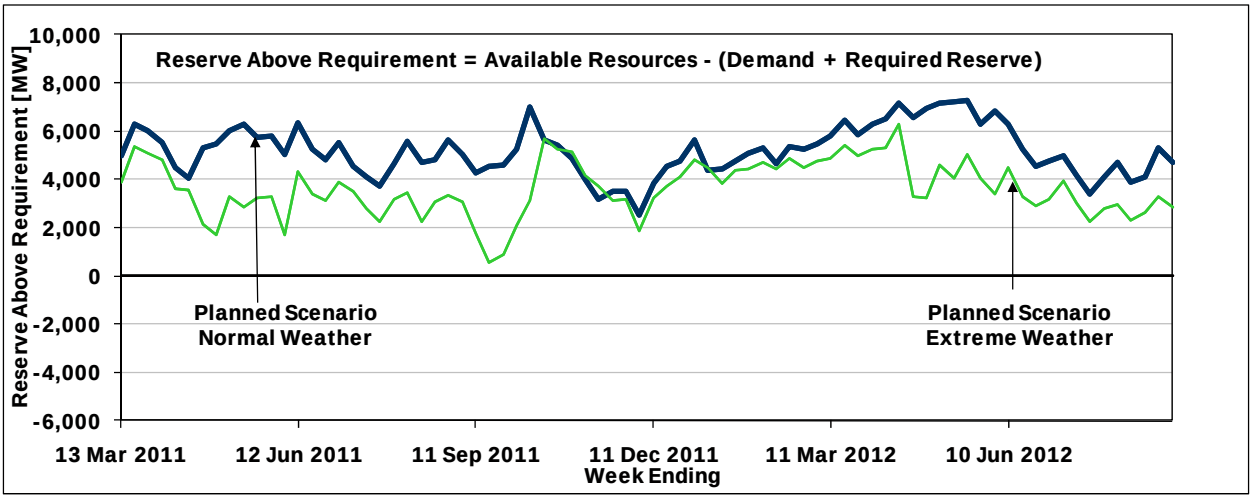
Table 4.3 Summary of Scenario Assumptions

Assumptions		Planned Scenario	Firm Scenario
Resource	Existing Installed Resources	Total Capacity	Total Capacity
		34,731	34,731
	New Generation and Capacity Changes	All	Only Capacity Changes, Generator shutdowns or retirements, Commissioning Generators and Generators starting in the first 3 months
		1,302	-803
Demand Forecast	Conservation	Incremental	
		Incremental growth of 85 MW on summer peak	
	Embedded Generation	Incremental	
		Incremental growth of 55 MW on summer peak	
	Demand Measures	Incremental	Existing
		1,382 MW	1,013 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.

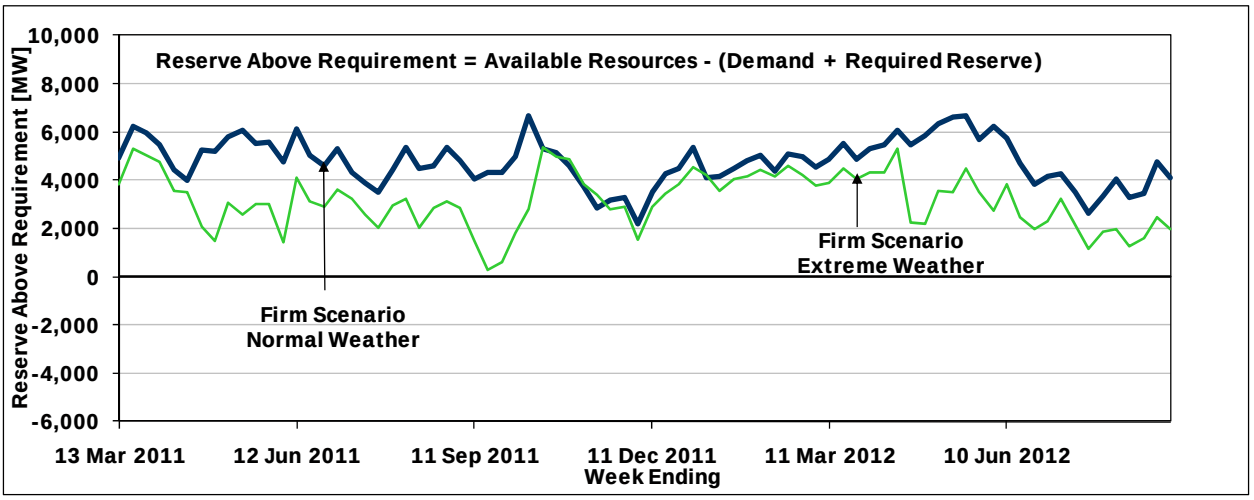
Figure 4.1 Reserve Above Requirement: Planned Scenario with Normal vs. Extreme Weather



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 4.2.

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 the 2011 Q1 Outlook Tables Appendix A, Table A7.

Table 4.4 Summary of Available Resources

Notes	Description	Summer Peak 2011		Winter Peak 2012		Summer Peak 2012	
		Firm Scenario	Planned Scenario	Firm Scenario	Planned Scenario	Firm Scenario	Planned Scenario
1	Installed Resources (MW)	34,908	34,910	33,928	34,387	33,928	35,157
2	Imports (MW)	0	0	0	0	0	0
3	Total Resources (MW)	34,908	34,910	33,928	34,387	33,928	35,157
4	Total Reductions in Resources (MW)	5,099	5,091	4,806	5,199	4,948	5,715
5	Demand Measures (MW)	1,013	1,235	1,013	1,224	1,013	1,382
6	Available Resources (MW)	30,822	31,053	30,135	30,412	29,993	30,824

Notes to Table 4.4:

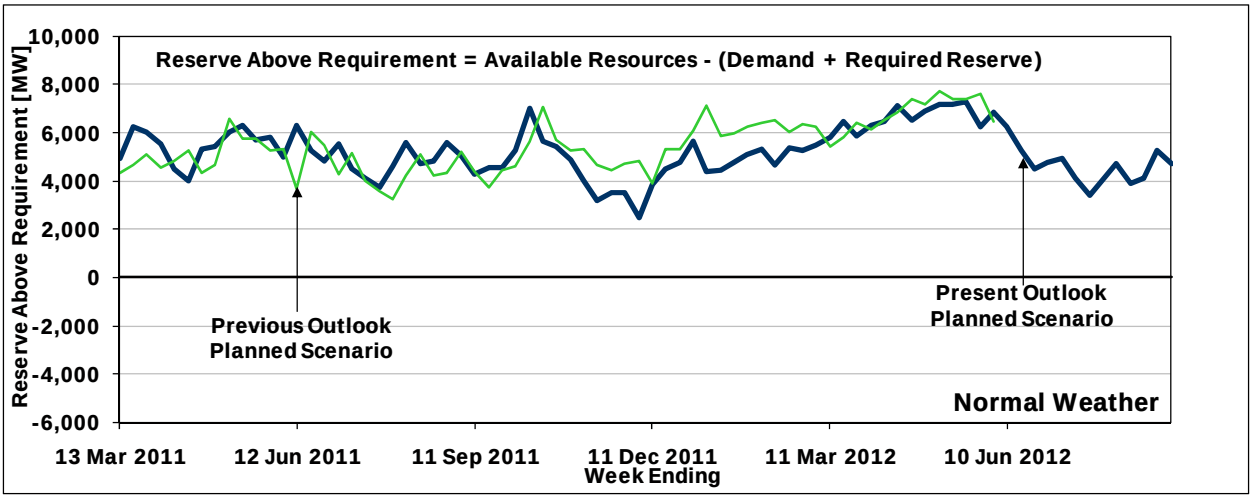
1. Installed Resources: This is the total generation capacity assumed to be installed at the time of the summer and winter peaks.
2. Imports: The amount of external capacity considered to be delivered to Ontario.
3. Total Resources: The sum of Installed Resources (line 1) and Imports (line 2).
4. Total 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).

7. 2 Nanticoke units have been notionally removed from the generation resources as of 2011Q4. This is a placeholder, as per Ontario's Ministry of Energy Supply Mix directive, until formal dates have been determined through normal protocols.

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 3, 2010. The difference is mainly due to the changes to outages, and the change in the demand forecast.

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



Resource adequacy risks are discussed in detail in the "Methodology to Perform Long Term Assessments" (IESO_REP_0266).

- End of Section -

5.0 Transmission Reliability Assessment

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

- Identify all major transmission and load supply projects that are planned for completion during the Outlook period and present their reliability benefits;
- 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 its base flow limit;
- Identify equipment outages that could require contingency planning by market participants or by the IESO. Planned transmission outages are reviewed in conjunction with major planned resource outages and the scheduled completion of new generation and transmission projects to identify reliability risks.

5.1 Transmission and Load Supply Projects

The IESO requires transmitters to provide information on the transmission projects that are planned for completion within the 18-month period. Construction of several transmission reinforcements is expected to be completed during the Outlook period. Major transmission and load supply projects planned to be in service are shown in Appendix B. Projects that are in service or whose completion has been deferred well beyond the period of this Outlook are not shown. The list includes only the transmission projects that represent major modifications or are considered to provide significant improvement to system reliability. Minor transmission equipment replacements or refurbishments are excluded.

Even with the recent recession, some area loads experienced modest growth requiring additional investments in new load supply stations and reinforcements of local area transmission. Several local area supply improvement projects are underway and will be placed in service during the timeframe of this Outlook. These projects help relieve loadings of existing transformer stations and provide additional transformer capacity for future load growth.

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. As the start time of the outage approaches, actual outage schedule and additional outage requirements, as well as outages with a scheduled duration of five days or less, could impose further transmission capacity restrictions. Prior to approving and releasing an outage, the IESO will reassess the outage for potential system impacts, taking into account all current and forecasted conditions.

The IESO's assessment 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 interconnection limits. Where multiple outages are scheduled during the same period, the combined effect of all outages on the reduction in transmission interface and interconnection limits is presented. Where multiple outages are scheduled during the same period and reliability is affected, the IESO will request the transmitter to reschedule some of the outages. The methodology used to assess the transmission outage plans is described in the IESO document titled "Methodology to Perform Long Term Assessments" (IESO_REP_0266).

The planned transmission outages are reviewed in correlation with major planned resource outages and scheduled completion dates of new generation and transmission projects. This allows the IESO to identify transmission system reliability concerns and to highlight those outage plans that need to be adjusted. A change to an outage may include rescheduling the outage, reducing the scheduled duration or reducing the recall time.

This assessment will also identify any resources that have potential or are forecast to be constrained due to transmission outage conditions. Transmitters and generators are expected to develop an ongoing arrangement to coordinate their outage planning activities. Transmission outages that may affect generation access to the IESO-controlled grid should be coordinated with the generator operators involved, especially at times when deficiency in reserve is forecast. 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 IESO, the IESO will inform the affected market participants and request that they resolve the conflict. If the conflict remains unresolved, the IESO will determine which of the planned outages can be approved according to the priority of each planned outage as determined by the Market Rules detailed in Chapter 5, Sections 6.4.13 to 6.4.18. This Outlook contains transmission outage plans submitted to the IESO as of January 3, 2011.

5.3 Transmission System Adequacy

Generally, IESO Outlooks identify the areas of the IESO-controlled grid where the projected extreme weather loading is expected to approach or exceed the capability of the transmission facilities for the conditions forecast in the planning period. In these situations there is also an increased risk of load interruptions.

The Ontario generation mix is changing rapidly with the addition of new renewable resources and the planned shutdown or conversion of coal resources. The transmission system needs to evolve to accommodate the supply mix changes and the incorporation of new generation while maintaining the reliable delivery of electricity to the consumers. Over the last few years, Hydro One, the OPA and the IESO have been collaborating in the development of a number of transmission enhancements required to accommodate these changes. Some of these transmission enhancements are scheduled to come into service during this Outlook period.

The IESO works with Hydro One and other Ontario transmitters to identify the highest priority transmission needs, and to ensure that those projects whose in-service dates are at risk are given as much priority as practical, especially those addressing reliability needs for peak demand periods of this Outlook. We have also been working closely with the OPA on identifying the transmission enhancements' location, timing and requirements to satisfy reliability standards.

Within the context of this approach, the Ontario transmission system with the planned system enhancements and known transmission outages is expected to be adequate to supply the demand under the normal weather conditions forecast for the Outlook period.

5.3.1 Toronto and Surrounding Area

The Greater Toronto Area (GTA) electricity supply is expected to be adequate for supplying the forecasted demand.

The addition of Halton Hills GS reduced the peak loading of the Trafalgar 500/230 kV autotransformers allowing for more operational flexibility. Some minor mitigating measures may be required under extreme conditions to accommodate a long term de-rated 500/230 kV autotransformer at Trafalgar TS and other possible unavailability events.

During the last quarter of 2010, Hydro One completed the Claireville to Cherrywood transmission reinforcement project that improves the reliability of the bulk electricity system and enhances operational flexibility during outage conditions.

Over the last few years the southwest GTA demand experienced moderate growth, compared to the higher growth seen in the previous decade, resulting in adequate supply margins still being available under normal conditions. To maintain reliability of supply under extreme conditions in the area, transmission solutions are now being considered. Until a transmission solution is in place some mitigating measures may be required under extreme conditions if local transmission elements become unavailable.

The York Region load-serving capability will be reinforced with the addition of York Energy Centre that is scheduled to go in service late-2012 to alleviate transmission constraints in the area.

5.3.2 Bruce and Southwest Zones

Planned refurbishments at the Bruce A generating station and new wind power resources in southwestern Ontario will increase generation capacity in the Bruce and Southwest zones. The interim transmission reinforcements required to accommodate the extra generation are on schedule with the installation of dynamic voltage control facilities at Nanticoke and Detweiler and modifications to the existing Bruce special protection system that will continue during this Outlook period.

In the longer term, the planned 500 kV line from Bruce to Milton, expected in service late 2012, will provide the required transmission capability to deliver the full benefits of the Bruce refurbishment project and the development of new renewable resources in southwestern Ontario. The work will continue during this Outlook period with some outages having the potential to temporarily reduce the transfer capability out of the Bruce zone. Hydro One and the affected parties are implementing an outage plan designed to minimize the overall impact of these outages.

To prevent low voltage conditions in the 115 kV transmission system in the Woodstock area during summer extreme weather conditions, Hydro One is planning to add a new transformer station and a second supply point by extending the 230 kV transmission lines from Ingersoll to the Woodstock area and installing a new 230/115 kV transformer station. These plans, scheduled to be completed during the fourth quarter of 2011, will provide an increased level of supply reliability, and support further load growth in the area.

Hydro One is currently undertaking major upgrade work at Burlington TS which will resolve limitations in the station's ability to supply the Burlington 115 kV area load, allow future load growth and yield a more flexible configuration. The remaining work, which includes the replacement of all 115 kV breakers and limiting bus sections, is scheduled to be completed in the second quarter of 2013.

In the Guelph area, the existing 115kV transmission facilities are operating close to capacity and have limited margin to accommodate additional load. A combined effort by the OPA, Hydro One, the affected distributors and the IESO is expected to determine the optimum solution for enhancing the overall supply capability to this area.

As identified in previous IESO reports the existing transmission infrastructure in the Cambridge area is unable to meet the IESO's load restoration criteria following a contingency. The OPA is currently examining solutions, including a new generating facility, to alleviate this issue.

5.3.3 Niagara Zone

The completion date for transmission reinforcements from the Niagara region into the Hamilton-Burlington area continues to be delayed. This delay impacts the use of the available Ontario generation in the Niagara area, particularly during hot weather and high demand periods.

The failed R76 voltage regulator and the BP76 circuit are expected to return to service by the end of 2012. This bypass will remain available for use if required until the R76 voltage regulator returns.

5.3.4 East Zone and Ottawa Zone

The planned outages in the East and Ottawa zones may result in small transfer capability reductions of the transmission circuits but are not expected to have any impact on the load supply in this area.

5.3.5 West Zone

Transmission constraints in this zone may restrict resources in southwestern Ontario. This is evident in the bottled generation amounts shown for the Bruce and West zones in Tables A3 and A6.

Phase angle regulators (PARs) are installed on the Ontario-Michigan interconnection at Lambton TS on the Ontario side and at Bunce Creek TS in Michigan, representing three of the four interconnections with Michigan. These will not be operational until completion of agreements between the IESO, MISO, Hydro One and International Transmission Company (ITC). The operation of these PARs along with the PAR on the Ontario-Michigan interconnection near Windsor will control flows to a limited extent, and assist in the management of system congestion.

5.3.6 Northeast and Northwest Zones

The transmission lines east of Mississagi TS and the north-south corridor have experienced increased congestion due to the continuing addition of new renewable resources and the lack of transmission reinforcements. It is expected that congestion will further increase with projects in the area, both proposed and under construction, becoming operational.

To help reduce this congestion and incorporate the future Lower Mattagami expansion projects and other renewable generation resources, Hydro One installed series compensation on the 500 kV north-south lines at Nobel SS and additional static reactive compensation facilities at Porcupine TS in the fourth quarter of 2010. To further improve the north-south transfer capability Hydro One will install dynamic reactive compensation facilities at Porcupine TS and Kirkland Lake TS with a planned in-service date during the first quarter of 2011 and static reactive compensation at Pinard TS with a planned in-service date during the third quarter of 2012.

Managing grid voltages in the Northwest has always required special attention. With significantly lower demands over the past few years, it is increasingly difficult to maintain an acceptable voltage profile without compromising the reliability of the supply, in particular during with low east-west transfers.

On several occasions normal dispatch actions were exhausted, and exceptional voltage control measures, including the temporary removal of one or more transmission circuits from service, were implemented to maintain the grid voltages within acceptable ranges. This reduced the grid's ability to withstand disturbances and subsequently undermined the customers' supply reliability.

To reduce and eventually eliminate the dependence on such measures during operations, additional reactive compensation is required for voltage control in this zone. The IESO has contacted Hydro One,

and is also in conversations with the OPA, in an effort to examine the short- and long-term solutions to this problem.

Some loads connected to the circuits emerging from Ear Falls TS experienced significant growth over the last few years and recently indicated their intention to expand operations. The transmission circuits in the area are currently operating close to their capability and have no margin to support the expected load growth without upgrades or reinforcements.

- End of Section -

6.0 Operability Assessment

The IESO monitors existing and emerging operability issues that could potentially impact system reliability. This past quarter, we have seen a few instances of surplus baseload generation (SBG) mostly as a result of isolated weather events.

Over the next 18 months, the IESO expects the periods with the highest potential for experiencing SBG conditions will arise over the summer of 2011 and the spring and summer of 2012.

The IESO continues to evolve its analysis of operability. As such, the IESO has chosen to provide additional information not previously offered. Rather than solely depicting the absolute minimum weekly demand, Figure 6.1 has now been enhanced to show the entire range of weekly minimum demands as well as offer the average minimum weekly demand projected for the next 18 months.

Figure 6.1 Minimum Demand and Baseload Generation

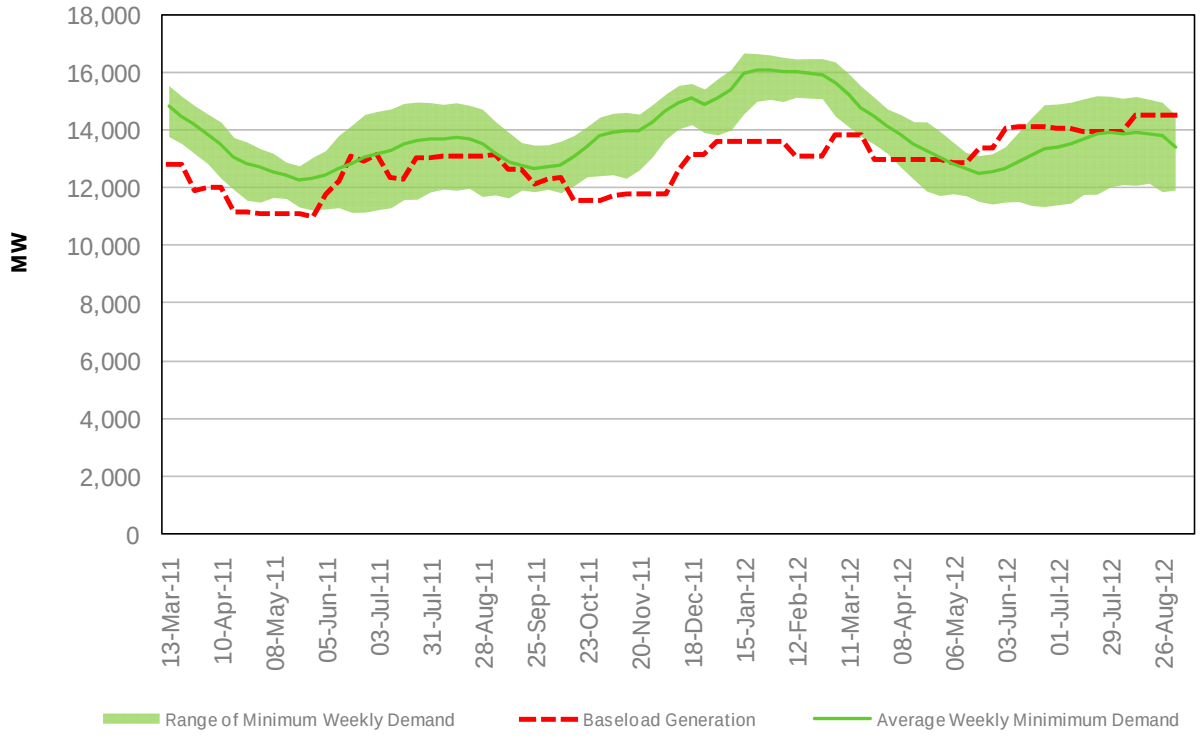


Figure 6.1 Baseload generation assumptions have been updated to include exports[1], the latest planned outage information, market participant submitted data, and in-service dates for new or refurbished generation. The expected contribution from self-scheduling and intermittent generation has also been

[11] An export assumption of 1,500 MW is applied under conditions which allow Ontario's aggregate export capability to be higher than 2,600 MW. The 1,200 MW export assumption will be applied when forecast planned outages are expected to limit Ontario's aggregate export capacity to between 1,400MW and 2,600 MW. For forecast planned outages that further limit export capacity to below 1,400 MW, an export assumption value of 700 MW will be used. See Appendix C of the 18-Month Outlook Tables for forecast reduction to major transmission interface limits, including interconnection interfaces.

updated to reflect the latest data. Output from commissioning units is explicitly excluded from this analysis due to uncertainty and highly variable nature of commissioning schedules.

- End of Document -