18-MONTH OUTLOOK

From September 2014 to February 2016

Power to Ontario. On Demand.

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

Executive Summary

The Outlook for the reliability of Ontario's electricity system remains positive for the coming fall – and throughout the next 18 months – with adequate supply and reliable transmission service forecasted.

During this Outlook period, two former coal stations that are being converted to biomass are expected to return to service. Atikokan Generating Station (GS) has completed commissioning and it is now the largest 100 per cent biomass facility in North America. Thunder Bay GS, the last coal facility to decommission in Ontario, will follow with their conversion to a biomass generation facility, and is anticipated in-service in early 2015.

Including Thunder Bay GS, more than 2,400 MW of new supply will be incorporated into the province's existing generation fleet during the Outlook period. This includes the province's first grid-connected solar projects which are presently commissioning and are expected to be in service in the next quarter, with facilities in northeast and western Ontario. By the end of the Outlook period, the amount of solar generation connected to the grid is expected to grow to 280 MW, complementing the 1,800 MW of embedded solar facilities located within distribution networks.

Continued growth in embedded solar and wind generation capacity is putting downward pressure on peak electricity demands on the bulk system and in conjunction with conservation and demand management initiatives, the IESO anticipates a narrower gap between winter and summer peaks than in recent previous years. In light of this increasing presence of variable generation, the IESO has taken a number of additional steps to augment the flexibility and resiliency of the provincial grid – including developing a better understanding of how electricity storage can benefit the power system. The following table summarizes the forecasted seasonal peak demands over the Outlook period.

Season	Normal Weather Peak (MW)	Extreme Weather Peak (MW)
Winter 2014-15	22,149	23,077
Summer 2015	22,808	24,669
Winter 2015-16	22,094	22,846

As part of its 2012 RFP for Alternative Technologies for Regulation Services, the IESO procured two projects, totaling six megawatts of storage capacity. Both came into service in summer 2014 and will help correct variations in power system frequency, and also support operational testing of storage capabilities. This procurement process also fed into the development of a framework for a subsequent storage RFP, which the IESO recently completed. This is expected deliver an additional 34 MW in storage capacity to provide additional benefits to both grid and market operations.

This report identifies nuclear outages scheduled in the spring of 2015. Demand response initiatives, increased reliance on the interties and restricted outage programs will be among the actions available to manage reserves in the event of extreme weather scenarios during the scheduled nuclear outages. The transmitters are requested to schedule preventive maintenance ahead of time to ensure reliable operation of their equipment such as voltage control facilities during the nuclear outages. Market participants are reminded to review their operational needs, such as fuel supply, to ensure their facilities are available to support the system during this period.

The IESO is also taking steps to strengthen the role of demand response in meeting the province's longer-term energy needs. In 2015, the IESO plans to hold a competitive capacity auction for new demand response resources to participate in the market beginning in 2016. This auction will contribute verifiable and reliable demand response that can be incorporated into forecasts.

Conclusions & Observations

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

Demand Forecast

- Both Ontario's grid supplied energy demand and peak demand are expected to decline throughout the period of this Outlook. Growth in embedded solar and wind generation capacity and on-going conservation initiatives reduce the need for electricity from the bulk power system, while also putting downward pressure on peak electricity demands on the bulk system. In conjunction with conservation and time-of-use rates, summer peaks are expected to face greater downward pressure than winter peaks.

Resource Adequacy

- Under the **planned scenario**, reserve requirements are expected to be met for the entire duration of this Outlook during normal weather. However, the planning reserve is below the requirement for five weeks under the extreme weather scenarios largely due to the planned nuclear generator outages in spring 2015.
- For the **firm scenario**, reserve requirements are expected to be met for the entire duration of this Outlook under normal weather conditions. Under extreme weather condition, the reserve is below the requirement for nine weeks. The firm scenario excludes any new generating facilities planned to come into service beyond the first three months of the report period. As a result, the shortfall is more pronounced in the firm scenario than in the planned scenario.
- One of the units at Thunder Bay GS is expected to be converted to a biomass facility during this Outlook period.
- More than 2,400 MW of grid-connected generation is expected to be added throughout this Outlook period.

Transmission Adequacy

Ontario's transmission system is expected to be able to reliably supply the demand while experiencing normal contingencies defined by planning documents under both normal and extreme weather conditions forecast for this Outlook period.

- 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, will help relieve loadings of existing transmission stations and provide additional supply capacity for future load growth. The IESO, OPA, Ontario's transmitters and affected distributors are reviewing system needs and considering solutions in accordance with the Regional Planning Process established by the Ontario Energy Board (OEB).
- To help control voltages in northwestern Ontario, new shunt reactors at Dryden TS are scheduled to be in service by the end of 2014.
- High voltages in southern Ontario continue to occur, especially during periods of light load. High voltages become more acute during these periods when shunt reactors are unavailable. While the IESO and Hydro One are currently managing this situation with day-

to-day operating procedures, planning work for the installation of new voltage control devices has been initiated.

- To improve the transmission capability into the Guelph area, Hydro One will be proceeding with the Guelph Area Transmission Refurbishment project to reinforce the supply into Guelph-Cedar Transformer Station (TS), with an expected completion date of Q2 2016.
- In the Cambridge area, a second 230/115 kV autotransformer at Preston TS and associated switching and reactive facilities are planned for 2017. This will provide additional capacity to meet forecast demand growth and help meet the IESO's load restoration criteria following a contingency on the main supply line. Studies will continue to assess the need for additional measures to address longer term needs in the area.
- The replacement of the existing Hydro One 115 kV switchyard at Hearn Switching Station (SS) is complete and the upgrading of the 115 kV breakers at Leaside TS and Manby TS is scheduled for completion by Q4 2014. These new facilities will increase the short-circuit interrupting capability of the 115 kV system and allow new generation to be connected in the Manby and Leaside sectors.
- A new station, Copeland TS, is planned to be in service in downtown Toronto in Q3 2015. The new station will facilitate the refurbishment of the facilities at John TS, while also enhancing the load security in the downtown core.
- Following receipt of environmental approval, the work has started on the construction of Clarington TS and is scheduled to be complete by the fall-2017. This facility will provide additional 500/230 kV transformation capacity to maintain supply reliability following the shut-down of Pickering GS. The 230 kV switching facilities at Clarington TS will also improve reliability to the loads in the Pickering, Ajax, Whitby, Oshawa and Clarington areas.

Operability

- The surplus baseload generation (SBG) assessment for this Outlook continues to include scenarios showing effects of nuclear curtailments and wind dispatch. Conditions for SBG are likely to continue over the Outlook period. However, it is expected that SBG will be managed effectively via normal market mechanisms including inter-tie scheduling, nuclear maneuvering or shutdown and the dispatch of grid-connected renewable resources.

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1 Introduction

This Outlook covers the 18-month period from September 2014 to February 2016 and supersedes the last Outlook released on June 19, 2014.

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/Pages/Participate/Reliability-Requirements/Forecasts-&-18-Month-Outlooks.aspx

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:

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- Tel: 905-403-6900
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- E-mail: customer.relations@ieso.ca.

- End of Section -

2 Updates to This Outlook

2.1 Updates to Demand Forecast

The demand forecast is based on actual demand, weather and economic data through to the end of May 2014. The demand forecast has been updated to reflect the most recent economic projections. Actual weather and demand data for July 2014 has been included in the tables.

2.2 Updates to Resources

The following projects have completed commissioning and the market entry process. Therefore, they are included in the existing generation capacity Table 4.1.

- East Lake St. Clair Wind – 99 MW
- Summerhaven Wind Energy Centre – 125 MW
- South Kent Wind – 270 MW
- Port Dover and Nanticoke Wind – 105 MW
- Third unit at Harmon GS – 78 MW
- Atikokan GS converted to biomass – 205 MW
- McLean’s Mountain Wind Farm – 60 MW

The 18-month assessment uses planned generator outages submitted by market participants to the IESO’s Integrated Outage Management System (IOMS) as of July 15, 2014. In addition, updates to available resources include the expected forced outage rates, seasonal generation derates and variable resource contribution as determined by market participants or calculated by the IESO based on actual experience.

Past experience with the new projects has shown that their commissioning period varies vastly, typically from 3 to 9 months. As a result, the IESO intends to change the assumptions for the Firm Scenario in the next Outlook, to include only facilities that have achieved commercial operation status in addition to the existing resources. Facilities that started commissioning, generators that are planned to come into service over the first three months of the Outlook and future uprates (or derates) to existing generation facilities will no longer be taken into account in the Firm Scenario, but will still be part of the Planned Scenario.

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 July 15, 2014 were used.

2.4 Updates to Operability Outlook

The Outlook for surplus baseload generation (SBG) conditions over the next 18 months uses the updated planned generator outages. The generator outage plans are submitted by market participants to the IESO's IOMS. This Outlook is based on submitted generation outage plans as of July 15, 2014.

- End of Section -

3 Demand Forecast

The IESO is responsible for forecasting electricity demand on the IESO-controlled grid. This demand forecast covers the period September 2014 to February 2016 and supersedes the previous forecast released in June 2014. Tables of supporting information are contained in the 2014 Q3 Outlook Tables spreadsheet.

Electricity demand is being shaped by a number of factors – economic expansion, population growth, conservation initiatives, embedded generation capacity growth, time of use rates and the Industrial Conservation Initiative. How each of these factors impacts electricity consumption varies by season and time.

Grid-supplied energy demand is forecasted to decline in the period covered by this Outlook. Economic expansion and population growth lead to increased demand for electricity. At the same time, conservation reduces the amount of end-use consumption and increasing embedded generation output offsets the need for grid-supplied electricity by generating electricity on the distribution system. For the period covered by this Outlook, the impacts of embedded capacity and conservation growth will more than offset the increase from weaker economic and population growth.

Peak demands are subject to the same forces as energy demand, though the impacts vary. This is true not only when comparing energy versus peak demand, but also in comparing the summer and winter peak. Summer peaks are significantly impacted by the growth in embedded generation capacity and pricing impacts (Industrial Conservation Initiative and time-of-use rates). The majority of embedded generation is provided from solar powered facilities that have high output levels during the summer peak period and virtually no output during the winter peak periods. Over the shoulder periods the timing of the peak hour and sunset are moving so the impact of embedded solar will vary.

With the five highest peaks expected to occur during the summer months the Industrial Conservation Initiative has a significant impact on the summer peak and none to date on the winter peaks. These impacts, combined with other conservation savings, will see the summer peaks decline over the forecast horizon. Winter peaks are largely subject to downward pressure from conservation via gains in lighting efficiency. Embedded generation impacts are more muted during the winter as solar production is minimal during peak periods. Price impacts are also lower during the winter as prices are more moderate.

Minimum demand levels are similarly impacted by these same forces – primarily economic activity and embedded generation. The recession had led to lower levels of industrial activity, particularly overnight and on weekends due to reductions in the number of shifts. Although most embedded generation is solar, embedded wind generation contributes to lower minimums by supplanting grid-supplied electricity. However, offsetting some of this downward pressure on minimums there is a significant price incentive to shift load to overnight hours. Over the forecast, a relatively small increase in embedded wind generation and very modest economic growth and load shifting will lead to a small increase in minimum demand levels over the forecast.

The following tables show 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)
Winter 2014-15	22,149	23,077
Summer 2015	22,808	24,669
Winter 2015-16	22,094	22,846
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	141.2	-0.6%
2012 Energy	141.3	0.1%
2013 Energy	140.5	-0.6%
2014 Energy (Forecast)	139.5	-0.7%
2015 Energy (Forecast)	138.8	-0.5%

Table 3.2: Weekly Energy and Peak Demand Forecast

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)
07-Sep-14	19,023	22,477	1,540	2,456	07-Jun-15	19,672	23,221	1,253	2,617
14-Sep-14	18,863	21,116	785	2,472	14-Jun-15	20,850	23,630	1,017	2,651
21-Sep-14	18,665	19,827	901	2,494	21-Jun-15	21,640	24,078	788	2,692
28-Sep-14	17,810	18,131	519	2,439	28-Jun-15	22,361	24,043	733	2,764
05-Oct-14	17,034	17,561	453	2,454	05-Jul-15	22,439	23,973	1,100	2,706
12-Oct-14	17,378	17,775	648	2,475	12-Jul-15	22,808	24,669	896	2,762
19-Oct-14	18,001	18,376	434	2,445	19-Jul-15	22,675	23,809	943	2,662
26-Oct-14	17,961	18,446	392	2,545	26-Jul-15	22,216	24,243	1,122	2,776
02-Nov-14	18,639	19,053	190	2,593	02-Aug-15	22,047	24,269	1,001	2,757
09-Nov-14	18,826	19,577	384	2,614	09-Aug-15	21,276	24,324	1,080	2,697
16-Nov-14	19,355	20,011	565	2,692	16-Aug-15	21,237	23,862	1,120	2,687
23-Nov-14	19,832	20,652	300	2,734	23-Aug-15	21,248	23,541	1,497	2,710
30-Nov-14	20,302	21,477	591	2,789	30-Aug-15	20,092	22,779	1,535	2,587
07-Dec-14	21,007	22,059	202	2,888	06-Sep-15	18,357	21,910	1,589	2,491
14-Dec-14	20,786	22,070	385	2,884	13-Sep-15	18,099	20,611	676	2,447
21-Dec-14	21,118	22,380	496	2,926	20-Sep-15	17,814	19,967	912	2,470
28-Dec-14	20,372	21,405	202	2,756	27-Sep-15	16,958	18,173	570	2,419
04-Jan-15	20,635	21,504	298	2,808	04-Oct-15	17,062	17,423	810	2,448
11-Jan-15	22,149	23,077	484	2,986	11-Oct-15	17,067	17,464	709	2,472
18-Jan-15	21,435	22,281	466	2,938	18-Oct-15	17,586	17,978	530	2,432
25-Jan-15	21,582	22,305	367	2,942	25-Oct-15	17,602	18,114	367	2,518
01-Feb-15	21,587	22,320	301	2,976	01-Nov-15	18,085	18,526	220	2,553
08-Feb-15	20,896	21,957	729	2,942	08-Nov-15	18,791	19,149	405	2,615
15-Feb-15	20,309	21,771	703	2,859	15-Nov-15	19,113	19,856	551	2,638
22-Feb-15	20,044	21,703	521	2,819	22-Nov-15	19,584	20,399	306	2,718
01-Mar-15	20,662	21,660	474	2,891	29-Nov-15	20,030	21,026	553	2,760
08-Mar-15	19,767	20,553	661	2,796	06-Dec-15	20,619	21,691	208	2,848
15-Mar-15	18,744	19,706	789	2,704	13-Dec-15	20,907	21,791	391	2,893
22-Mar-15	18,127	18,907	728	2,616	20-Dec-15	20,598	21,650	501	2,879
29-Mar-15	18,197	19,368	667	2,619	27-Dec-15	20,303	22,033	210	2,841
05-Apr-15	17,981	18,634	580	2,525	03-Jan-16	20,571	21,493	298	2,819
12-Apr-15	17,352	18,340	598	2,491	10-Jan-16	22,094	22,846	484	2,982
19-Apr-15	16,713	17,192	495	2,445	17-Jan-16	21,348	21,993	466	2,927
26-Apr-15	16,477	16,825	645	2,420	24-Jan-16	21,497	22,019	367	2,930
03-May-15	17,312	19,741	829	2,417	31-Jan-16	21,499	22,030	301	2,966
10-May-15	17,527	20,135	814	2,409	07-Feb-16	20,818	21,769	729	2,930
17-May-15	18,489	21,730	753	2,440	14-Feb-16	20,230	21,593	703	2,846
24-May-15	18,833	21,852	1,108	2,394	21-Feb-16	19,944	21,503	521	2,805
31-May-15	19,331	21,523	1,262	2,443	28-Feb-16	20,578	21,475	474	2,888

3.1 Actual Weather and Demand

Since the last forecast the actual demand and weather data for May, June and July have been recorded.

May

- May's temperature was fairly normal though it lacked any humidity. As a result, Ontario's energy demand for the month was 10.6 TWh (10.6 TWh weather corrected). The actuals and weather corrected values were the lowest since 2009.

- Peak day temperatures were fairly typical for May as evidenced by the fact that the actual peak and weather corrected peak were very similar (18,844 MW versus 18,705 MW). The peak occurred on the second hottest day of the month, following the hottest day.
- Wholesale customers' consumption for the month increased by 3.4% over the previous May.

June

- June's weather, like May, was also pretty close to normal. This is evidenced by the monthly energy which was 11.2 TWh and 11.1 TWh weather corrected. Both values have been typical of June values since the recession.
- The peak occurred on the second hottest day of the month which was also the last day of the month. The actual peak of 20,807 MW and weather corrected peak of 20,350 MW were the lowest June peaks since 1996 – almost 20 years. Industrial loads, embedded generation output and weather were all fairly typical. The reduction is attributable to cooler than normal peak temperatures and timing, as the peak day fell between a Sunday and Canada Day.
- Wholesale customers' consumption continued to show consistent growth with a 6.0% increase over the previous June.

July

- The weather for July was lower than normal. Energy demand for the month was 11.7 TWh (12.1 TWh weather corrected). This represents a change of -7.9% from previous July.
- The peak demand for the month was 21,300 (21,527 MW weather corrected) and occurred on the hottest day of the month. Overall, the peak temperature was lower than normal. The peak demand of 21,300 MW was the second lowest July peak since Market opening. As in June, the reduction came from lower distributor loads as well as lower than expected peak temperatures. Additionally, the peak day was proceeding and followed by cooler temperatures which did not allow for any "heat build-up" that is typical of most summer peaks.
- Wholesale customers' consumption increased for the eleventh consecutive month. Their consumption rose 6.1% compared to the last July.

Overall, energy demand for the three months from May to July was down 3.2% compared with the same three months one year prior. Much of the decrease was due to the colder than normal weather. After adjusting for the cold weather, demand for the three months showed a more modest 1.6% decrease.

For the three months wholesale customers' consumption posted a healthy 5.3% increase over the same months a year prior.

The 2014 Q3 Outlook Tables spreadsheet contains 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

Ontario's economy continues to exhibit modest growth. However, that growth isn't consistent nor is it broad based. Most of the employment growth is centered in the Greater Toronto Area and is concentrated in the service sector. Recent economic data remains mixed as positive signs alternate with negative reports. A stronger U.S. economy does help Ontario's export industries, but geopolitical tensions throughout the world, the high price of oil and weaker growth in the emerging markets act as a drag on growth and impact business confidence. On the plus side, Canada's economy enjoys low borrowing costs, reasonable debt loads, an educated and productive labour force and vast natural resources.

The wholesale customers' electricity consumption has shown consistent gains since August of 2013, indicating a higher level of economic activity. The results vary by sector but are anecdotal confirmation of the broader economic direction.

- The risks aside, Ontario's economy should see improved growth in 2014 and 2015. Table 3.3.4 of the 2014 Q3 Outlook Tables presents the economic assumptions for the demand forecast.

Weather Scenarios

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 2014 Q3 Outlook Tables presents the weekly weather data for the forecast period.

Conservation, Embedded Generation, Demand Management and Pricing

Conservation will continue to grow throughout the forecast period. The demand forecast is decremented for the impacts of conservation.

Embedded generation capacity will continue to grow over the forecast horizon. The forecast of grid supplied electricity is directly impacted by the growth of distribution connected generation as it supplants the need for bulk system power. The forecast accounts for the growth in embedded generation production.

Demand measures include dispatchable loads, Demand Response 3 and Peaksaver Plus. Demand measures are treated as resources in the assessment and therefore have no impact on demand. The actual impacts of these programs are added back to the demand and the forecast is based on demand prior to the impact of these programs. The total demand measure capacity is discounted – based on historical and contract data – to reflect the reliably available resource capacity.

The impact of time-of-use rates and the Industrial Conservation Initiative are factored into the demand forecast as they have a downward impact on peak demands.

- End of Section -

4 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 will reject outages based on their order of precedence. Conversely, an opportunity exists for additional outages when reserves are above required levels.

The existing installed generation capacity is summarized in Table 4.1. This includes capacity from new projects that have completed commissioning and the market entry process.

Table 4.1: Existing Generation Capacity as of August 21, 2014

Fuel Type	Total Installed Capacity (MW)	Forecast Capability at Winter Peak (MW)	Number of Stations	Change in Installed Capacity (MW)	Change in Stations
Nuclear	12,947	12,383	5	0	0
Hydroelectric	8,119	6,059	71	106	1
Oil / Gas	9,920	9,418	29	0	0
Wind	2,483	822	20	659	5
Biomass / Landfill Gas	302	289	7	178	0
Total	**33,771**	**28,971**	**132**	**942**	**6**

In addition, two electricity storage facilities with the capacity of 6 MW are in service and are available to provide regulation service. They are the 2 MW flywheel facility owned by NRStor and the 4 MW battery storage facility owned by Renewable Energy Systems (RES) Canada.

4.1 Assessments Assumptions

4.1.1 Committed and Contracted Generation Resources

All generation projects that are scheduled to come into service, be upgraded, or be shut down within the Outlook period are summarized in Table 4.2. This includes generation projects in the IESO's Connection Assessment and Approval process (CAA), those that are under construction, as well as 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/Pages/Participate/Connection-Assessments/default.aspx under Application Status.

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 when existing capacity will be shut down. This data is accurate as of August 21, 2014. 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 operation date for the project.

Table 4.2: Committed and Contracted Generation Resources

Project Name	Zone	Fuel Type	Estimated Effective Date	Change	Project Status	Capacity Considered	
						Firm (MW)	Planned (MW)
Thunder Bay Condensing Turbine Project	Northwest	Biomass			Commercial Operation	40	40
Silvercreek Solar Park	West	Solar	2014-Q3		Commissioning	10	10
Northland Power Solar Abitibi	Northeast	Solar	2014-Q3		NTP	10	10
Northland Power Solar Empire	Northeast	Solar	2014-Q3		NTP	10	10
Northland Power Solar Long Lake	Northeast	Solar	2014-Q3		NTP	10	10
Northland Power Solar Martin's Meadows	Northeast	Solar	2014-Q3		NTP	10	10
Grand Renewable Energy Park	Southwest	Wind	2014-Q4		Construction	149	149
Jericho Wind Energy Centre	Southwest	Wind	2014-Q4		Pre-NTP	150	150
Grand Valley Wind Farms (Phase 3)	Southwest	Wind	2014-Q4		Pre-NTP		40
Goshen Wind Energy Centre	Southwest	Wind	2014-Q4		Pre-NTP		102
Liskeard 1	Northeast	Solar	2014-Q4		Construction		10
Liskeard 3	Northeast	Solar	2014-Q4		Commissioning	10	10
Liskeard 4	Northeast	Solar	2014-Q4		Commissioning	10	10
Armow Wind Project	Southwest	Wind	2014-Q4		NTP		180
New Unit at Smoky Falls	Northeast	Water	2014-Q4		Commissioning	89	89
Twin Falls	Northeast	Water	2014-Q4		Construction		5
Adelaide Wind Energy Centre	Southwest	Wind	2015-Q1		Construction		60
Adelaide Wind Power Project	West	Wind	2015-Q1		NTP		40
Bluewater Wind Energy Centre	Southwest	Wind	2015-Q1		Commissioning	60	60
Bornish Wind Energy Centre	Southwest	Wind	2015-Q1		Construction		74
White Pines Wind Farm	East	Wind	2015-Q1		Pre-NTP		60
Thunder Bay Unit 3 conversion to biomass	Northwest	Biomass	2015-Q1		Construction		142
Leamington Pollution Control Plant	West	Oil	2015-Q1				2
Second New Unit at Smoky Falls	Northeast	Water	2015-Q1		Commissioning	89	89
New Third Unit at Kipling	Northeast	Water	2015-Q1		Construction		78
Dufferin Wind Farm	Southwest	Wind	2015-Q1		Construction		100
Third New Unit at Smoky Falls	Northeast	Water	2015-Q2		Construction		89
Goulais Wind Farm	Northeast	Wind	2015-Q2		pre-NTP		25
Niagara Region Wind Farm	Southwest	Wind	2015-Q2		Pre-NTP		230
Decommission the existing Smoky Falls Units	Northeast	Water	2015			-52	-52
Bow Lake Phase 1	Northeast	Wind	2015-Q2		NTP		20
Grand Renewable Energy Park	Southwest	Solar	2015-Q2		NTP		100
K2 Wind Project	Southwest	Wind	2015-Q2		NTP		270
High Falls Hydropower Development	Northwest	Water	2015-Q2		Pre-NTP		5
Cedar Point Wind Power Project Phase II	Southwest	Wind	2015-Q4		Pre-NTP		100
Kingston Solar Project	East	Solar	2015-Q4		NTP		100
Total						**595**	**2,426**

Notes on Table 4.2:

1. The total may not add up due to rounding. Total does not include in-service facilities.
2. 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. Pre-NTP/NTP - Feed-in Tariff (FIT) projects are categorized as Notice to Proceed (NTP) or pre-NTP. OPA issues NTP when the project proponent provides necessary approvals and permits, finance plan, Domestic Content Plan and documentation on impact assessment required by the Transmission System Code or the Distribution System Code.
    f. Commercial Operation – the project has achieved commercial operation under OPA criteria but has not met all the commissioning requirements of the IESO.

4.1.2 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 Tables 4.3 and 4.4.

Table 4.3: Summary of Scenario Assumptions for Resources

		Planned Scenario	Firm Scenario
Over the 18-Month Period	Total Existing Installed Resource Capacity (MW)	33,771	
	New Generation and Capacity Changes (MW)	All Projects	Generators reached commercial operation, commissioning generators and generator shutdowns and retirements
		2,426	595

Both scenarios' starting point is the existing installed resources shown in Table 4.1. The Planned Scenario assumes that all resources scheduled to come into service are available over the study period. The Firm Scenario only assumes resources scheduled to come into service over the first three months of the report period, uprates (or derates) to existing generation facilities as well as generators that have started commissioning or are being removed from service during the Outlook period. The Firm and Planned Scenarios also differ in their assumptions regarding the amount of demand measures. The firm scenario considers demand response programs from existing participants only, while the planned scenario considers demand response programs from future participants too. Both scenarios recognize that resources are not available during times for which the generator has submitted planned outages. Also considered for both scenarios are generator-planned shutdowns or retirements that have high certainty of occurring in the future.

Table 4.4: Summary of Scenario Assumptions for Normal Weather Demand

		2015 Winter Peak	2016 Winter Peak
Seasonal Peak Comparison	Growth in Conservation at Peak (MW)	170	
	Growth in Embedded Generation Capacity at Peak (MW)	270	
	Demand Measures Effective Capacity at Peak (MW)	555	555

Notes on Table 4.4:

1. Conservation and embedded generation impacts are included in the peak demand forecast.
2. Demand Measures are accounted as resources in the capacity and energy assessments.

The IESO routinely monitors the accuracy of the forecast of the in service dates against actuals. The experience with the new projects in the past few years has shown that the commissioning period varied vastly between projects from 3 to 9 months. As a result, the IESO intends to change the assumptions for the Firm Scenario in the next Outlook to include only facilities that have achieved commercial operation status in addition to the existing resources. Facilities that have started commissioning, uprates (or derates) to existing generation facilities and generators that are planned to come into service over the first three months of the Outlook will no longer be taken into account in the Firm Scenario, but will still be part of the Planned Scenario.

The generation capability assumptions used in this Outlook are described in the following paragraphs.

The hydroelectric capability for the duration of this Outlook is typically based on median historical values (including energy and operating reserve) during weekday peak demand hours from May 2002 to March 2014. Adjustments may be made periodically, when outage or water conditions drive expectations of higher or lower output that varies from median values by more than 500 MW. The Table 4.3 below shows the historical hydroelectric median values calculated with the data from May 2002 to March 2014. These values are updated annually to coincide with the release of summer 18-Month Outlook.

Table 4.5: Monthly Historical Hydroelectric Median Values

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Historical Hydroelectric Median Values (MW)	6,059	6,025	5,876	5,812	5,841	5,716	5,684	5,414	5,018	5,401	5,730	6,131

- Thermal generators' capacity and energy contributions, planned outages, expected forced outage rates and seasonal deratings are based on market participant submissions or calculated by the IESO based on actual experience.
- Non-utility Generators (NUGs), whose contracts have expired but which continue to operate and provide forecasts are included in both planned and firm scenarios. NUGs whose contracts are expiring during the Outlook period are excluded from the Firm Scenario after their contract expiry date. These NUGs are included as part of the Planned Scenario if they have provided forecast data. Former NUGs that subsequently reach a contract with the OPA or register with the IESO as a dispatchable facility are added to both scenarios.
- For wind generation the monthly Wind Capacity Contribution (WCC) values are used at the time of weekday peak, while annual energy contribution is assumed to be 29% of installed wind capacity. The Table 4.4 below shows the monthly WCC values (with actual historic wind output up to February 28, 2014). These values are updated annually to coincide with the release of summer Outlook.

Table 4.6: Monthly Wind Capacity Contribution Values

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WCC (% of Installed Capacity)	33.1%	33.1%	26.2%	22.4%	23.4%	13.6%	13.6%	13.6%	16.7%	21.6%	28.6%	33.1%

- For solar generation, the monthly Solar Capacity Contribution (SCC) values are used at the time of weekday peak. For annual solar energy contribution, 14% output of installed capacity is assumed. The specifics on wind and solar values can be found in the Methodology to Perform Long Term Assessments. The Table 4.5 below shows the monthly

SCC values. These values are updated annually to coincide with the release of summer Outlook.

Table 4.7: Monthly Solar Capacity Contribution Values

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SCC (% of Installed Capacity)	0.0%	0.0%	0.0%	1.0%	37.0%	27.0%	27.0%	27.0%	6.0%	1.0%	0.0%	0.0%

4.2 Capacity Adequacy Assessment

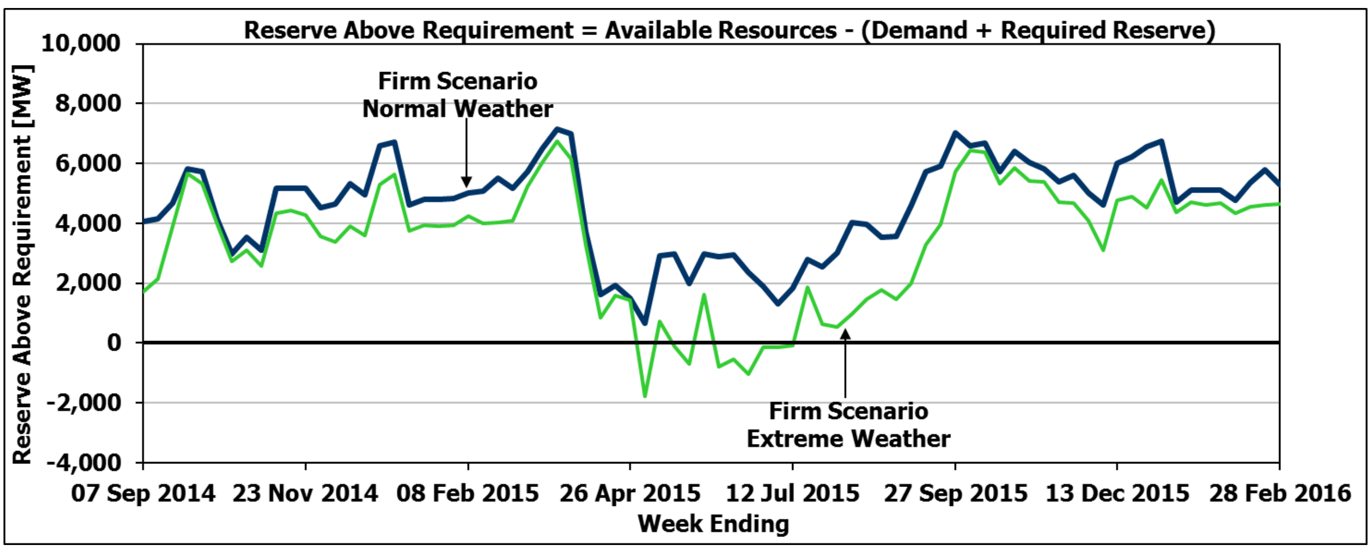
The capacity adequacy assessment accounts for zonal transmission constraints imposed by planned transmission outages. The planned outages occurring during this Outlook period have been assessed as of July 15, 2014.

4.2.1 Firm Scenario with Normal and Extreme Weather

The firm scenario incorporates capacity coming into service in the first three months of the Outlook period, generation being commissioned and generation being removed from service during the 18 months. This will include the addition of about 350 MW of wind, 40 MW of bio fuel, 180 MW of hydroelectric and 70 MW of solar capacity.

Reserve Above Requirement (RAR) levels, which represent the difference between Available Resources and Required Resources, are shown in Figure 4.1. As can be seen, the reserve requirement is being met throughout the Outlook period under normal weather conditions. During extreme weather conditions, the reserve is lower than the requirement for a total of nine weeks during the spring and summer of 2015. This shortfall is largely attributed to the planned generator outages scheduled during those weeks.

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

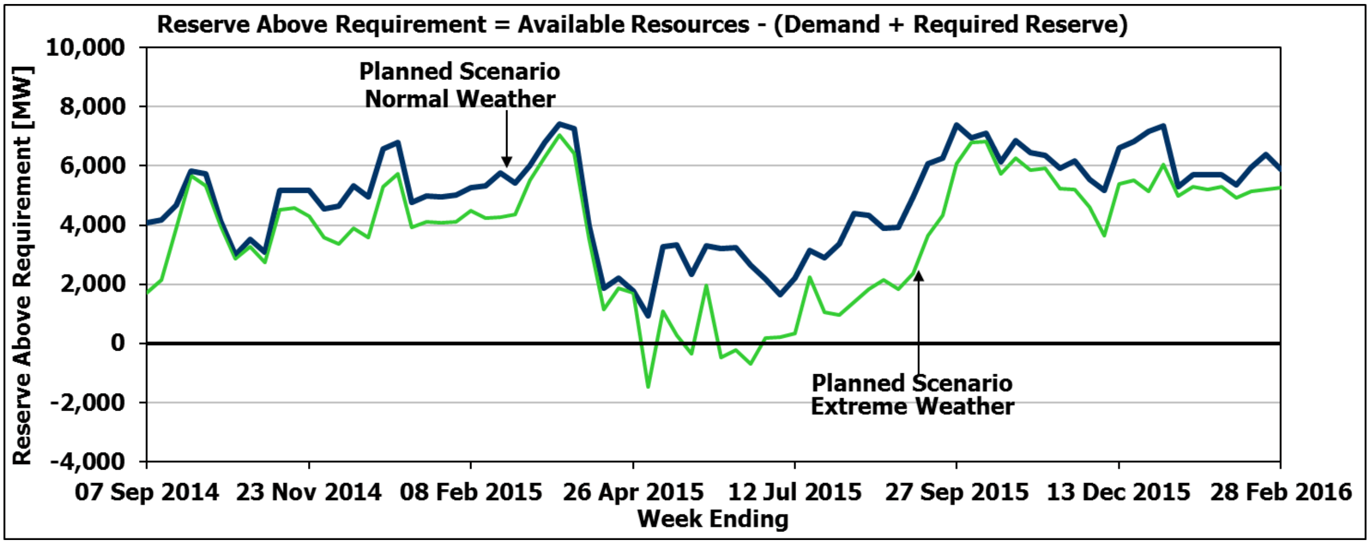


4.2.2 Planned Scenario with Normal and Extreme Weather

The planned scenario incorporates all existing capacity plus all capacity coming in service and being removed from service over the Outlook period. More than 2,400 MW of generation capacity is expected to connect to Ontario's grid over this Outlook period.

Reserve Above Requirement levels, which represent the difference between Available Resources and Required Resources, are shown in Figure 4.2. As can be seen, the reserve requirement is being met throughout the Outlook period under normal weather conditions. The reserve is lower than the requirement for five weeks during the spring and summer months of 2015 under extreme weather conditions. This shortfall is largely attributed to the planned outages scheduled for those weeks.

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



4.2.3 Comparison of Resource Scenarios

Table 4.5 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.

Table 4.8: Summary of Available Resources

Notes	Description	Winter Peak 2015		Summer Peak 2015		Winter Peak 2016	
		Firm Scenario	Planned Scenario	Firm Scenario	Planned Scenario	Firm Scenario	Planned Scenario
1	Installed Resources (MW)	34,291	34,628	34,388	36,019	34,388	36,219
2	Total Reductions in Resources (MW)	5,152	5,379	7,028	8,357	5,273	6,573
3	Demand Measures (MW)	490	555	503	567	490	555
4	Available Resources (MW)	29,628	29,803	27,862	28,230	29,604	30,201

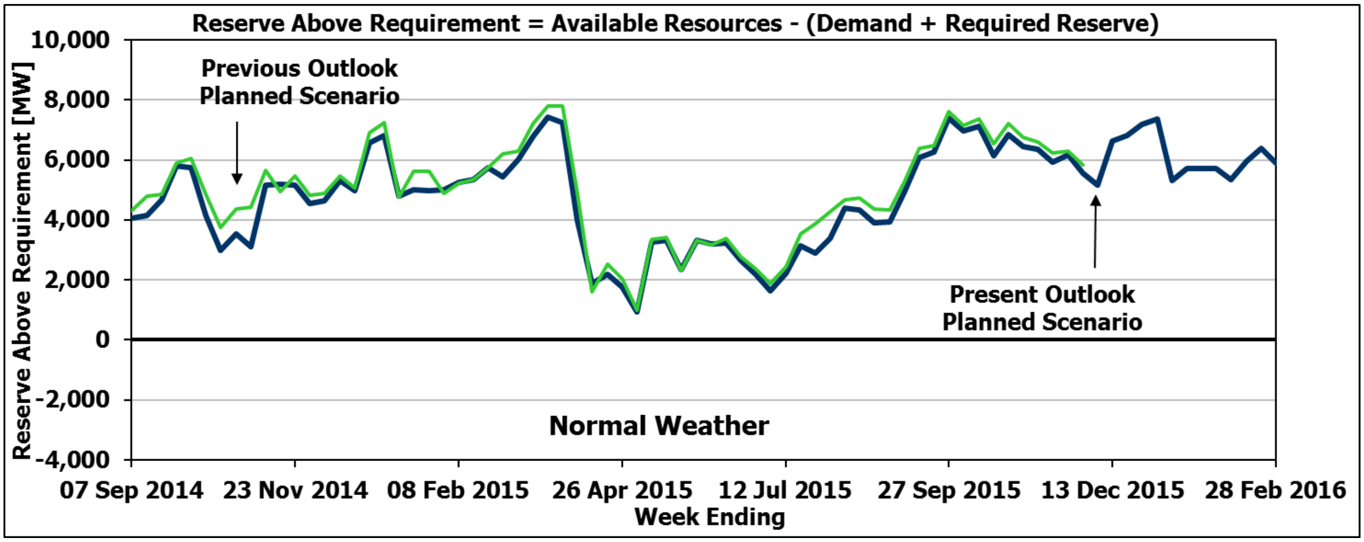
Notes on Table 4.8:

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

Comparison of the Current and Previous Weekly Adequacy Assessments for the Planned Normal Weather 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 June 19, 2014. The difference is mainly due to the changes to outages and changes in the demand forecast.

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



Resource adequacy assumptions and risks are discussed in detail in the "[Methodology to Perform Long Term Assessments".]

4.3 Energy Adequacy Assessment

This section provides an assessment of energy adequacy, the purpose of which is to determine whether Ontario has sufficient supply to meet its energy demands and to highlight any potential concerns associated with energy adequacy within the period covered under this 18-Month Outlook.

4.3.1 Summary of Energy Adequacy Assumptions

In order to achieve results consistent with the capacity adequacy assessments, the energy adequacy assessment is performed using the same set of assumptions pertaining to resources expected to be available over the next 18 months. Refer to Table 4.1 for the summary of 'Existing Generation Capacity and Table 4.2 for the list of 'Committed and Contracted Generation Resources' for this information.

For the energy adequacy assessment, only the Firm Scenario as per Table 4.3 with normal weather demand is considered. In addition, in order to reasonably capture the variability and uncertainty associated with wind resources and forced outages of generators, multiple wind samples (hourly profiles) and generator forced outage patterns were considered in the energy adequacy assessment. The key assumptions specific to the Energy Adequacy Assessment (EAA) are described in the IESO document titled "Methodology to Perform Long Term Assessments".

4.3.2 Results - Firm Scenario with Normal Weather

Table 4.9 summarizes key energy statistics over the 18-Month period for the Firm Scenario with normal weather demand for Ontario as a whole, and provides a breakdown for each transmission zone. The results indicate that occurrences of unserved energy are not expected over the 18-Month timeframe of this Outlook.

Based on these results it is anticipated that Ontario will be energy adequate for the normal weather scenario for the review period.

Table 4.9: Firm Scenario - Normal Weather: Summary of Zonal Energy Statistics for the Outlook Period

Zone	18 -Month Energy Demand		18-Month Energy Production		Net Inter-Zonal Energy Transfer	Potential Un-served Energy	Zonal Energy Demand on Peak Day of 18-Month Period	Available Energy on Peak Day of 18-Month Period
	TWh	Average MW	TWh	Average MW	TWh	GWh	GWh	GWh
Ontario	**208.8**	**15,934.0**	**208.8**	**15,934.0**	**0.0**	**0.0**	**450.8**	**602.3**
Bruce	0.9	65.0	58.4	4,457.0	57.5	0.0	1.4	136.4
East	12.3	940.0	16.2	1,236.0	3.9	0.0	25.0	79.1
Essa	11.1	846.0	3.2	241.0	-7.9	0.0	22.4	14.5
Niagara	6.2	474.0	21.0	1,601.0	14.8	0.0	14.6	42.7
Northeast	16.6	1,263.0	17.2	1,312.0	0.6	0.0	25.6	47.0
Northwest	5.7	434.0	6.8	522.0	1.1	0.0	9.2	18.6
Ottawa	15.9	1,216.0	0.8	64.0	-15.1	0.0	33.6	2.3
Southwest	43.1	3,289.0	5.1	388.0	-38.0	0.0	90.0	19.0
Toronto	78.4	5,981.0	70.3	5,365.0	-8.1	0.0	185.8	177.1
West	18.7	1,425.0	9.8	746.0	-8.9	0.0	43.1	65.6

The monthly forecast of energy production capability, based on information provided by market participants, is included in the 2014 Q3 Outlook Tables Appendix A, Table A7.

Figures 4.4 and 4.5 show the percentage contribution from each resource type for each calendar year of the 18-Month period under conditions of zero net exports, while Table 4.10 summarizes these simulated production results by resource type, for each year.

Figure 4.4: Production by Fuel Type – Sep. 1 to Dec. 31, 2014 (%)

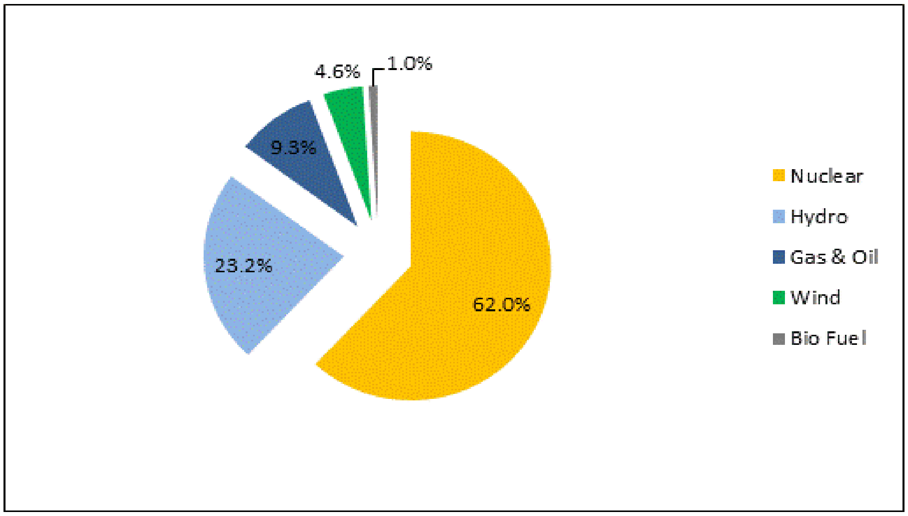


Figure 4.5: Production by Fuel Type – Jan. to Dec. 2015 (%)

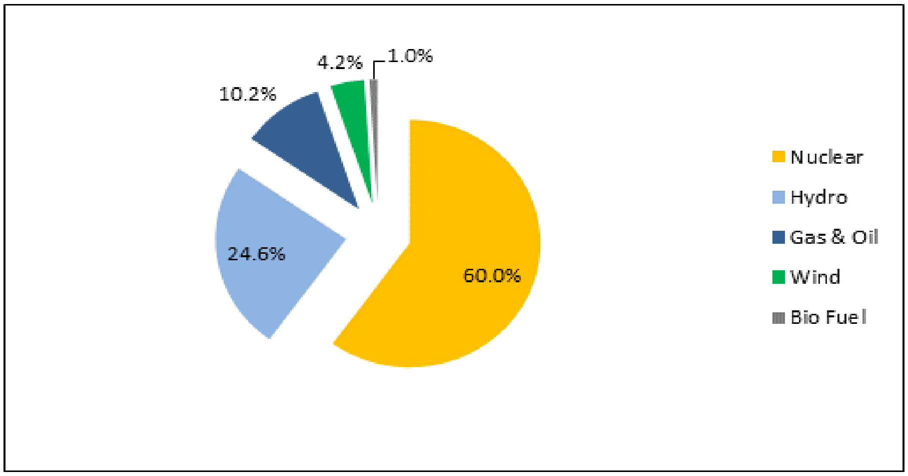


***Figure 4.6*: Production by Fuel Type – Jan. 1 to Feb. 28, 2016 (%)**

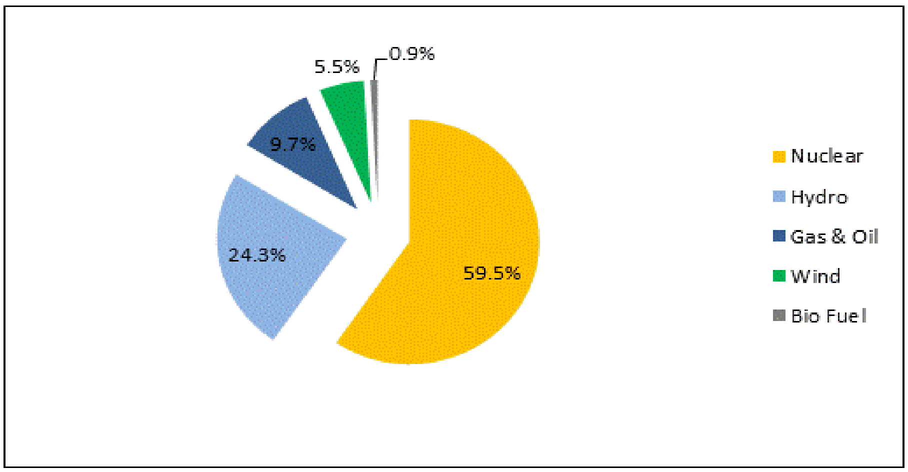


Table 4.10: Firm Scenario - Normal Weather: Ontario Energy Production by Fuel Type for 2014 to 2016

Grid-Connected Resource Type	2014 (Sep – Dec)	2015 (Jan – Dec)	2016 (Jan – Feb)
	(GWh)	(GWh)	(GWh)
Nuclear	28,359	83,138	14,516
Hydro	10,612	34,156	5,922
Gas & Oil	4,244	14,139	2,367
Wind	2,084	5,763	1,353
Bio Fuel	456	1,369	219
Other (Solar & DR)	14	81	7
Total	45,769	138,646	24,385

4.3.3 Findings and Conclusions

The energy adequacy assessment results indicate that Ontario is expected to have sufficient supply to meet its energy forecast during this 18-Month Outlook period for the Firm Scenario with normal weather demand.

- End of Section -

5 Transmission Reliability Assessment

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 this Outlook period. Major transmission and load supply projects planned to be in service are shown in Appendix B. Projects that are already in service or whose completion is planned beyond the period of this Outlook are not shown. The list includes only the transmission projects that represent major modifications or are considered to significantly improve system reliability. Minor transmission equipment replacements or refurbishments are not shown.

Some area loads have experienced load growth, significant to warrant 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 on existing transmission infrastructure and provide additional supply capacity for future load growth.

5.1 Transmission Outages

The IESO's assessment of the transmission outage plans is shown in Appendix C, Tables C1 to C10. The methodology used to assess the transmission outage plans is described in the IESO document titled "Methodology to Perform Long Term Assessments". This Outlook contains transmission outage plans submitted to the IESO as of July 15, 2014.

5.2 Transmission System Adequacy

The IESO assesses transmission adequacy using the methodology on the basis of conformance to established criteria, planned system enhancements and known transmission outages. Zonal assessments are presented in the following sections. Overall, the Ontario transmission system is expected to supply the demand under the normal and extreme weather conditions forecast for the Outlook period.

The existing transmission infrastructure in some areas in the province, as described below, has been identified as currently having or anticipated to have some limitations to supply local needs. Hydro One, the IESO and the OPA are considering long-term options to address these situations in accordance with local communities under the Regional Planning Process established by the OEB.

5.2.1 Toronto and Surrounding Area

The load supply capability to the GTA is expected to be adequate to meet the forecast demand through to the end of this 18 month period.

The replacement of the entire 115 kV switchyard at Hearn SS is complete and Hydro One is continuing with the replacement of the 115 kV breakers at Manby TS and Leaside TS. Once this work is complete at the end of 2014, it will allow additional generation to be incorporated into the Toronto 115 kV system and the distribution level.

Following receipt of environmental approvals, the development of Clarington TS has started with a scheduled in-service date of fall 2017. This will ensure that the additional 500 kV to 230 kV transformation capacity required to maintain supply reliability, will be available before

Pickering GS is shutdown. Without this additional capacity there would have been an increased risk of overloading the existing auto-transformers at Cherrywood TS.

The associated 230 kV switching facilities at Clarington TS will also improve the supply reliability to the loads in the Pickering, Ajax, Whitby, Oshawa and Clarington areas by providing a full, alternative source of supply to these loads.

In central Toronto, Copeland TS is expected to be in service in Q3 2015. The new station will allow some load to be transferred from John TS. This will help meet the short- and mid-term need for additional supply capacity in the area and will also facilitate the refurbishment of the facilities at John TS.

High voltages in southern Ontario continue to present operational challenges during periods of light load. The situation has become especially acute during those periods when the shunt reactors at Lennox TS have been unavailable due either to repair or maintenance activities. While the IESO and Hydro One are currently managing this situation with day-to-day operating procedures, the situation is expected to become more difficult once Pickering GS is shut down in 2020. Planning work for the installation of new voltage control devices has been initiated.

In order to increase the load-meeting capability of the two 230 kV circuits between Claireville TS and Minden TS and allow the proposed Vaughan TS No. 4 to be connected, Hydro One is planning to install two 230 kV in-line breakers at Holland TS, together with a load rejection scheme. These facilities are scheduled to be in service by early 2017. Until these facilities become available, operational measures will be required to avoid possible overloading of these circuits during peak load periods.

5.2.2 Bruce and Southwest Zones

In the Guelph area, the existing 115 kV transmission facilities are operating close to capacity and have limited margin to accommodate additional load. To improve the transmission capability into the Guelph area, Hydro One is proceeding with the Guelph Area Transmission Refurbishment project to reinforce the supply into Guelph-Cedar TS, with an expected completion date in Q2 2016. As part of this project, circuit switchers are to be installed at Guelph North Junction that will allow the 230 kV system between Detweiler TS and Orangeville TS to be sectionalized. These devices will reduce the restoration times for the loads in the Waterloo, Guelph and Fergus areas following a supply interruption.

In association with the Guelph Area Transmission Refurbishment project, a second 230/115 kV autotransformer at Preston TS, together with the associated switching and reactive facilities, is planned to be in-service by 2017. This incremental investment is required not only to improve the load restoration capability to those customers in the Cambridge area affected by a major transmission outage, but also to accommodate the development of the Cambridge No. 2 transformer station on the 115 kV system between Preston TS and Detweiler TS to meet load growth in the area.

Beyond 2016, further facilities will be required to address the longer-term supply needs of the area and also to satisfy the IESO's load restoration criteria.

A new 500 kV switching station, Evergreen is in service and another 500 kV switching station Ashfield, is planned to be in service by the end of Q4 2014 to accommodate new wind farms rated at 384 MW and 270 MW, respectively.

The transmission transfer capability in the Southwest zone and its vicinity is expected to be sufficient to supply the load in this area with a margin to allow for planned outages.

Hydro One is planning to replace the aging infrastructure at the Bruce 230 kV switchyard, with a completion date of June 2018. While this work is being implemented, careful coordination of the transmission and generation outages will be needed.

5.2.3 Niagara Zone

Completion of the transmission reinforcements from the Niagara region into the Hamilton-Burlington area continues to be delayed and the transmission congestion will still restrict connection of new generation in the area. This project, if completed, would increase the transfer capability from the Niagara region to the rest of the Ontario system by approximately 700 MW.

Hydro One is working to replace existing 115 kV breakers at Allanburg TS. The new equipment is expected to be in service by the end of 2014 and will alleviate the short circuit capability issue which restricted connection of new generation in the area.

Transmission transfer capability in Niagara and its vicinity is expected to be sufficient for the purpose of supplying load in this area with a margin to allow for planned outages.

5.2.4 East Zone and Ottawa Zone

The replacement of the existing 115 kV breakers at Hawthorne TS is complete to address load growth in the Ottawa area, a new load supply transformer station, Orleans TS, is expected to come into service by Q2 2015.

A joint regional planning group representing the IESO, OPA, Hydro One and the affected distributors is currently assessing the supply and reliability needs in the Ottawa area and examining potential alternatives to address these needs.

With further increases in the amount of load supplied from the 230 kV system in the Merivale area and with a minimum threshold of 400 MW on the level to which the transfers from Hydro Quebec can be automatically reduced following the loss of one of the 230 kV Hawthorne-to-Merivale circuits, there is an increased possibility that imports may need to be restricted during peak load periods. The situation will be especially challenging during periods of low hydroelectric output from the plants on the Ottawa and Madawaska Rivers, which is not uncommon during summer peak periods.

5.2.5 West Zone

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

Hydro One is upgrading the thermal rating of two 230 kV circuits from Lambton TS to Longwood TS. This upgrade is expected to be in service by the end of 2014 and will increase the transfer capability into the London area by approximately 100 MW.

Transmission transfer capability into the West zone is expected to be sufficient to supply load in this area with a margin to allow for planned outages.

5.2.6 Northeast and Northwest Zones

In northeast Ontario, Hydro One is expected to finish the transmission work required to accommodate the increased output from the Lower Mattagami generation expansion project by the end of Q4-2015.

Managing grid voltages in the Northwest has always required special attention. With significantly lower demand in the past few years, it has become increasingly difficult to maintain an acceptable voltage profile without compromising the reliability of supply, particularly during times with low westbound power transfers into the zone.

To reduce and eventually eliminate the dependence on operational measures for voltage control in northwest Ontario, additional reactive compensation is required. New shunt reactors at Dryden that will be in service by the end of 2014 will to help resolve this problem. Atikokan generating station, which is being converted to biomass and is slated to come into service during Q3 of 2014, will further improve the voltage management capability in this area.

Some loads in the north of Dryden to Pickle Lake area 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. The OPA has issued a draft Integrated Regional Resource Plan (IRRP), with assistance from the IESO, Hydro One, local distributors, customers and First Nations in the area to resolve these issues. This regional planning study accounts for recent expansion plans of customers in the area.

In addition to the conversion of Atikokan GS from coal to biomass, one of the Thunder Bay units will also be converted to advanced biomass operation. To accommodate the outages required to complete the conversion of these units, the planned maintenance of other critical equipment has been advanced, and plans have been developed to manage the high voltage situations.

Transmission transfer capability in the Northeast and Northwest zones is expected to be sufficient to supply load in this area with a margin to allow for planned outages.

- End of Section -

6 Operability Assessment

This section highlights any existing or emerging operability issues that could potentially impact system reliability of Ontario's power system.

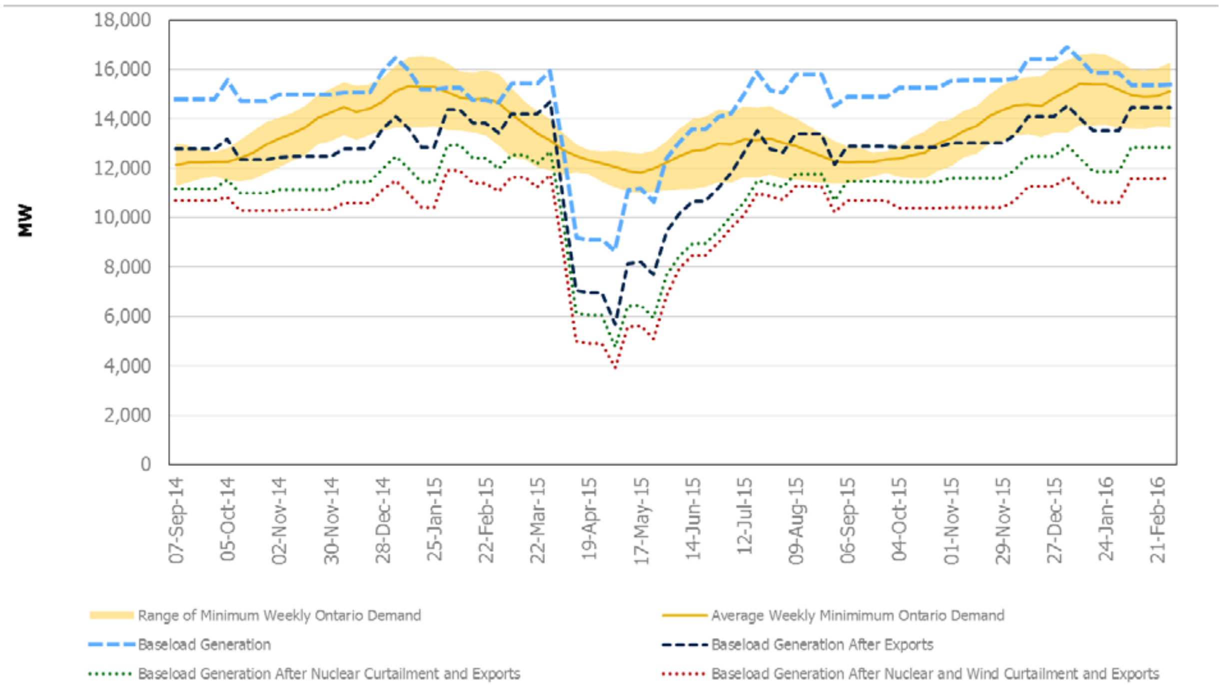
6.1 Surplus Baseload Generation (SBG)

Baseload generation is made up of nuclear, run-of-the-river hydroelectric and variable generation such as wind and solar. SBG conditions occur when the amount of baseload generation exceeds Ontario demand. However, when the baseload supply is expected to exceed Ontario demand plus scheduled exports, the IESO typically balances the system via export scheduling, nuclear curtailments and wind dispatch scheduled through the IESO-administered markets.

Maneuvering capability from eight units at Bruce Power and dispatchable variable generation has provided additional flexibility to manage SBG, while also mitigating the need for manual control actions. These actions usually occur in the spring and fall, when Ontario demand is lowest.

The forecast SBG for the next 18 months can be seen in Figure 6.1, which shows information to reflect the flexibility from nuclear and variable generation.

Figure 6.1: Minimum Ontario Demand and Baseload Generation



Ontario will continue to experience SBG conditions during this Outlook period. The steep decline in SBG in the spring of 2015 is attributed to planned generation outages, as previously discussed in section 4.2 of this report. The vast majority of SBG can be managed through normal market mechanisms including export scheduling and nuclear maneuvering. IESO's variable generation dispatch tools have provided additional flexibility to alleviate most SBG events.

The baseload generation assumptions include market participant-submitted minimum production data, the latest planned outage information, in-service dates for new or refurbished generation, and reliable export capability. The expected contribution from self-scheduling and intermittent generation has also been updated to reflect the latest data. Output from commissioning units is explicitly excluded from this analysis due to uncertainty and the highly variable nature of commissioning schedules. Table 6.1 shows the monthly Off-Peak WCC values (with actual historic wind output up to February 28, 2014). These values are updated annually to coincide with the release of summer 18-Month Outlook.

Table 6.1: Monthly Off-Peak Wind Capacity Contribution Values

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Off-Peak WCC (% of Installed Capacity)	33.1%	33.1%	30.0%	33.0%	24.1%	15.2%	15.2%	15.2%	21.6%	28.4%	31.8%	33.1%

- End of Document -