

ONTARIO ENERGY REPORT Q4 2014

OCT – DEC 2014
ELECTRICITY

Electricity Generation Output by Fuel Type (Q4)

Nuclear	24.6 TWh	62.7%
Hydro	9.5 TWh	24.3%
Gas	2.8 TWh	7.1%
Wind	2.2 TWh	5.7%
Biofuel	0.1 TWh	0.2%

Source: IESO

Conservation Savings (for 2014)

Net Peak Demand Savings	684 MW
Net Energy Savings	808 GWh

Source: IESO

Ontario Peak Demand (Q4)

20,938 MW Dec 2, 2014 6:00 PM EST

Ontario Peak Demand (for 2014)

22,774 MW Jan 7, 2014 7:00 PM EST

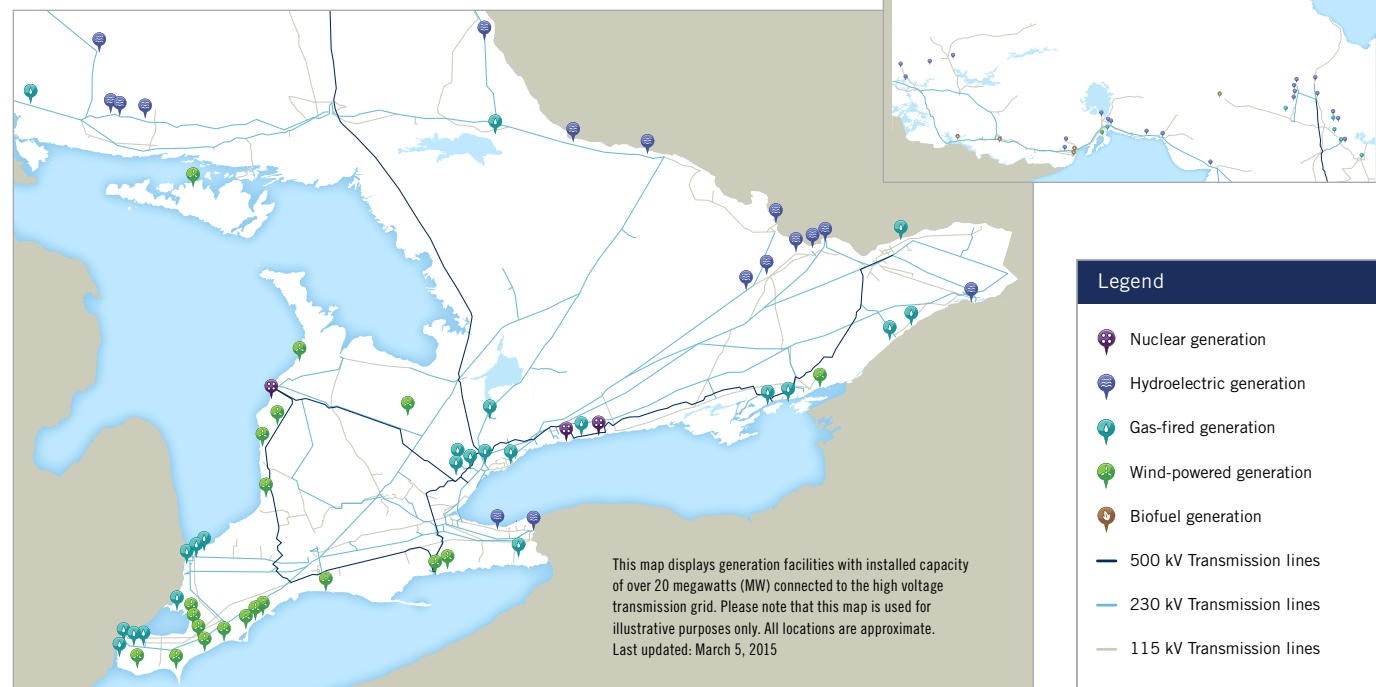
Source: IESO

Commodity Cost (YE 2014)

Hourly Ontario Energy Price (Weighted Average) Year to Date	3.60 ¢/kWh
Global Adjustment (YE Average, Class B)	5.46 ¢/kWh
Total	9.06 ¢/kWh

Source: IESO

Ontario's Power Grid



Electricity Supply

Electricity production was lower in Q4 than in previous years, with milder than normal weather in October and December resulting in lower demands. Demand for electricity in November was typical.

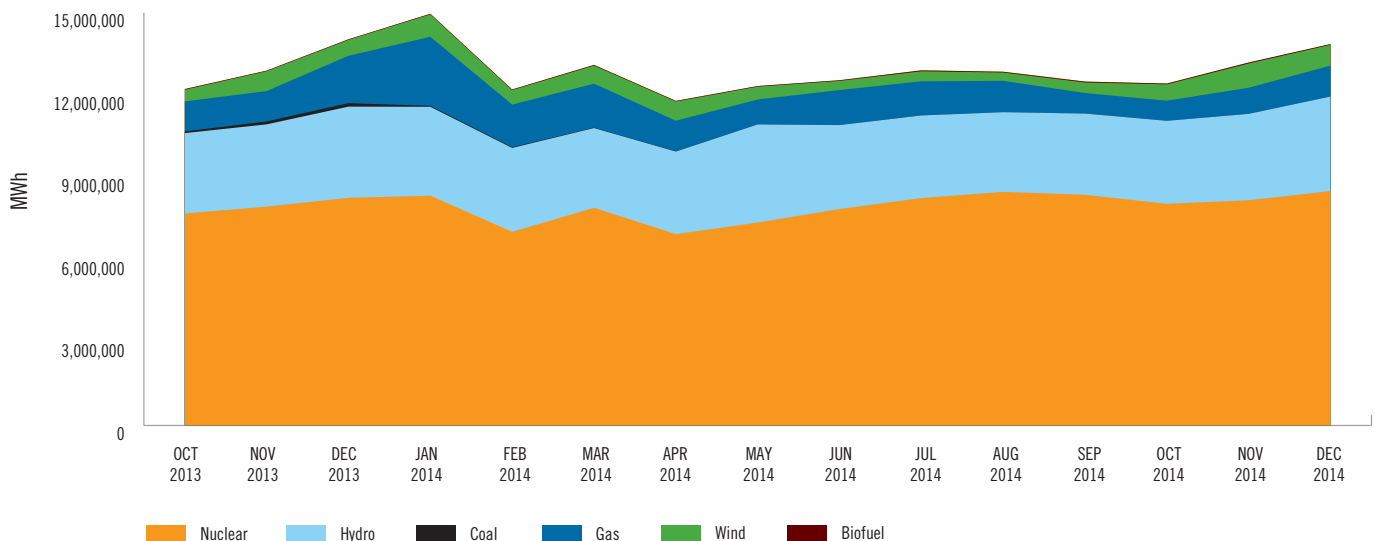
In order to provide reliability in all situations, the IESO dispatches suppliers to ramp production up and down in response to changes in demand. This includes dispatching units at the Bruce Nuclear facility and wind generators during periods of surplus baseload generation.

Dispatch capability allows for more efficient management of baseload resources that traditionally have had less flexibility than other forms of generation, and helps to avoid costly nuclear shutdowns. In 2014, wind dispatch helped to avoid 18 nuclear shutdowns – only one nuclear shutdown occurred due to surplus baseload conditions during the year, compared to six in 2013.

More information about the wind dispatch and nuclear manoeuvres is available from the IESO at www.ieso.ca.

Monthly Energy Output by Fuel Type (MWh)

Ontario has a diverse supply mix, featuring baseload generators that provide energy 24 hours a day, variable generators as well as flexible generators that change output quickly. The chart below sets out single month-end values of output by fuel type over the past 18 months, from October 2013 to December 2014, illustrating how generator availability, demand for electricity and cost can lead to month-to-month variances.



Source: IESO

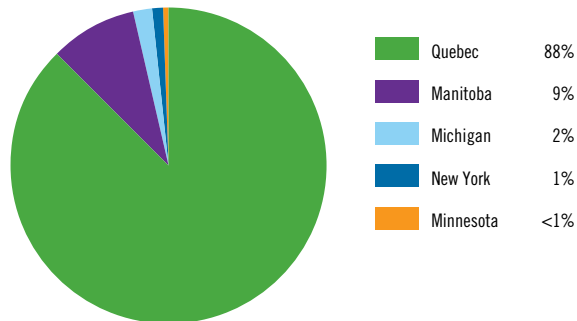
The IESO has developed a new report, available at reports.ieso.ca/public/GenOutputbyFuelMonthly/PUB_GenOutputbyFuelMonthly.xml, that uses settlements data to provide additional information for all self-scheduling, intermittent and dispatchable Ontario generators registered as market participants. The report – which includes generators smaller than 20 MW and records solar values for the first time in grid-connected generation data – is published monthly.

Imports and Exports

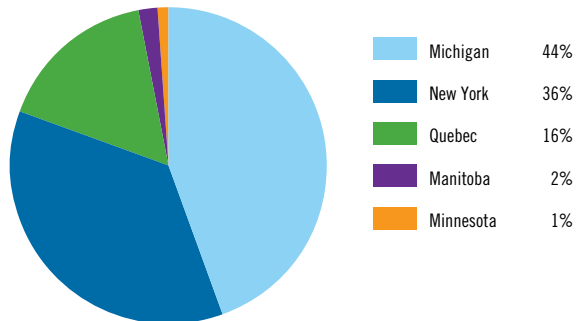
Imports compete against domestic generation to provide energy at the best possible price, and Ontario also exports energy when prices are higher elsewhere. When energy is not needed to meet local needs, it brings revenue to help offset investments made in new infrastructure. Exports of power for October and November 2014 were slightly up over the same period in the previous year.

Ontario imports and exports power across 26 interties with two provinces and three states, to support system reliability and economic efficiency. While Ontario is electrically interconnected with Manitoba, Michigan, New York and Quebec, the interties allow for trade of electricity in transactions that can reach across eastern North America, contributing to a more diversified and competitive pool of supply.

Imports Q4



Exports Q4



Q4 GWh	Manitoba	Michigan	Minnesota	New York	Quebec	Total
Imports	75.21	13.64	2.04	10.4	717.54	818.83
Exports	135.58	2,471.17	52.90	2,012.76	899.26	5,571.66

Source: IESO

Note: Numbers may not add up to source totals due to rounding.

Installed Capacity Connected to Transmission Grid

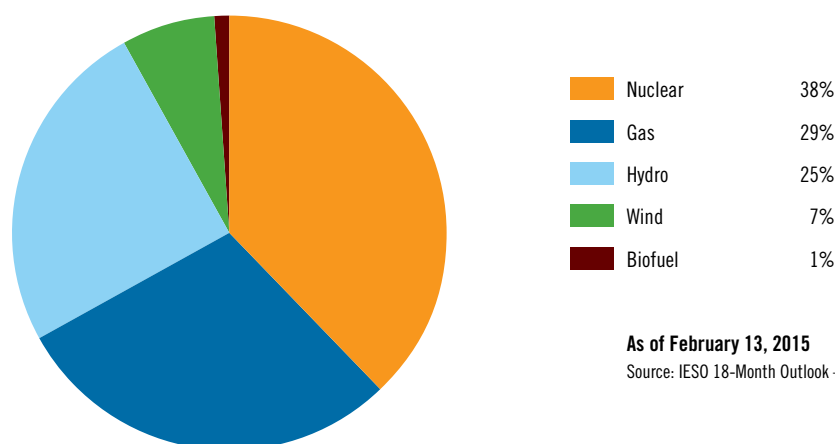
Changes to installed capacity in this quarter highlight the continuing process of renewal in Ontario's electricity sector. While nuclear, hydroelectric and natural gas/oil production currently account for the vast majority of supply, new wind, biofuel and solar generators continued to connect to the grid. Over 2014, more than 1,900 MW of new supply came into commercial operation on the province's transmission and distribution systems.

New Facilities Registered in Q4

- Silvercreek Solar Park – 10 MW
- Bluewater Wind Energy Centre – 60 MW
- Liskeard Solar 1, 3 and 4 – 30 MW
- Smoky Falls – 3 hydroelectric units – 264 MW
- Thunder Bay G3 (biomass conversion) – 153 MW
- Kipling Unit 3 – third hydroelectric unit – 79 MW

Source: IESO 18-Month Outlook – Mar 23, 2015

Current Installed Generation Capacity (Grid-Connected) (MW)



As of February 13, 2015

Source: IESO 18-Month Outlook – March 23, 2015

Note: Nominal grid-connected solar capacity is not represented in chart.

The table below portrays the increased use of renewable resources and the elimination of coal in 2014 as a source of fuel for generating electricity in the province.

Grid-Connected Installed Capacity (MW)

Year	Nuclear	Hydro	Coal	Gas ¹	Wind	Biofuel	Solar ²	Total
2014 MW (Feb. 13, 2015)	12,947	8,462	0	9,920	2,543	455	40	34,367
2014 %	38%	25%	0%	29%	7%	1%	<1%	100%
2013	12,947	7,939	2,291	9,920	1,725	124	0	34,946
2012	12,998	7,947	3,293	9,987	1,511	122	0	35,858
2011	11,446	7,947	4,484	9,549	1,412	122	0	34,960

Source: IESO 18-Month Outlook – Mar 23, 2015

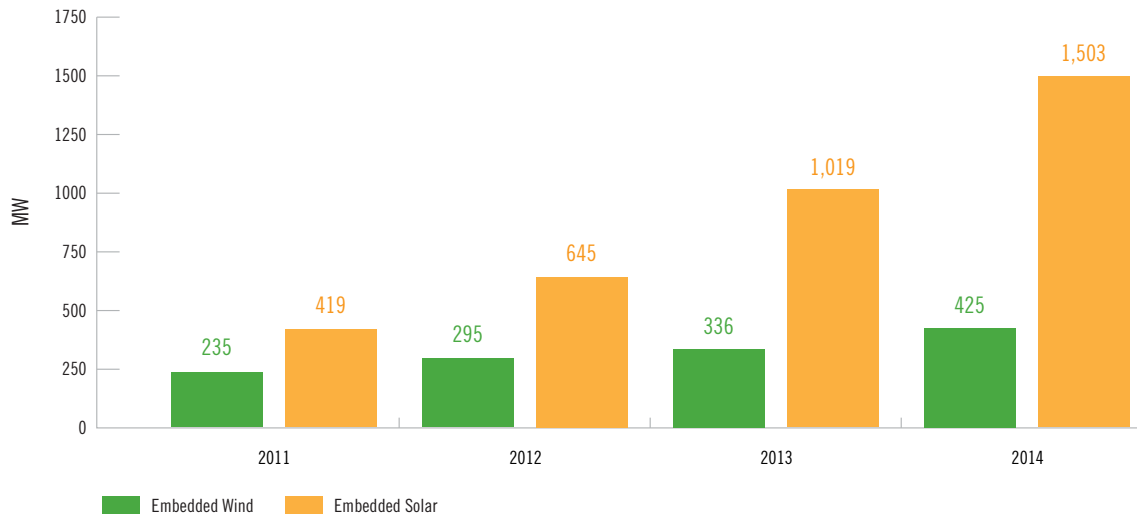
1. Units that use natural gas, oil or are dual fuel, such as Lennox, NP Kirkland and NP Cochrane, are included in the Gas category.

2. Solar category represents grid-connected solar facilities. Most solar generation in Ontario is currently connected to distribution systems.

Contracted Solar and Wind Generation Capacity (Distribution-Connected)

Embedded generators supply electricity to the distribution system and help serve the needs of local communities. Increasing amounts of new wind and solar generation are being connected to local distribution networks, offsetting demand on the bulk system as generators on the distribution system meet some local demand requirements. By the end of 2014, more than 1,925 MW of wind and solar generation was operating within local distribution systems.

Total Contracted Solar and Wind Generation Capacity (Distribution-Connected) (MW)



Source: IESO

Available Capacity versus Ontario Demand

The weather in Ontario for October and December was generally milder than normal, and cold weather in November generally occurred on weekends. While cold temperatures also occurred over the holiday period in December, peak demand for the quarter was set on that month's third coldest day – December 2.

Available Capacity at Peak 25,788 MW (Q4)

Peak Demand	20,938 MW (Q4)	Operating Reserve Requirement	1,418 MW (Q4)
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Available Capacity is all installed grid-connected capacity, minus allowances made for seasonal derates, planned outages and the capacity of energy-limited resources.

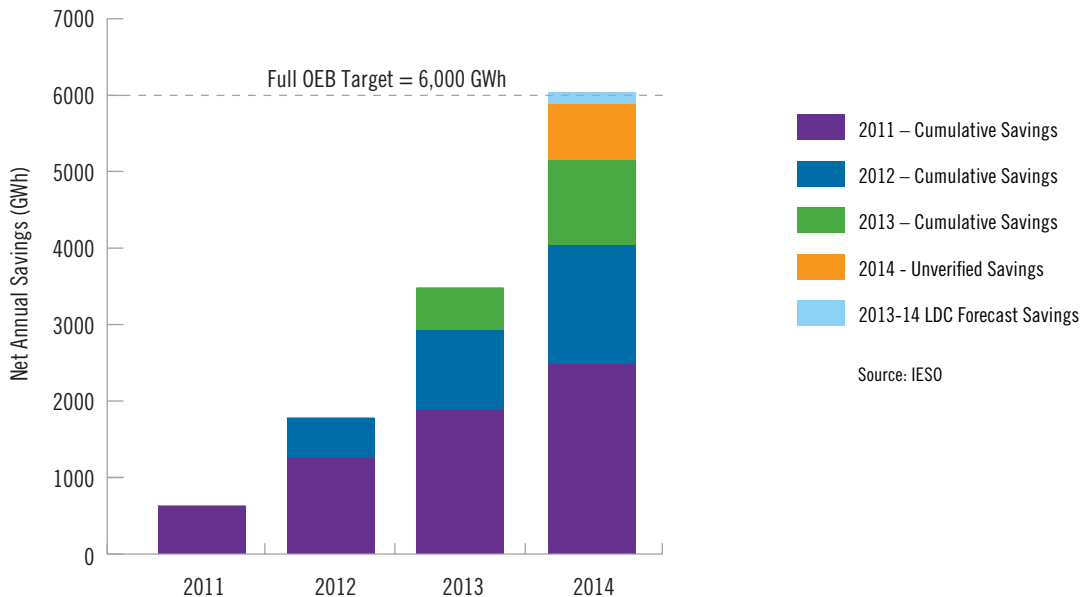
Reserve Requirement is the amount of supply resources required to handle the loss of the largest generating unit on the grid, plus loss of half the amount of the second largest unit.

Source: IESO

Conservation

Preliminary results from the **saveONenergy** programs for the 2011-2014 framework period show that local distribution companies (LDCs) have already reached 98 per cent of their target, set by the Ontario Energy Board (OEB), of 6,000 GWh in cumulative energy savings. Once these results are verified and the final results are delivered, it is anticipated that LDC conservation programs will have delivered savings that slightly surpass this target.

Energy Savings through LDC-led Conservation Programs (2011-2014) (GWh)



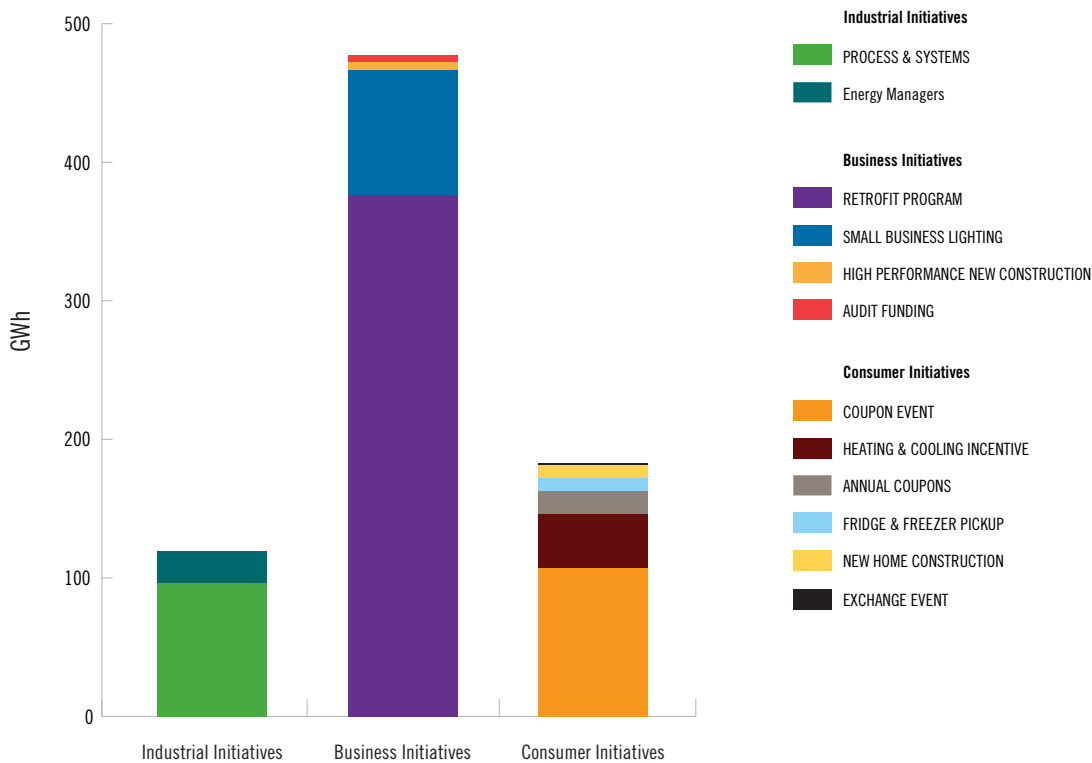
See Excel spreadsheet for notes.

LDC saveONenergy Program Highlights

saveONenergy offers a suite of energy efficiency and demand management programs for all customer classes. Highlights from the 2014 **saveONenergy** programs delivered by LDCs included:

- Consumer Programs: Tremendous interest in LED lights through the COUPON EVENT and increased uptake in the FRIDGE & FREEZER PICKUP initiative as the program came to a close;
- Business Programs: A 25 per cent increase in RETROFIT in Q4 2014 over the same quarter in 2013, with a 55 per cent increase in SMALL BUSINESS LIGHTING participation;
- Industrial Programs: PROCESS & SYSTEMS contributed 96 GWh of net energy savings, and Energy Managers contributed a further 23 GWh; and
- The ABORIGINAL CONSERVATION PROGRAM and the HOME ASSISTANCE PROGRAM: contributed 3.9 GWh and 13.4 GWh respectively.

2014 Incremental Net Energy Savings by LDC-served Customer Segment (GWh) *



Source: IESO

* Results do not include Non-LDC initiatives such as the Industrial Accelerator Program, the Conservation Fund and provincial demand response initiatives.

Demand Management and Peak Savings

Demand response initiatives, along with conservation efforts, have worked to have a significant impact on demand peaks in Ontario. These include:

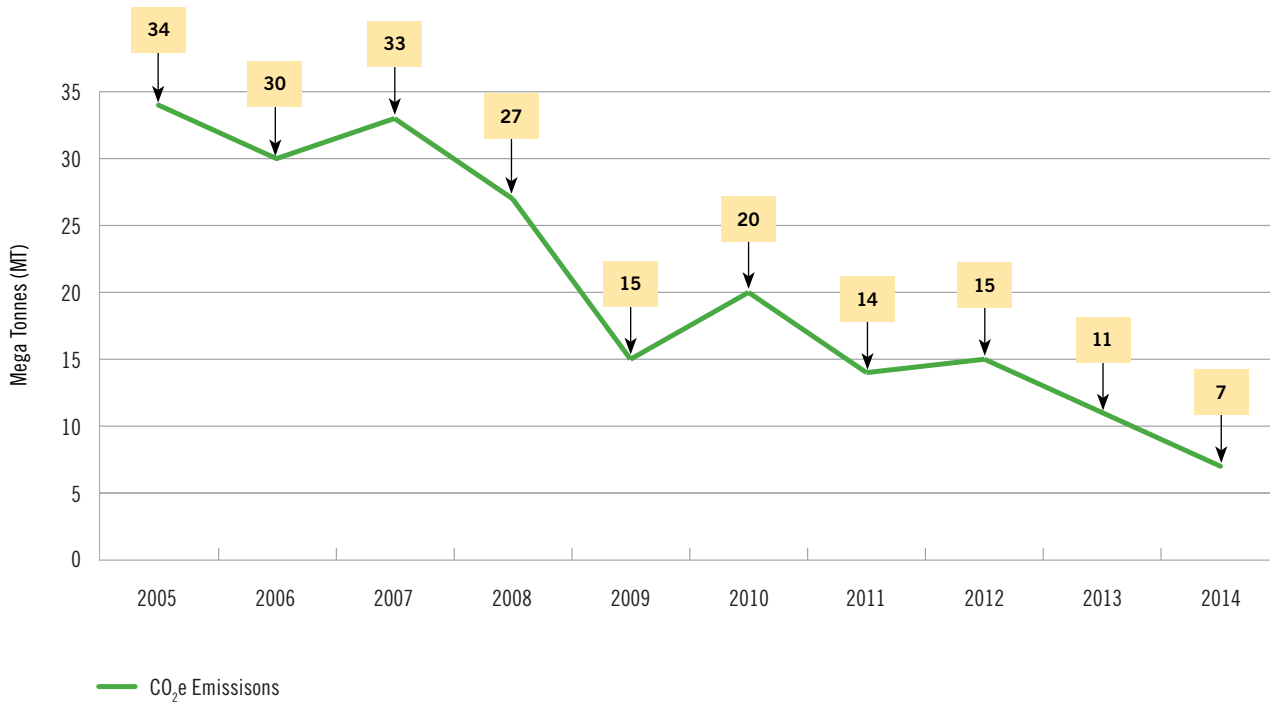
- Businesses participating in the Industrial Conservation Initiative and providing an estimated 1,000 MW of peak reduction on the highest demand day of summer 2014; and
- Provincial and LDC-conservation programs impacting demand by reducing peaks by about 1,100 MW, over the space of four years.

These programs contribute to overall peak savings for the province, which benefits the electricity system and lowers energy costs for consumers.

Emissions – CO₂ Equivalents

The marked decline in CO₂ equivalents is a result of the phase out of coal-fired electricity generation in the province. Emissions of oxides of sulfur (SO_x) – which are predominantly a bi-product of coal combustion – have also shown a marked decrease with the phase-out of coal-fired electricity. Coal-fired generators on average emit approximately 2.5 times more greenhouse gases than gas-fired generators on a per MWh basis.

CO₂ Emissions for the Ontario Electricity Sector (Mega Tonnes)



Source: IESO, Environment Canada

See Excel spreadsheet for source and notes.

Air Contaminants

Air contaminants, including oxides of sulphur (SO_x), oxides of nitrogen (NO_x) and fine particulate matter (PM_{2.5}) are also released during combustion of fossil fuels.

Air Contaminants for the Ontario Electricity Sector (Tonnes)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
SO _x Emissions	114,323	87,932	105,420	76,020	30,768	38,448	11,971	10,342	10,192	1,033
NO _x Emissions	48,143	38,955	43,846	38,314	24,389	28,130	18,988	19,077	17,183	9,726
PM _{2.5} Emissions	1,787	1,529	1,876	1,314	1,779	2,120	562	478	439	246

Source: IESO, Environment Canada

See Excel spreadsheet for source and notes.

Electricity Demand

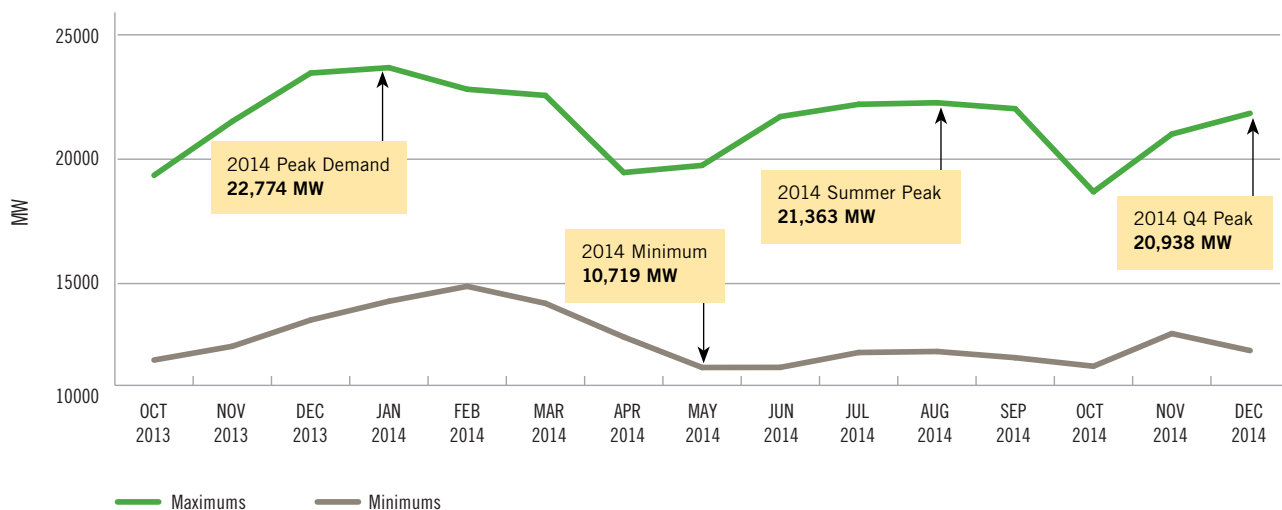
Electricity demand is shaped by several factors which have differing impacts – those that increase demand (population growth and economic expansion), those that reduce demand from the grid (conservation and embedded generation) and those that shift demand (time-of-use rates and the ICI). The impact of each of these factors on electricity consumption varies by season, and time of day.

Ontario Peak Demand – YE 2014

22,774 MW Jan 7, 2014 7:00 PM EST

Ontario Monthly Peaks and Minimums (MW)

For the first time in a decade, Ontario was winter peaking in 2014. A milder-than-normal summer and a long winter contributed to the peak for demand being established in January, not in the summer, when hot temperatures would usually drive heavy air-conditioning load. Embedded solar generation, as well as conservation, time-of-use rates and the ICI all put additional downward pressure on peak demand.



Source: IESO

Forecast Demand Peaks

The demand for electricity in the province is forecast on a rolling 18-month basis, and an assessment is done to assure the adequacy of the existing and proposed generation and transmission facilities to meet demand needs. The chart below presents Normal Weather forecasts, representing a typical peak for that time of year, and Extreme Weather forecasts that reflect severe weather conditions. The impacts of time-of-use rates and the ICI, which is expected to generate a response on the demand side on peak days this winter, are also factored into the demand forecast in this report as they have a downward impact on peak demand.

Season	Normal Weather (MW)	Extreme Weather (MW)
Summer 2015	22,991	24,814
Winter 2015-16	22,237	23,029
Summer 2016	22,966	24,541

Source: IESO 18-Month Outlook – March 23, 2015

Total Annual Ontario Energy Demand (TWh)

Year	Total (TWh)*	Change Over Previous Year
2014	139.8	-0.64%
2013	140.7	-0.42%
2012	141.3	-0.14%
2011	141.5	-0.35%

* Total does not include the impact of embedded generation to reduce demand.

Source: IESO Power Data, Demand Overview

Electricity Prices

Commodity Cost (¢/kWh)

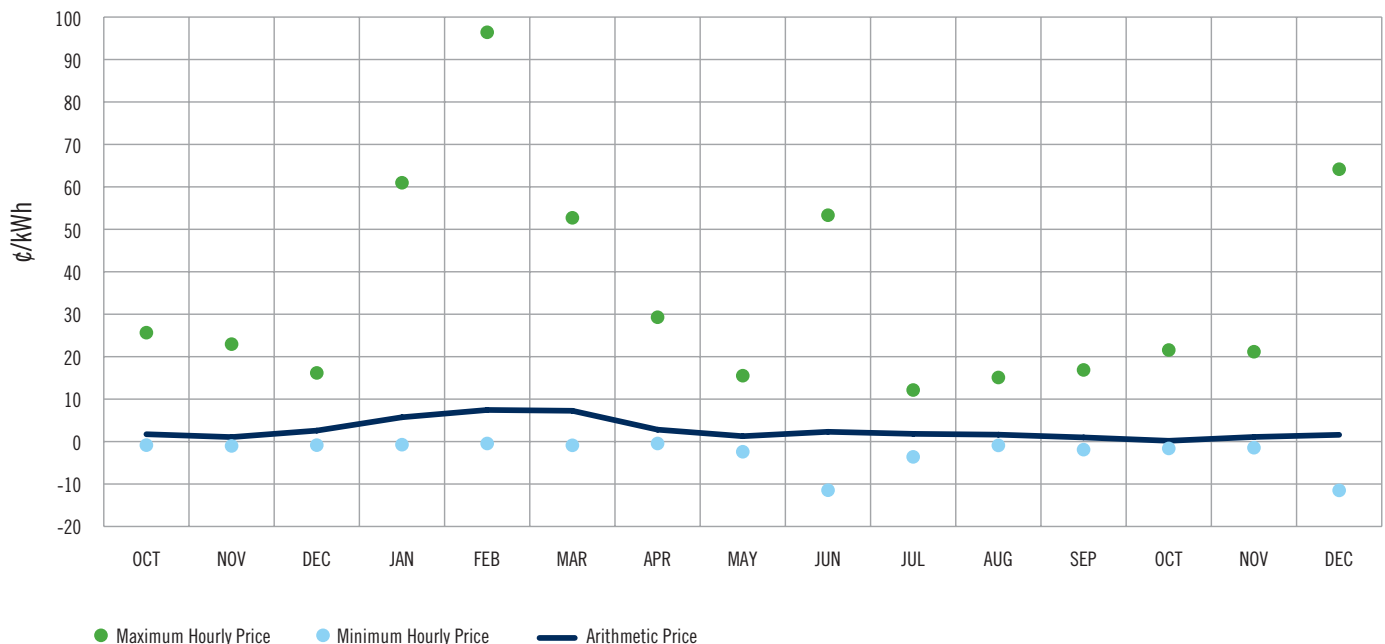
Commodity cost comprises two components, the wholesale price (the Hourly Ontario Energy Price) and the Global Adjustment. Note the commodity cost is only a portion of the total energy bill.

Year 2014 ¢/kWh	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YTD Avg.
HOEP ¹ (Weighted Avg)	6.54	8.18	8.04	3.33	1.79	2.98	2.37	2.21	1.55	0.71	1.65	2.24	3.60
Global Adjustment ² (Class B Customers)	1.26	1.33	-0.03	5.20	7.20	6.03	6.26	6.76	7.96	10.01	8.23	7.44	5.46
Total Cost of Commodity	7.8	9.51	8.01	8.53	8.99	9.01	8.63	8.97	9.51	10.72	9.88	9.68	9.06

Source: IESO

Monthly Wholesale Electricity Prices (¢/kWh)

The wholesale electricity price fluctuates by the hour. This chart shows the highest, lowest and average wholesale prices for each month. The monthly price varies depending on factors in the electricity market that shift the energy price higher or lower. A higher average monthly price exerts a downward pressure on money that needs to be recovered through Global Adjustment.



Source: IESO

1. HOEP (Hourly Ontario Electricity Price) is the wholesale price of electricity, determined by bids and offers that are settled in the electricity market operated by the IESO.

2. Global Adjustment is calculated based on the difference between the HOEP and regulated rates to nuclear and baseload hydroelectric generating stations, contracts with IESO for gas-fired facilities, renewable facilities, and nuclear refurbishments, and contracted rates paid to existing generators. It also includes the cost of delivering conservation programs and payments made to participants under contracts with the IESO for demand response programs.

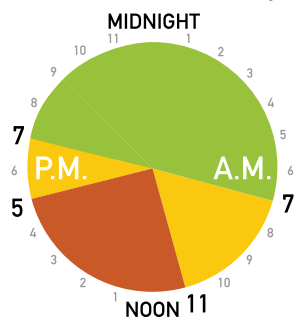
Time-of-Use Pricing under the Regulated Price Plan (RPP)

In accordance with the mandate provided under the *Ontario Energy Board Act*, the OEB has developed the regulated price plan (RPP), a plan which provides eligible residential and small business consumers with stable and predictable electricity pricing, encourages conservation and ensures the price consumers pay for electricity better reflects the price paid to generators. The plan has been in place since 2005.

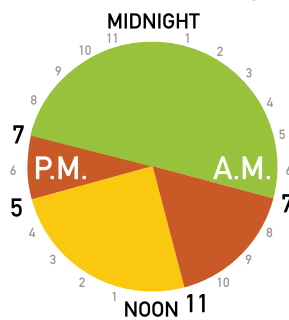
The RPP is established by forecasting the cost of supply for RPP customers for an upcoming year and determining the prices that will recover those forecast costs from eligible customers. Consumers with eligible time-of-use (or “smart”) meters that can determine when electricity is consumed during the day will pay the RPP under a time-of-use price structure. The prices for this plan are based on three time-of-use periods per weekday. These periods are referred to as off-peak, mid-peak and on-peak and are shown below. The hours for mid-peak and on-peak periods are different in the summer and winter months to match energy consumption patterns in those seasons.

Summer and Winter Time-of-Use Hours

Summer-Weekdays



Winter-Weekdays



Weekends & Holidays



\$ Off-peak

\$\$ Mid-peak

\$\$\$ On-peak

Source: Ontario Energy Board

RPP prices reflect a forecast of prices on the Ontario wholesale electricity market, as well as other components of supply costs, such as those resulting from contracts. These costs are allocated to time-of-use consumption periods based on the type of supply that is active at those times. For example, costs for always-on baseload sources of generation (such as nuclear) are allocated across all periods whereas costs for demand response conservation programs are only allocated to on-peak periods. The lowest (off-peak) price is below the average RPP supply cost, while the other two are above it. The current time-of-use prices for consumers with eligible time-of-use meters are shown in the table below.

RPP Time-of-Use Prices (effective November 1, 2014)

Time-of-use RPP Prices – ¢/kWh	Off-Peak	Mid-Peak	On-Peak	Average Price
Price	7.7¢	11.4¢	14.0¢	9.5¢
Per cent of time-of-use consumption	64%	18%	18%	

Source: Ontario Energy Board

Electricity – What's New

A collection of electricity reports and publications.

	Information	Published By	Date
	Electricity Distributor Performance Data, Reports and Regulatory Information	OEB	March 2, 2015
	18-Month Outlook	IESO	March 23, 2015
	Quarterly Conservation Report and Summary	IESO	March 23, 2015
	Progress Report on Contracted Electricity Supply	IESO	March 23, 2015
	Generator Output by Fuel Type – Monthly	IESO	March 23, 2015
	Annual Report on Wind Dispatch	IESO	March 23, 2015
	Annual Report on Nuclear Manoeuvring and Shutdown	IESO	March 23, 2015
	Nuclear Station Performance and Environmental Reports	OPG	March 23, 2015
	Provincial Policy Statement InfoSheet Planning for Electricity Infrastructure	Ministry of Energy	March 23, 2015
	Provincial Policy Statement InfoSheet Energy Conservation, Efficiency and Supply	Ministry of Energy	March 23, 2015