18-MONTH OUTLOOK

From December 2011 to May 2013

ieso
Power to Ontario. On Demand.

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

Executive Summary

Over the next 18 months, Ontario will continue to have an adequate supply of electricity to meet consumers' needs. However a number of decisions and actions will need to be taken over the period to manage emerging reliability concerns that if not addressed, could affect local areas and the IESO's ability to balance the system in real time.

Ontario's generation resources will continue to grow over the next 18 months with the anticipated return of two refurbished Bruce nuclear units, and the addition of approximately 400 megawatts (MW) of gas-fired generation and more than 800 MW of grid-connected renewable generation. The construction of a new 500 kV double-circuit line from the Bruce Power complex to the Milton Switching Station is in progress, with completion expected in December 2012. This new line will accommodate the full output of all eight generating units at the Bruce complex and the new renewable resources being developed in southwestern Ontario. These expected generation and transmission additions result in a forecast of adequate resources in every week over the outlook period, even under extreme weather conditions.

Continued additions of wind and solar generation will see a combined total of more than 4,300 MW in Ontario by May 2013. Current volumes of variable generation combined with lower off-peak demand for electricity and the return of two additional nuclear units mean that surplus baseload generation (SBG) is and will remain an ongoing concern for the IESO. To address this concern over the past year, a nuclear unit was taken off line on three separate occasions with nuclear maneuvers required five per cent of the time. Having the ability to dispatch all resources, including variable generation resources, will help address this and IESO is continuing to pursue this needed flexibility both in the short and longer terms. The Stakeholder Engagement 91 (SE-91) process currently underway addresses the need to have renewable resources dispatched on a five minute basis. This has not only the potential to mitigate surplus conditions but will also address other operability concerns such as matching generation to demand when consumer use quickly ramps up and down. Maximum flexibility from all resources is becoming imperative to successfully managing operations.

By the end of this year the installed capacity of coal-fired generation will be reduced to 3,504 MW when two additional units at Nanticoke (980 MW) are shut down and Ontario is on pace to transition off coal completely in 2014. While coal use so far in 2011 has totaled just three percent of Ontario's overall generating output there are still times when the flexibility of coal units is needed.

Decisions are required to address local area needs in Guelph, Cambridge and southwestern GTA. The Guelph area is operating close to capacity, while 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 to alleviate this issue. In the southwestern GTA, load supply has been an ongoing concern over the last number of years with a number of transmission solution options available. The recent declines in demand reduced some of the urgency around these decisions but the need for solutions remains.

During the latter part of 2011, economic growth has been weaker than anticipated. This has been reflected in energy demand which is expected to decline by 0.3 percent in 2011. Lingering economic issues will influence growth in 2012 where energy demand is expected to grow by a modest 1.1 percent.

The following table summarizes the forecasted seasonal peak demand numbers.

Season	Normal Weather Peak (MW)	Extreme Weather Peak (MW)
Winter 2011-12	22,160	23,424
Summer 2012	23,527	25,972
Winter 2012-13	22,375	23,555

Conclusions & Observations

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

Demand Forecast

- Overall electricity demand has weakened as the year has progressed resulting in a lower forecast of demand for both 2011 and 2012.
- Ontario electricity demand will continue to be moderated by the conservation efforts of the Ontario Power Authority and electricity distributors.
- The growth in embedded generation capacity also reduces the demand for grid-supplied electricity.
- The net result of these factors will be a small decline in electricity demand for 2011 before showing modest growth in 2012.
- With the forecasted 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.
- Bruce units 2 and 1 are expected to be complete in Q1 and Q2 of 2012 respectively.
- York Energy Centre is expected to be in service in Q3 of 2012
- Nanticoke Units 1 and 2 are expected to be shut down at the end of 2011
- The 2012 decisions around the timing of Pickering retirements and associated transmission upgrades are required within the timeframe of this Outlook to ensure supply adequacy continues as the province enters a period beyond 2014 where coal-fired generation has ceased and some nuclear units begin to reach their expected end of life.

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

Transmission Adequacy

- With the planned system enhancements and scheduled maintenance outages, the Ontario transmission system is expected to be adequate to supply the demand under the normal and extreme weather conditions forecast for the Outlook period.
- Load supply adequacy in southwestern GTA has been an ongoing concern over the last number of years with a number of transmission solution options available. Lower than expected increases in the growth in the area have reduced some of the urgency around these requirements, although the

fundamental requirements remain. Appropriate study efforts have begun with the OPA and affected transmitters.

- 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.
- In preparation for the planned removal from service of southern Ontario coal-fired units, Hydro One is installing dynamic reactive compensation at Nanticoke TS and Detweiler TS respectively.
- 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.
- The OPA is currently conducting an assessment of the Kitchener-Waterloo Cambridge Guelph area to recommend a solution to ensure the local area load is served reliably.
- Analysis is currently underway to determine interim and long term transmission solutions to address the future shutdown of Pickering NGS.

Operability

- The IESO is continuing with plans to move to an economic dispatch of variable generation to assist in managing general operability issues, initially with dispatch on an hourly basis, to be followed in 2013 by dispatch on a 5 minute schedule.
- The risk of surplus conditions is likely to continue with the expected increased penetration of renewable generation projects, as well as the return of two additional nuclear units.
- The availability of the remaining coal fleet, although running at reduced levels from previous years, provides flexibility essential to the reliable operation of the Ontario power system.

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 December 2011 to May 2013 and supersedes the last Outlook released in May 2011.

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 August 2011. The demand forecast has been updated based on the most recent economic projections and data. Actual weather and demand data for September and October has been included in the tables.

2.2 Updates to Resources

Raleigh Wind Energy Centre with an installed capacity of 78 MW came into service since the previous Outlook.

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 October 21, 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 September 28, 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 October 21, 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 indicates the potential SBG conditions by illustrating the range of weekly minimum demands rather than the absolute minimum weekly demand. The average weekly demand is also 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 December 2011 to May 2013 and supersedes the previous forecast released in August 2011. Tables of supporting information are contained in the 2011 Q4 Outlook Tables spreadsheet.

Electricity demand is expected to decline in 2011, the result of a weak global economy. A string of events, from natural disasters (Tohoku earthquake and tsunami) to man-made (sovereign and personal debt issues) have prevented a strong recovery from gaining traction. Unfortunately, the world wide debt issues, sluggish job creation and low consumer confidence will drag on, lowering growth expectations for Ontario in 2012. As such, electricity demand is expected to increase a modest 1.1%. Peak demands are expected to show a slight increase due to the strength of Ontario's home building and construction sectors.

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)
Winter 2011-12	22,160	23,424
Summer 2012	23,527	25,972
Winter 2012-13	22,375	23,555
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)	141.6	-0.3%
2012 Energy (Forecast)	143.2	1.1%

Forecast Details

The companion document, the Ontario Demand Forecast, looks at demand in more detail. It contains the following:

- Details on the demand forecast
- Analysis of historical demand
- Discussion on the impact of the drivers affected demand

The data contained in the Ontario Demand Forecast document are included in the 2011 Q4 Outlook Tables spreadsheet.

- 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

In addition to approximately 800 MW of new renewable supply, York Region Energy Centre and the Bruce G1 and G2 units are also scheduled to come into service over the Outlook period. These new supply projects are currently at various stages of their construction.

Two units at Nanticoke are expected to shut down at the end of this year.

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 August 2, 2011

Fuel Type	Total Installed Capacity (MW)	Forecast Capability at Winter Peak* (MW)	Number of Stations	Change in Installed Capacity (MW)	Change in Stations
Nuclear	11,446	10,586	5	0	0
Hydroelectric	7,947	6,009	71	0	0
Coal	4,484	3,387	4	0	0
Oil / Gas	9,549	8,474	28	0	0
Wind	1,412	518	11	78	1
Biomass / Landfill Gas	122	34	6	0	0
Total	34,960	29,008	125	78	1

* 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 under Application Status.

An amendment with a revised commercial operation date to the Becker Cogeneration contract is being finalized and therefore this project is no longer included in Table 4.2.

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. 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

Project Name	Zone	Fuel Type	Estimated Effective Date	Change	Project Status	Capacity Considered	
						Firm (MW)	Planned (MW)
Nanticoke Units 1 and 2 shutdown	Southwest	Coal	2011-Q4			-980	-980
Greenwich Wind Farm (RES III)	Northwest	Wind	2011-Q4		Commissioning	99	99
Conestogo Wind Energy Centre 1 (FIT)	Southwest	Wind	2011-Q4		pre-NTP	69	69
Bruce Unit 2	Bruce	Uranium	2012-Q1		Construction		750
Summerhaven Wind Energy Centre (FIT)	Southwest	Wind	2012-Q1		pre-NTP		125
Leamington Pollution Control Plant	West	Oil	2012-Q2		Construction		2
Bruce Unit 1	Bruce	Uranium	2012-Q2	Advanced	Construction		750
York Energy Centre	Toronto	Gas	2012-Q3		Construction		393
Comber Wind Limited Partnership (FIT)	West	Wind	2012-Q3		Commissioning		166
Pointe Aux Roches Wind (FIT)	West	Wind	2012-Q3		Construction		49
Thunder Bay Condensing Turbine Project	Northwest	Biomass	2013-Q1		Construction		40
Port Dover and Nanticoke Wind Project (FIT)	Southwest	Wind	2013-Q1		pre-NTP		105
Farm Owned Power (Melancthon) Ltd (FIT)	Essa	Wind	2013-Q1		pre-NTP		100
Goulais Wind Farm (FIT)	Northeast	Wind	2013-Q1		pre-NTP		25
McLean's Mountain Wind Farm (FIT)	Northeast	Wind	2013-Q1		pre-NTP		60
Total						**-812**	**1,752**

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. Feed-in Tariff (FIT) projects are categorized as at Notice to Proceed (NTP) or at 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.

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. Also considered for both scenarios are 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 typically based on median historical values during weekday peak demand hours from May 2002 to March 2011. 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. Manual adjustments to affected months have been made during this outlook period to account for specific scheduled hydroelectric outages.

- 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%.

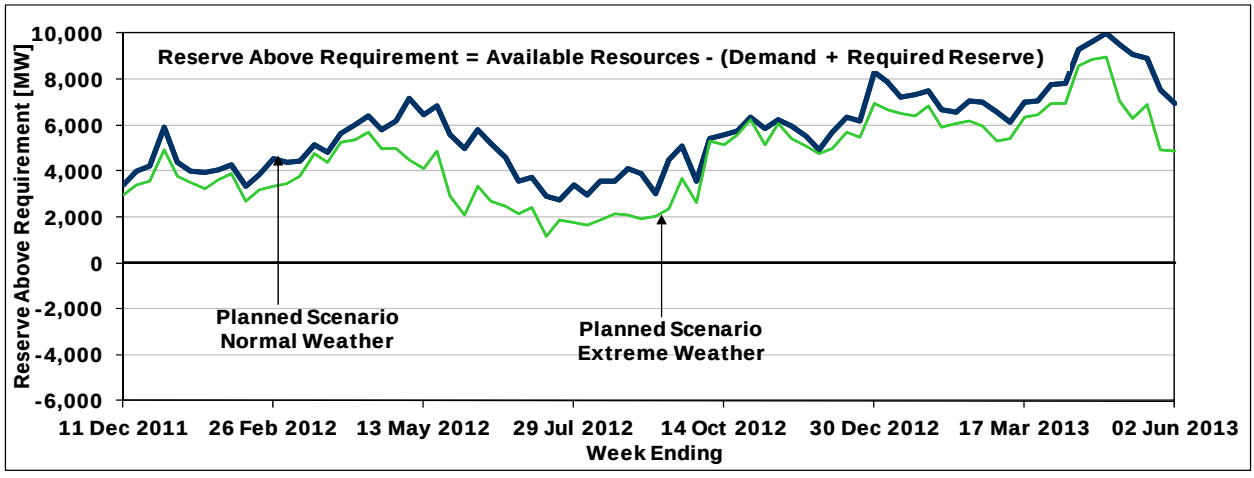
Table 4.3 Summary of Scenario Assumptions

Assumptions		Planned Scenario	Firm Scenario
Resource	Existing Installed Resources	Total Capacity	Total Capacity
		34,960	34,960
	New Generation and Capacity Changes	All	Generator shutdowns or retirements, Commissioning Generators and Generators starting in the first 3 months
		1,752	-812
Demand Forecast	Conservation	Incremental	
		Incremental growth of 85 MW on summer peak	
	Embedded Generation	Incremental	
		Incremental growth of 70 MW on summer peak	
	Demand Measures	Incremental	Existing
		1,330	1,168

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.

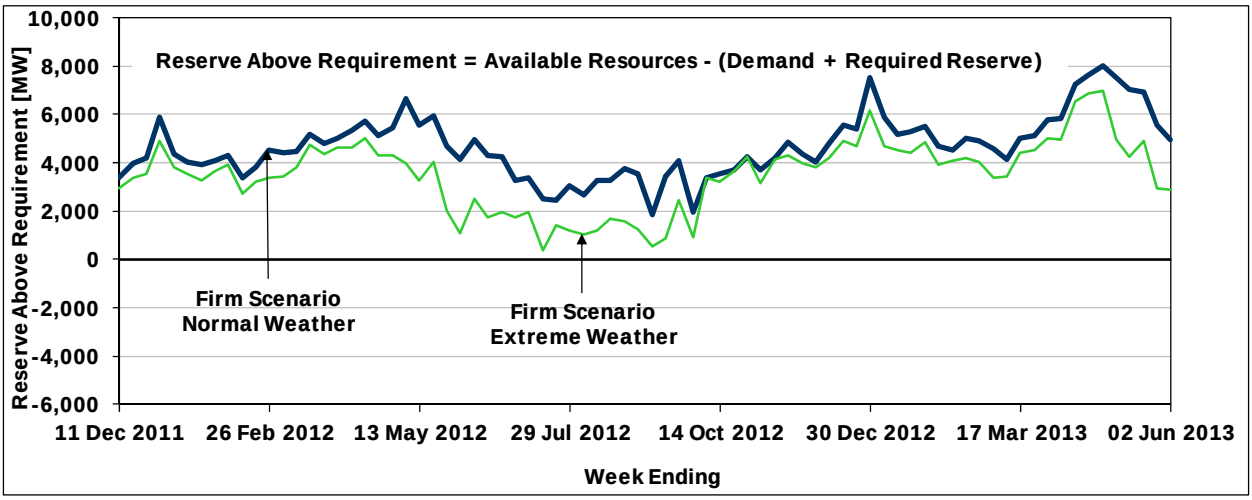
Figure 4.1 Reserve Above Requirement: Planned Scenario with Normal vs. Extreme Weather



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 Q4 Outlook Tables Appendix A, Table A7.

Table 4.4 Summary of Available Resources

Notes	Description	Winter Peak 2012		Summer Peak 2012		Winter Peak 2013	
		Firm Scenario	Planned Scenario	Firm Scenario	Planned Scenario	Firm Scenario	Planned Scenario
1	Installed Resources (MW)	34,148	34,148	34,148	35,775	34,148	36,382
2	Imports (MW)	0	0	0	0	0	0
3	Total Resources (MW)	34,148	34,148	34,148	35,775	34,148	36,382
4	Total Reductions in Resources (MW)	5,854	5,878	5,866	7,150	4,375	4,651
5	Demand Measures (MW)	1,168	1,168	1,168	1,330	1,168	1,330
6	Available Resources (MW)	29,462	29,438	29,450	29,955	30,941	33,061

Notes to Table 4.4:

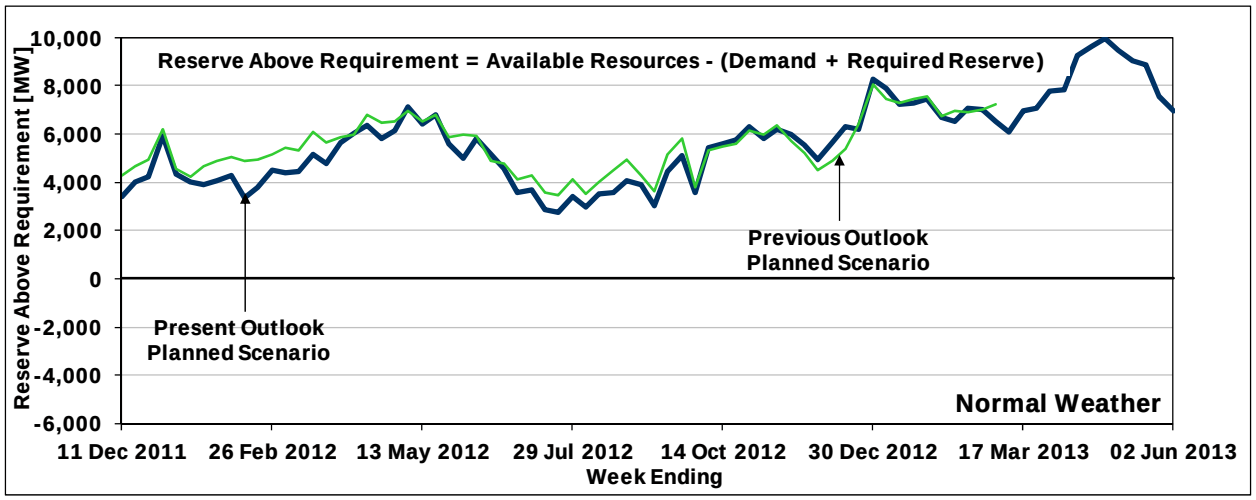
1. Installed Resources: This is the total generation capacity assumed to be installed at the time of the summer and winter peaks.
2. Imports: The amount of external capacity considered to be delivered to Ontario.
3. Total Resources: The sum of Installed Resources (line 1) and Imports (line 2).
4. Total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

6. Available Resources: Equals Total Resources (line 3) minus Total Reductions in Resources (line 4) plus Demand Measures (line 5).

Comparison of the Weekly Adequacy Assessments for the Planned Scenario

Figure 4.3 provides a comparison between the forecast Reserve Above Requirement values in the present Outlook and the forecast Reserve Above Requirement values in the previous Outlook published on May 24, 2011. 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 identify 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 significantly improve system reliability. Minor transmission equipment replacements or refurbishments are excluded.

Some area loads have 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 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" (IESO_REP_0266).

This Outlook contains transmission outage plans submitted to the IESO as of September 28, 2011.

5.3 Transmission System Adequacy

The IESO assesses transmission adequacy on the basis of conformance to established criteria, planned system enhancements and known transmission outages. This process is also described in IESO_REP_0266. Zonal assessments are presented in the sections which follow. Overall, the Ontario transmission system 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 to meet the forecasted demand.

Load in south-western GTA is close to the load-serving capability of the transmission system, with very little margin for load growth. Over the outlook period, this margin is expected to be fully utilized for load transfers to allow transmission enhancement work on the Leaside supply to the Bridgman and Dufferin stations. Day-to-day operating procedures are available to manage the transmission loading, but a long-term solution will be required to accommodate the future load growth net of conservation initiatives.

In the York Region, the York Energy Centre is scheduled to go into service in the third quarter of 2012 and will enhance the supply to the area. To provide for future load growth in the area, the OPA is co-ordinating with affected stakeholders to re-assess the long-term needs and to develop a regional supply plan.

The IESO is working with the OPA to determine when additional transformer capacity will be required to maintain supply reliability to the eastern portion of the GTA, as a result of the planned shutdown of the Pickering generating units. The design and location of these enhancements must also improve the supply to the loads in the Pickering, Ajax, Whitby, Oshawa and Clarington areas, and enhance the system capacity to restore supply to these loads in the event of normal planning contingencies.

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 expected to be completed during the fourth quarter of 2011 and modifications to the existing Bruce special protection system that will continue during this Outlook period.

Additionally, 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 by the end of the year, will provide an increased level of supply reliability, and support further load growth in the area.

Planned outages in the Southwest zone may result in some transfer capability reductions of the transmission circuits but are not expected to have any impact on the load supply in this area.

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. About 350 MW of the Cambridge area load is supplied from the tapped connection at Galt Junction. In the event of a failure of this connection, only about 50 MW of this load can be restored via the existing transmission infrastructure

at Preston TS, much less than the amount and timing called for in the IESO criteria. The OPA is currently examining solutions, as part of its regional supply plan, 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 both the use of available Ontario generation in the Niagara area and imports into the province, particularly during hot weather and high demand periods.

The planned outages in the Niagara zone may result in some transfer capability reductions of the transmission circuits but are not expected to have any impact on the load supply in this area.

The failed R76 voltage regulator and the BP76 circuit are expected to return to service by the end of 2012. The bypass constructed in Q4 of 2010 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 some transfer capability reductions of the transmission interfaces 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.

The planned outages in the West zone may result in some transfer capability reductions of the transmission interfaces but are not expected to have any impact on the load supply in this area.

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 become operational following final regulatory approval. 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

Hydro One recently completed the installation of the series compensation on the 500 kV north-south lines at Nobel SS and the dynamic reactive compensation faculties at Porcupine TS and Kirkland Lake TS. These facilities will ease north-south transmission congestion and help incorporate the future Lower Mattagami expansion projects and other renewable generation resources. To further improve the north-south transfer capability Hydro One will install static reactive compensation facilities at Porcupine TS and Hanmer TS with a planned in-service date during the fourth 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 has become increasingly difficult to maintain an acceptable voltage profile without compromising the reliability of supply, in particular during times of low east-west transfers.

On several occasions normal dispatch actions have been 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 impacted customers' supply reliability.

The reduction in the load in the Northeast, and in particular at the Kidd Creek Metsite, has resulted in higher than acceptable voltages in the Timmins area. While the new SVC at Porcupine TS will help, additional reactive compensation is required to reduce the increasing dependence on the generating facilities in the Northeast to maintain voltages within acceptable ranges.

The planned outages in the Northeast and Northwest zones may result in some transfer capability reductions of the transmission interfaces but are not expected to have any impact on the load supply in this area.

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 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 and the IESO, Hydro One, local distributors and customers are working towards changes that may allow some increase in the load-serving capability. .

- End of Section -

6.0 Operability Assessment

The IESO monitors existing and emerging operability issues that could potentially impact system reliability. Although over this past quarter instances of surplus baseload generation (SBG) have lessened SBG remains an ongoing concern for the IESO. The reprieve we project over the winter is anticipated to end as off-peak demands decline in the spring of 2012 and additional baseload resources come in service.

Figure 6.1 Minimum Ontario Demand and Baseload Generation (Includes Net Export Assumption)

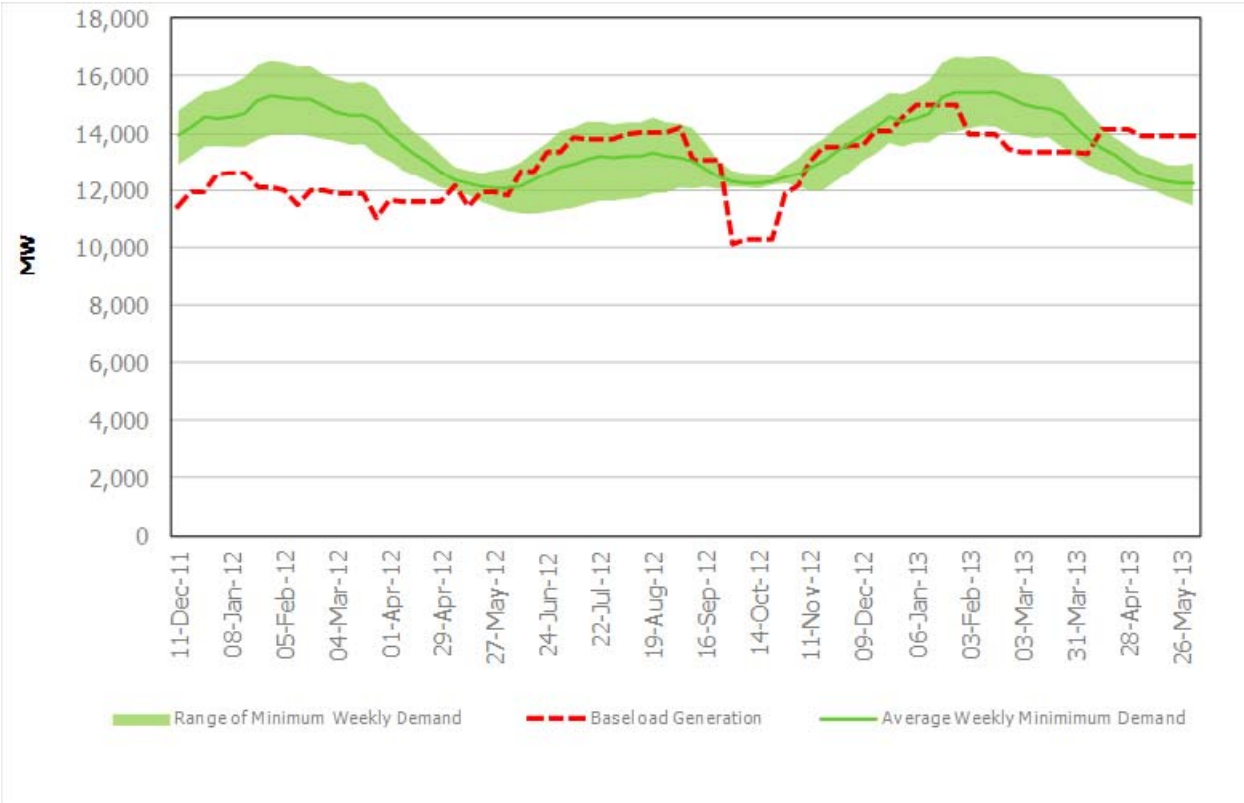


Figure 6.1 Baseload generation assumptions include exports[1], the latest planned outage information, market participant submitted minimum production data, and in-service dates for new or refurbished generation. The expected contribution from self-scheduling and intermittent generation has also been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

As surplus conditions reappear in spring 2012 and persist throughout the summer, some out of market control actions are expected to be required in order to manage the surplus, extending beyond the typical market actions which include exports, minimum hydro dispatch and nuclear maneuvers.

A lack of direct control over a number of factors that contribute to SBG, such as temperature, other weather factors, consumption and market behavior, contributes to difficulty in managing the condition.

[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.

A low demand period with heavy winds, during freshet, with neighbours either unwilling or unable to take our exports, may lead to a nuclear unit shutdown, which in turn would cause that generation to be unavailable for 48 to 72 hours. However, a similar low demand period with no wind and a strong ability to export could require no mitigating actions.

With wind and solar becoming more prominent resources on our system, the need for maximum flexibility from all resources has become integral for the reliable and efficient operation of the grid. The IESO will continue to pursue the ability to dispatch these resources, first on an hourly economic constrained basis with the intent of moving soon after to 5 minute dispatch intervals.

The loss of two additional Nanticoke units will not only remove 980 MW of installed capacity from our system but also remove the associated flexibility. The existing coal fleet, though running at vastly reduced levels from previous years, provides the IESO with needed flexibility, especially under circumstances where the system is stressed. Having the coal available allows more flexibility for managing maintenance outages, provides effective ramp capability and can provide regulation when necessary. These characteristics are important and not necessarily present in the same degree in the existing replacement capacity. With the recent changes to gas-fired generation projects, and the continuing uncertainty of the Pickering Nuclear station's future, decisions must be made over the next 18 months to ensure adequate supply beyond the middle of the decade. The IESO continues to support the complete shutdown of coal by 2014 however, any decisions to shutdown additional units prior to the end of 2014 must be assessed by the IESO for reliability impacts.

- End of Section -

7.0 Historical Review

This section provides a review of past power system operation, including the most recent months of operation, to identify noteworthy observations, emerging problems and variations from forecast.

7.1 Weather and Demand Historic Review

Since the last full Outlook document was released actual demand and weather data have been reported for the past summer.

For the period May through October, the weather was fairly normal with the exception being July. July set records for both high temperatures and lack of precipitation. Mean temperatures were the highest in decades for many cities – Toronto (1921), London (1955) and Windsor (1955). Additionally, the weather was particularly severe over the period of July 16th to 23rd when daily peak day temperature continually exceeded 30°C. On Thursday, July 21st temperatures reached upwards of 35°C and the Humidex reached 49°C. Peak demand was the highest since 2007 as it topped 25,450 MW. If it wasn't for over 450MW of demand response, the peak would have been the highest since the all-time record set in August 2006.

Despite the weather driven events of July, all months except September showed a year over year decline – both actual and weather corrected. This is a reflection of the underlying economic situation. For the six months, combined weather corrected energy demand was down 1.1% over the previous year (-1.6% for the actuals).

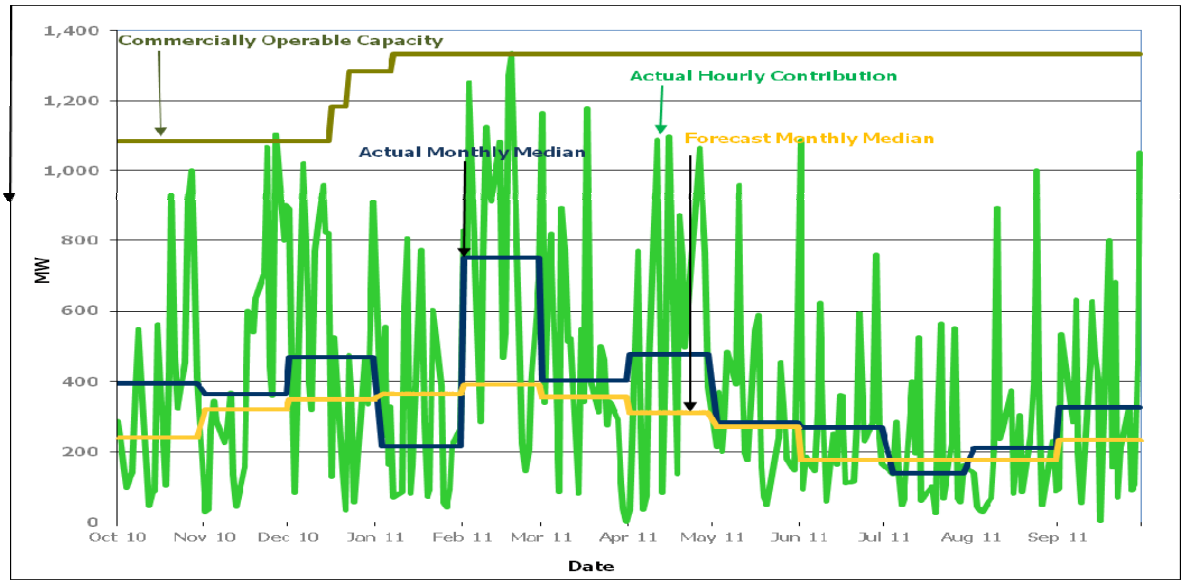
Wholesale customer's load has also reflected the weak state of the global economy. Their load has trended lower over the summer but had shown some small improvements in August and September before falling again in October. For the six months, wholesale consumers' load has fallen by 2.5% compared to 2010.

7.2 Hourly Resource Contributions at Time of Weekday Peak

The figures from 7.2.1 to 7.2.4 show the contributions made by wind generators, hydro generators, imports, and net interchange into Ontario at the time of weekday peak. The period analyzed is from October l, 2010 to September 30, 2011. Holiday and weekend data were not considered in the analysis since hydro peaking generation and interchange transactions during this timeframe are not typical of time periods when Ontario's supply adequacy may be challenged.

Figure 7.2.1 indicates the amount of wind contribution to the wholesale market at the time of weekday peak, compared to the forecast contributions. The forecast methodology takes into account seasonal variances in wind patterns, among other factors. Installed wind capacity is expected to grow with wind generation procured under the RES III and FIT programs.

Figure 7.2.1 Wind Contributions at the Time of Weekday Peak



Note: Commercially operable capacity does not include commissioning units. Therefore actual hourly contribution may exceed commercial capability.

Figure 7.2.2 indicates the amount of hydroelectric contributions to energy and operating reserve markets at the time of weekday peak, excluding weekends and holidays, compared to the forecasted contributions. The forecasted monthly median consists of the median contribution of hydroelectric energy at the time of weekday peak since 2002. The hydroelectric production at the hour of weekday peak summer months were lower than forecasted. The lower summer values for 2011 are due to a decrease in precipitation levels from previous years and larger than usual outages scheduled for hydroelectric generating stations. We expect the impact of these outages to continue at varying degrees over the next 18 months. We have made adjustments to the forecast in this Outlook to account for these outages.

Figure 7.2.2 Hydro Contributions (Energy and Operating Reserve) at the Time of Weekday Peak

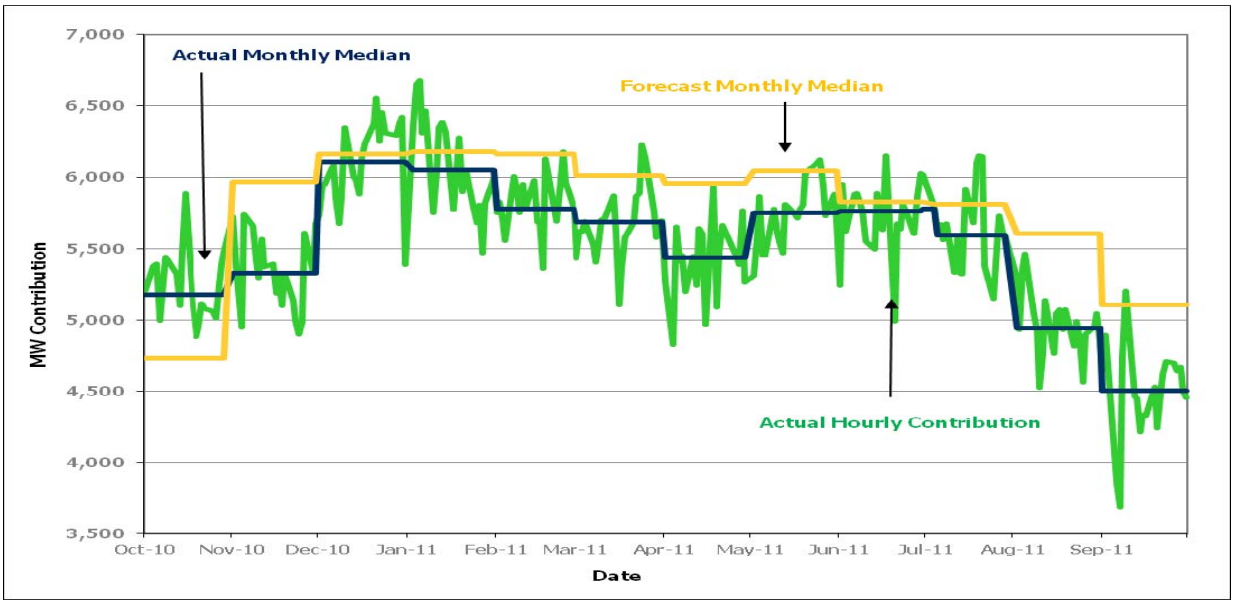


Figure 7.2.3 shows imports into Ontario at the time of weekday peak. Average hourly imports during the winter/spring of 2010/2011 followed the same trend from a year ago. Summer 2011 imports were slightly higher than seen a year ago. This can be attributed to extremely high temperatures and demand during these months. Despite the high volume of imports, Ontario remained a net exporter for the majority of the year.

Figure 7.2.3 Imports into Ontario at the Time of Weekday Peak

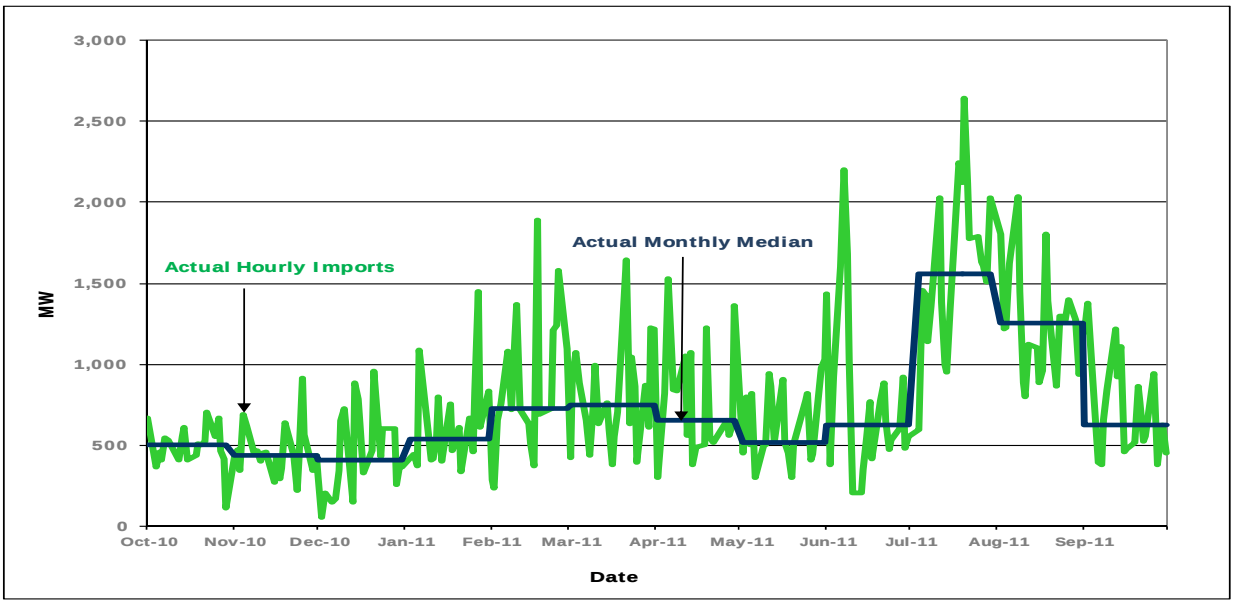
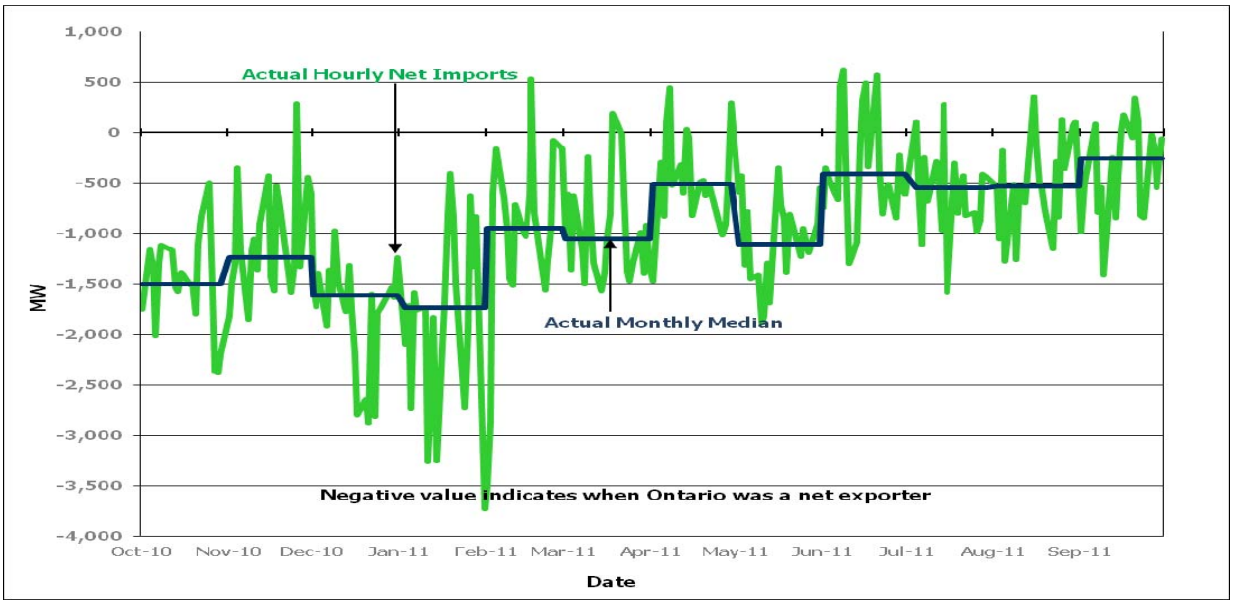


Figure 7.2.4 shows the amount of net imports into Ontario at the time of weekday peak, excluding weekends and holidays. Net Interchange is the difference between total imports into Ontario and total exports out of Ontario. An average net export position prevailed over the reporting time period. This can be attributed to the continued export capability with Quebec, and an increase in generator capacity over the previous years. We did see a decrease in net export values over the summer of 2011. This can be attributed to extremely high temperatures and demand during these months and the associated increase in imports.

Figure 7.2.4 Net Interchange into Ontario at the Time of Weekday Peak



7.3 Report on Initiatives

Centralized forecasting for wind resources is an initiative designed to allow for better forecasting of energy production to ensure a more accurate unit commitment occurs. A centralized wind forecast will be developed for all resources with an installed capacity of 5 MW or greater, with implementation set for 2012. This initiative may be extended to other variable resources such as solar as their aggregate installed capacity becomes material.

The Enhanced Day Ahead Commitment Process (EDAC) project successfully went live on October 11, 2011. EDAC is designed to enhance the efficiency of the electricity market through the advanced scheduling and commitment of resources that are required to provide electricity on a daily basis.

7.4 Variation from Previous Year

One of the biggest variations from the previous year is that in the summer months of 2011 we saw an increase in imports and, therefore, a decrease in net exports. The major factor that contributed to this variation is the extremely high temperatures and demand values seen in the summer months.

The other large variation seen from the previous year was the frequency by which a nuclear unit had to be either maneuvered or shut down. So far in 2011, nuclear units have been maneuvered 113 times for a total of 364 hours. Compared to 2010 which had nuclear units maneuvered 14 times for a total duration of 64 hours, this represents a significant increase. This rise in manual action is a result of a lower minimum demands as well as a growing portfolio of inflexible generation. The ability to dispatch renewable resources may help to mitigate the need for these actions moving forward,

- End of Document -