

Q8: How high are Ontario electricity prices?

A: From 2006 to 2016, average home electricity bills in Ontario increased 45% faster than the Canadian average. In 2016, before the Fair Hydro Plan, Ontarians had the highest electricity rates in Canada (though lower than some U.S. states and most of Europe).

As of January 2017, Ontario residents began paying less than many Canadians in Atlantic Canada and in Saskatchewan.¹ Further reductions on residential electricity bills took effect in June 2017.

With the Fair Hydro Plan in place, only about 80% of the costs of operating the electricity system are paid by today's electricity customers; the remainder is funded through taxes or borrowing from future customers.

Overall Ontario home *energy* costs (including natural gas, and other fuels), are middle of the Canadian pack, because Ontarians rely less on electricity for water and space heating, and more on fossil fuels, than many other provinces. However, customers on electric resistance heating face very high winter electricity costs.

The details...

Electricity Rates Had to Rise, and Did

As discussed in **Q5 (reliability)**, Ontario's electricity supply was stretched to its limits by the mid-2000s. By 2006, Ontario began to take steps to make its electricity system cleaner and more reliable, by making significant investments in new generation of all forms and conservation. As a result, electricity prices began to rise. The causes of these increases are discussed in **Q9 (why costs have gone up)**.

From 2006 to 2015 (**UPDATE WITH 2016 #S**), Ontario's average unit cost of electricity (per kilowatt-hour(kWh)) increased by 41% (see **figure 8.1**), to 14.4¢/kWh.² This included costs for³:

- **generation** (building, operating and decommissioning power generation facilities);

- **transmission** (building and operating major power lines);
- **distribution** (building and operating smaller power lines that take power from transmission lines to consumers);
- **wholesale market charge** (the cost to administer the electricity market and maintain the reliability of the grid);
- **conservation** (delivering electricity conservation programs, including incentives to participants and administration costs), and
- **debt retirement** (the cost of paying down the old debt that Ontario Hydro built up before 2006).

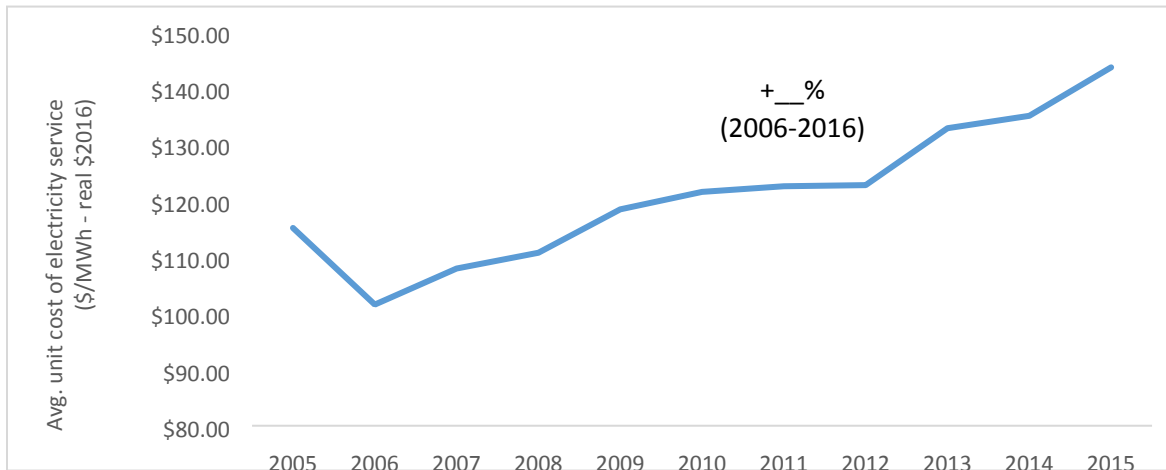


Figure 8.1. Average unit cost of Ontario's electricity system (2006-2016, real \$2016). [awaiting 2016 data from IESO, CHANGE MWH TO KWH]

Note: Data represents true cost of service as calculated by the Independent Electricity System Operator, and is not available prior to 2005. In 2005, unusual weather and tight supply conditions led to high demand and record market prices for power. Ontario demand peaked at 158.8 TWh, and Ontario was a net importer of power. By 2006, installed generation capacity had increased, and Ontario demand dropped by 6 TWh to 152.8 TWh. The cost of power declined and Ontario also returned to being a net exporter of power.

Source: IESO, information request (2018).

The rise in electricity *prices* was partly offset by a 9% drop in average household electricity *use*,⁴ even though air conditioning use has grown.⁵ Conservation programs have helped, and buildings, equipment and appliances have become more energy efficient. Until 2009, the Ontario Energy Board defined the average Ontario household used 1,000 kWh/month.⁶ In 2009, the Board concluded that the average Ontario household used only 800 kWh/month. In 2016, the Board decided that Ontario's typical residential electricity consumer now uses only 750 kWh a month.⁷ (For more on Ontario's changing electricity demand, see Q3(DEMAND))

In other words, though cost per kilowatt-hour (kWh) has increased by 42%, average residential consumer bills have only increased by ___% (see Figure 8.2). Adjusted for inflation, the net increase in average residential bills 2005 to 2017 is ___%.

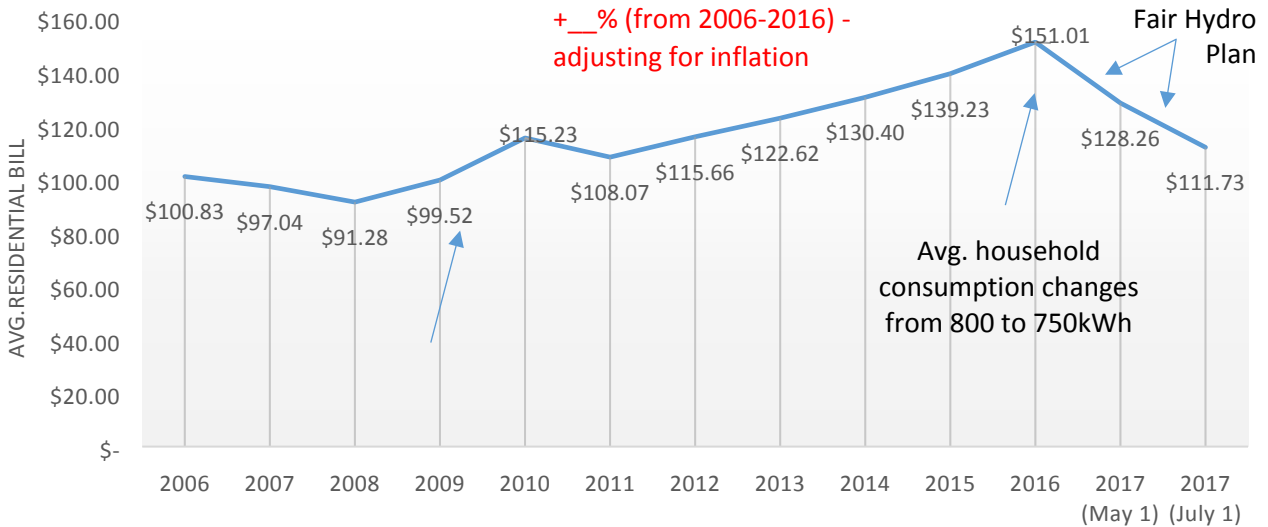


Figure 8.2. Changes in average residential electricity bill (2006-2017, nominal dollars, Ontario).

Source: Ontario Energy Board, Information Request (December 2017).

Note: Values are not adjusted for inflation. The average electricity bill assumes 800 kWh prior to 2016, and 750 kWh from 2016 onwards (TO BE UPDATED WITH ACTUAL AVERAGE RESIDENTIAL RATE CLASS CONSUMPTION FROM OEB AND REAL 2016 DOLLAR VALUES) and on simple average of all LDC rates as set at the beginning of the rate year (Jan 1 or May 1, depending on each LDC's rate year).⁸

Not Everyone is “Average”

Many consumers do not pay “average” rates, and many consumers do not have “average” electric consumption.

Different types of users may pay different rates. For example, distribution rates vary in different parts of the province. Many rural and on-reserve residents have historically paid higher than average delivery charges, but as of July 1, 2017, on-reserve First Nations customers receive a 100% credit to offset their delivery charges. As of June 2017, many rural residents benefit from a lower maximum monthly distribution charge.⁹

Some Ontario households use much more electricity than the “average” resident. For example, roughly 16% of homes rely on electric resistance heating, and some of those homes are in colder parts of the province where heating loads are high.¹⁰ Other residents may rely on electrically-powered medical equipment 24-hours-a-day.

Over the course of a year, a typical home heated by electric resistance (e.g., electric furnaces or baseboard heating) may use about 3 times more electricity than the same home if it did not use

electricity for space and water heating (e.g., was heated by natural gas or another fuel type) as shown in **Figure 8.3**.¹¹ Since Ontario electricity is currently about **5 times** more expensive than natural gas for the equivalent amount of input energy (see **Q15(ELECTRIFICATION)**), electric resistance heating systems result in much higher than average home energy bills during the coldest months of the year.¹² Electric heat pumps use only about one third the electricity that electric resistance heating systems do, but still cost more for heating than natural gas at current prices.¹³

Figure 8.3. Sample average monthly electricity bills for two types of urban residential consumers: (1) natural gas heated and (2) electric baseboard heated.

Source: Ontario Energy Board, Rate Calculator, online (accessed October 5, 2017) [Toronto Hydro Rates used to represent typical urban delivery rates].

Note: The Ontario Energy Board uses 750 kWh to represent the average monthly residential Ontario electricity usage, while 2,400 kWh is an estimated monthly usage for an average size residence relying on electric resistance heating (of course this would be concentrated in the winter heating season). These bills incorporate rate reductions resulting from Ontario's Fair Hydro Plan.

SAMPLE MONTHLY BILL STATEMENT			
750 kWh (Natural gas heated)		URBAN 2,400 kWh (Electric resistance heated)	
Account Number: 000 000 000 0000 Meter Number: 0000000		Account Number: 000 000 000 0000 Meter Number: 0000000	
Your Electricity Charges		Your Electricity Charges	
Electricity		Electricity	
Off-Peak @ 6.5 ¢/kWh	31.69	Off-Peak @ 6.5 ¢/kWh	101.40
Mid-Peak @ 9.5 ¢/kWh	12.11	Mid-Peak @ 9.5 ¢/kWh	38.76
On-Peak @ 13.2 ¢/kWh	17.82	On-Peak @ 13.2 ¢/kWh	57.02
Delivery	50.26	Delivery	98.04
Regulatory Charges	3.28	Regulatory Charges	9.96
Debt Retirement Charge	0.00	Debt Retirement Charge	0.00
Debt Retirement Charge exemption saved you \$X.XX		Debt Retirement Charge exemption saved you \$X.XX	
Total Electricity Charges	\$115.16	Total Electricity Charges	\$305.19
HST	14.97	HST	39.67
8% Provincial Rebate*	(-\$9.21)	8% Provincial Rebate*	(-\$24.42)
Total Amount	\$120.92	Total Amount	\$320.45

Energy Poverty

For some consumers, high electricity consumption and high resulting costs can cause real hardship. Energy poverty (a.k.a., fuel poverty) is defined as residents who must spend more than 10% of their income on home energy.¹⁴ This ratio of energy costs-to-income can result in individuals having to make difficult decisions between energy and other life necessities (e.g., food, rent, clothing). Based on Ontario's median income in 2015,¹⁵ average winter electricity and natural gas bills represent almost 4.5% of income.¹⁶ For a home heated by electric resistance, that would go up to almost 6.4%. According to 2015 data, Canada's National Energy Board found 7% of Ontarians to be energy poor, compared to 13% in Atlantic Canada and 10% in Saskatchewan, and a Canadian-wide average of 8%.¹⁷

Low-income households are at greatest risk of energy poverty,¹⁸ often because they cannot afford to (or do not have the right to) make their homes more energy efficient, or switch to a heat pump. As a

result, these households are a priority for subsidized energy conservation programs. For this reason, low-income electricity and natural gas conservation programs do not need to meet as strict a cost-benefit test as most other conservation programs in Ontario.¹⁹ One example of a low-income electricity conservation program available to Ontario residents is the Home Assistance Program, which offers free basic energy efficiency upgrades for low-income residents, with deeper upgrades (such as home insulation) offered free of charge for electrically-heated homes. Gas utilities also offer conservation programs at no cost to low-income customers.²⁰

The province also currently has a low-income electricity bill subsidy program to limit energy poverty. Ontario's Electricity Support Program provides on-bill credits (now paid for by taxes) for low-income households (\$45-\$75/month), including higher credits for low-income households with electric heating (\$68-\$113/month).²¹ For those residents that don't quite qualify for the OESP program, the \$100M Affordability Fund set up as part of the Fair Hydro Plan supports free efficiency upgrades.²²

Compared to the Rest of Canada (2000-2015)

In order to compare Ontario's residential electricity bills to the rest of Canada, the consumer price index (CPI) for electricity is a useful metric. The CPI measures the percentage change in how much an average resident pays for a staple good or service in relation to a base year. The CPI for a basket of representative goods and services (e.g., milk, eggs, gasoline, home electricity costs, etc.) is a key market indicator used by central banks to determine the rate of inflation.

The following graphic shows that Ontario's CPI for residential electricity bills increased at a similar rate to the rest of Canada between 2000 and 2009, after which it accelerated so that by 2016 it was 45% higher.²³ CPI data for 2017 is not yet available, but the Fair Hydro Plan has likely substantially reduced this differential.

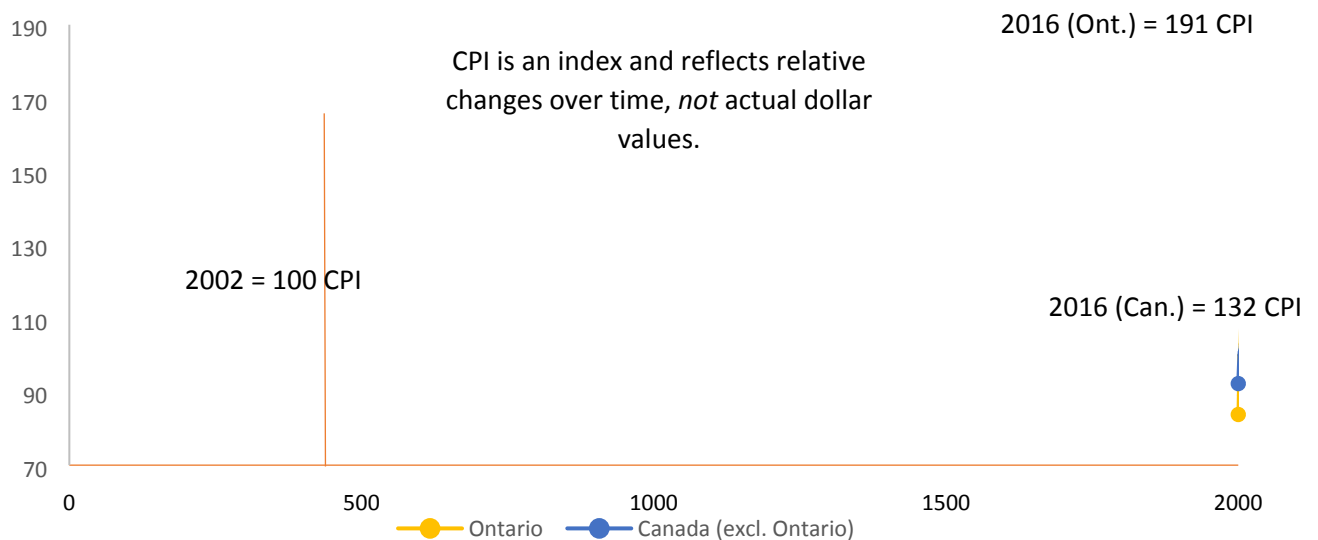


Figure 8.4. Ontario and Canada's consumer price index for primary residence electricity (1990-2016).

Source: Statistics Canada, *Consumer Price Index*, Table 326-0020; Statistics Canada, *Gross Domestic Product, Expenditure-Based, Provincial and Territorial*, Table 384-0038; Calculations for Canadian CPI electricity (excl. Ontario) by author, provincial CPI weighted by GDP.

Note: The consumer price index (CPI) for electricity is a measurement of the relative cost a residential consumer pays for electricity in relation to a base year (here being 2002). The CPI for a representative basket of consumer goods and services is a key market indicator used by central banks to determine the rate of inflation. To determine the Canadian CPI for electricity without including Ontario, provincial and territorial GDP was used as a weighting factor.

Where are we now? (2016-2017)

Above average electricity price increases continued through 2016. From 2015 to 2016, Ontario residents experienced a rate increase 2.5 times the national average.²⁴ In 2016, Ontario residential and large consumer costs per kWh were the highest in Canada.²⁵

In 2017, Ontario introduced what the government calls its “Fair Hydro Plan”, which reduced average electricity bills for residential and small business customers by 25%. This reduction was achieved in 2 stages. In January 2017, all electricity bills saw a rebate of 8%, and in June 2017, a further 17% rebate (on average) took effect.²⁶ *The Fair Hydro Plan is discussed further in Q13 (LTEP).*

As of November 2017, residents in Toronto (Ontario’s most populous and one of its most expensive electricity distribution regions) were no longer paying Canada’s most expensive electricity prices, that honour has passed to Charlottetown, Regina, and Halifax (see *Figure 8.5*).

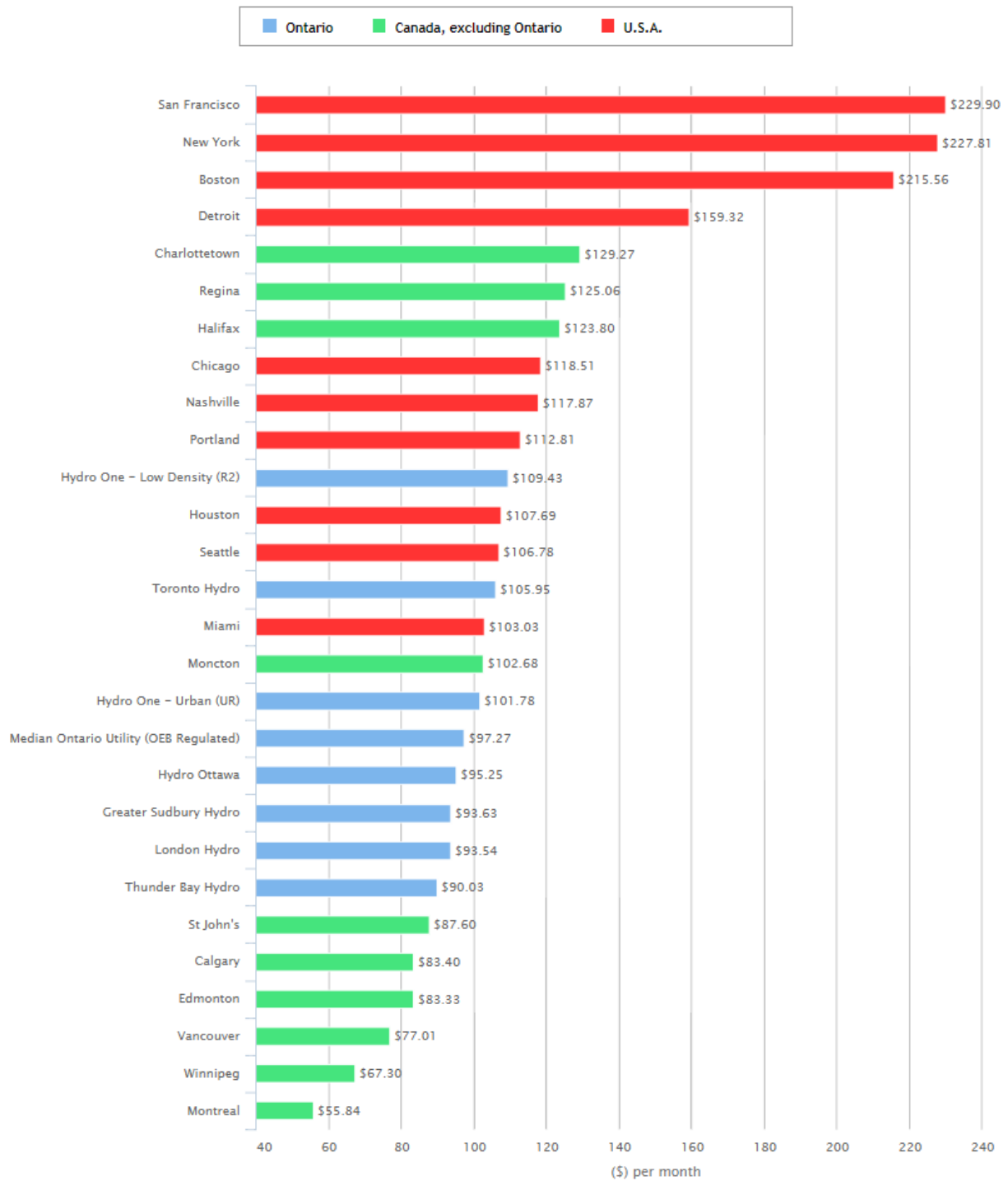


Figure 8.5. 2017 Estimated Total Monthly Bill Amount (\$) (before Tax) for Residential Rate Class in Selected Jurisdictions in Canada and the United States.

Source: Ontario Energy Board, *Electricity Rate Comparison* (16 January 2018) online: www.oeb.ca/newsroom/2018/see-how-ontarios-electricity-rates-stack

Note: The Ontario figures are based on current electricity commodity prices (November 1, 2017) for the Regulated Price Plan, time-of-use (TOU), as well as the OEB rate database, while data for jurisdictions outside of Ontario is based on the Hydro-Quebec Report (2017). The Ontario figures in this chart assume a typical consumption pattern of 65% Off-Peak, 17% Mid-Peak and 18% On-Peak for each TOU period, which represents the average across all consumers on TOU pricing in Ontario. The data in this chart is based on 750 kWh as the average monthly consumption of electricity in all selected jurisdictions.

Understanding your residential electricity bill

Figure 8.6 provides an example of the current format of a typical residential electricity bill in Ontario, including recent changes arising from the *Ontario Fair Hydro Plan Act, 2017*.²⁷ The bill calculation assumes monthly electricity use of 750 kWh (the Ontario Energy Board's current value for the typical electricity customer), and is for a customer on time-of-use pricing (roughly 91% of eligible customers).²⁸ Bills for users on tiered electricity rates or on contract with electricity retailers will look slightly different, as will bills for larger commercial and industrial customers.²⁹ Customers can visit the Ontario Energy Board's bill calculator (www.oeb.ca/consumer-protection/energy-contracts/bill-calculator) to generate a custom estimate based on where they live and the amount of electricity they use.

Electricity

The charge for the generation resources used to supply our electricity (including conservation programs). This charge is proportional to the amount of electricity used, and is the only part of the bill to which time-of-use (TOU) pricing applies. TOU rates are regulated by the OEB and updated every 6 months on May 1 and November 1.³⁰ There are currently three TOU periods (on-peak, mid-peak, and off-peak) with different rates to reflect the fact that the cost to supply our electricity is higher at times of day when demand is high. The time slots change for summer and winter since consumption patterns are different in each season.^{31,32} TOU rates were reduced in July 2017 when the Fair Hydro Plan was implemented.

Delivery

The charge for delivering electricity from the generating station through high voltage (transmission) and low voltage (distribution) power lines to a customer.³³

Unlike electricity rates, which are identical across the province, delivery rates vary across local distribution companies (LDCs) depending on the age of an LDC's infrastructure, its service area's density and geography, and the ratio of residential to other customer classes.³⁴

Regulatory Charges

Regulatory charges include the cost of Ontario's Independent Electricity System Operator to administer Ontario's electricity system, and other minor charges.³⁵

Debt Retirement Charge

The Debt Retirement Charge (DRC) was charged to residential electricity consumers to help service and pay down the liabilities of the old Ontario Hydro.³⁶ As of December 2015, the DRC has been removed from residential bills.³⁷ The province has committed to remove it for all other electricity consumers by April 1, 2018.

Harmonized Sales Tax and the 8% Provincial Rebate

Electricity is subject to the Harmonized Sales Tax (HST). As of January 1 2017, the Ontario government provides an 8% rebate, equal to the provincial portion of the HST, on electricity bills.³⁸ This is part of the current government's Fair Hydro Plan.

SAMPLE MONTHLY BILL STATEMENT

Toronto Hydro-Electric System Limited - Main

Account Number: 000 000 000 0000

Meter Number: 0000000

Your Electricity Charges

Electricity

Off-Peak @ 6.5 ¢/kWh	31.69
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Mid-Peak @ 9.5 ¢/kWh	12.11
----------------------	-------

On-Peak @ 13.2 ¢/kWh	17.82
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Delivery	50.26
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Regulatory Charges	3.28
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Debt Retirement Charge	0.00
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Debt Retirement Charge exemption saved you \$X.XX

Total Electricity Charges	\$115.16
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HST	14.97
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8% Provincial Rebate*	(-\$9.21)
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Total Amount	\$120.92
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Figure 8.6. Sample monthly residential electricity bill (Ontario, 2017).

Overall Home Energy Bills

Although Ontarians pay more for electricity than most of the rest of the country, average home energy bills (including electricity, natural gas, and other fuels) in the province tell a somewhat different story. As the Financial Accountability Office of Ontario commented in 2016, "looking at how much households actually spend on energy in the home, rather than at prices alone, provides a clearer picture of how energy costs affect the cost of living of Ontarians."³⁹

According to a Statistics Canada survey, as of 2015, average Ontario home energy costs were in the middle of other Canadian provinces and territories (see [Figure 8.7](#)). Although the results of this survey are only *indicative* of actual costs due to methodological limitations (i.e., sample size and accuracy of

responses), the results do reflect the home energy use profiles of average Ontarians. Based on more reliable data from Natural Resources Canada, we can safely say that, on average, Ontarians get less of their home energy from electricity (21% share of overall home energy use vs. a 47% Canadian average) and more from natural gas (68.5% share vs. a 37% Canadian average) than the rest of Canada (see **Figure 8.8**).⁴⁰

In **Q15(ELECTRIFICATION)** we discuss the relative price differential between electricity and natural gas, and how this affects fuel switching away from electricity and Ontario's climate change goals.

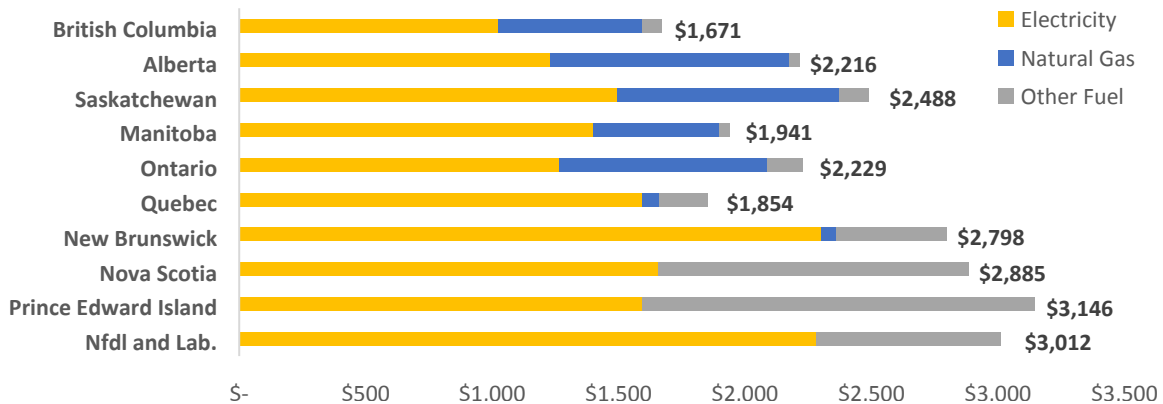


Figure 8.7. Provincial average home energy cost, by energy source (2015).

Source: Statistics Canada, *Survey of Household Spending*, Table 203-0021.

Note: Does not account for regional differences in after-tax income, or normalize for weather. Natural gas spending data for Newfoundland Labrador, Prince Edward Island, and Nova Scotia was considered too unreliable to be published by Statistics Canada, as a result, no data was entered at all.

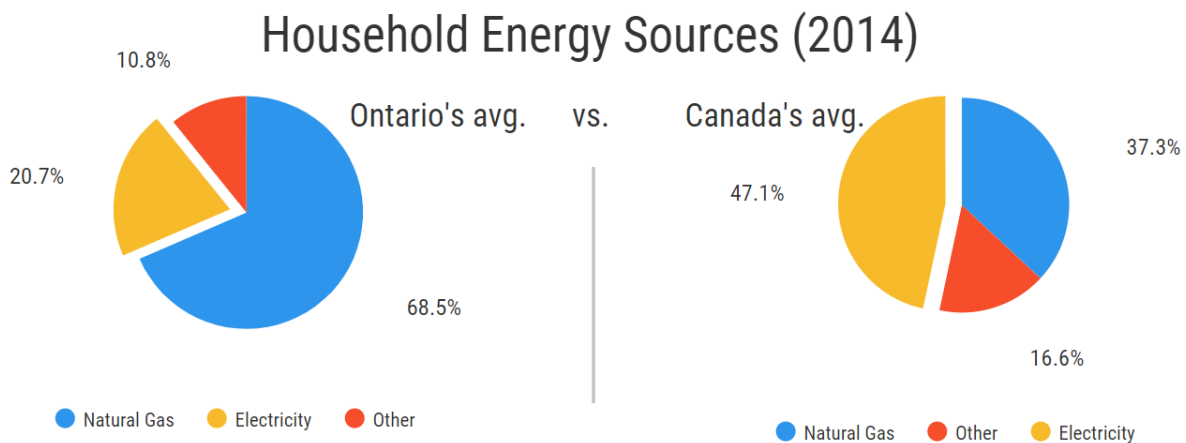


Figure 8.8. Share of home energy use supplied by natural gas, electricity and other fuels (including propane, oil, and wood), Ontario vs. Canada, 2014.

Source: Natural Resources Canada, *Comprehensive Energy Use Database*, Residential Sector, Table 1 – Secondary Energy Use and GHG Emissions by Energy Source.⁴¹

Note: Canadian average does not exclude Ontario. Data does not normalize for weather.

Businesses

Large power consumers are generally charged less for electricity than residential customers⁴² (see [Figure 8.9](#)), and this is also true in Ontario. In some jurisdictions, industrial consumers have lower base electricity rates; in Ontario, they have preferential access to peak demand reduction and conservation programs that reduce their share of service costs.

Without savings from the Industrial Conservation Initiative program, which can be significant (the government estimates 33%⁴³), Ontario's large-power consumers⁴⁴ would pay more than their counterparts in any other Canadian province. However, according to the Ministry of Energy's analysis, which includes the average impact of bill savings due to the Industrial Conservation Initiative, Ontario industrial electricity rates were actually far more competitive.⁴⁵ By this metric, as of September 2017, Ontario's northern industrial electricity rates were lower than five other provinces, and Ontario's southern industrial electricity rates were lower than seven provinces.⁴⁶

Several U.S. States (e.g., Massachusetts and California) have higher prices per kWh for both residential and large customers (see [Figure 8.9](#)), and most of Europe pays more per kWh.⁴⁷

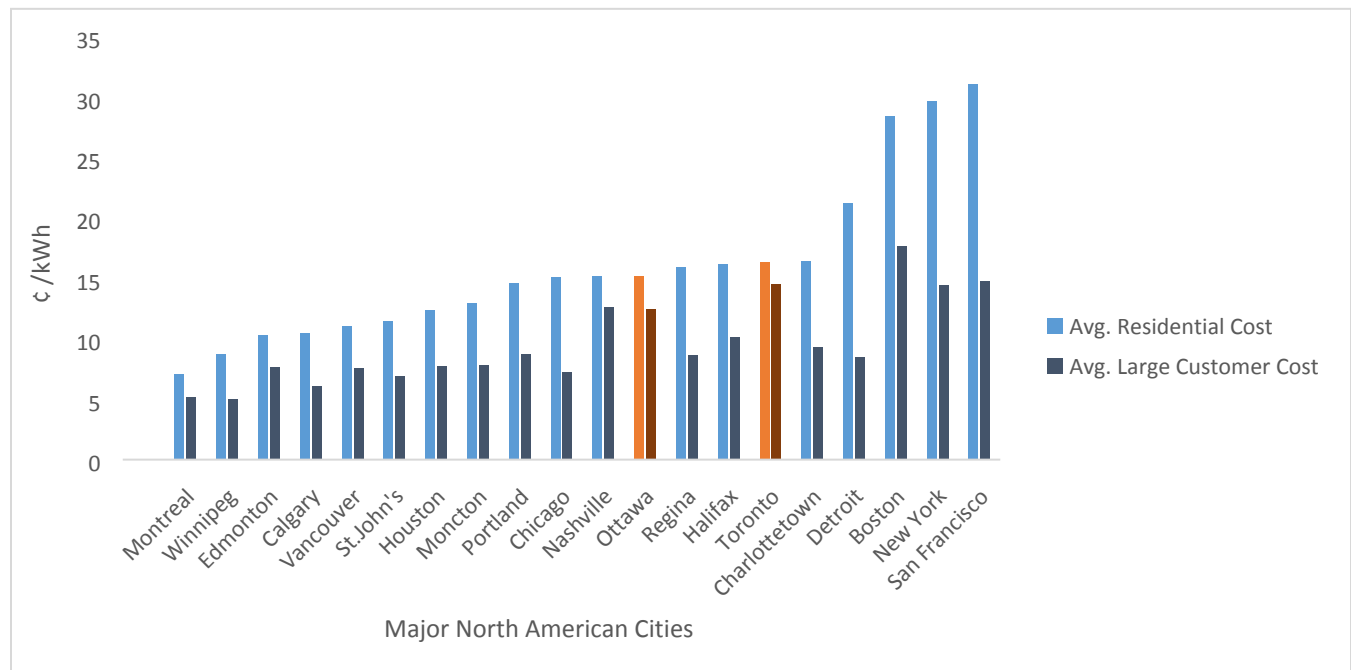


Figure 8.9. Average prices for residential and large-power customers in major North American cities – not including any applicable discount programs (¢/kWh, rates in effect April 1, 2017).

Source: Hydro Quebec, Comparison of Electricity Prices in Major North American Cities (2017) at 4-5.

Note: Residential prices are based on average bill for consumption levels of 1,000 kWh, not including taxes. Large-customer prices are based on a monthly consumption of 3,060,000 kWh and a power demand of 5,000 kW.⁴⁸ (For further details on methodology, see page 9 of the

Hydro Quebec report). Prices do not include applicable discount programs, such as Ontario's Industrial Conservation Initiative that can save large-power customers about 33% on their bills.

Ontario's economy grew steadily from 2006 to 2015⁴⁹ but shifted away from energy-intensive industrial and manufacturing sectors towards less energy-intensive industries, such as the service industry.⁵⁰ This shift in Ontario's economy has been attributed to many factors, including the 2008 financial crisis, the cost and rigidity impacts of unionized workplaces⁵¹ and increased competition from emerging markets.⁵² Several studies have attempted to assess whether electricity rates have had an impact on Ontario's industrial competitiveness, but have reached differing conclusions.⁵³

As of April 1 2017, Ontario's Fair Hydro Plan expanded coverage of the Industrial Conservation Initiative. This change enables smaller businesses to potentially reduce their electricity costs by reducing electricity consumption during peak times, an option which had previously only been available for larger businesses.⁵⁴

Electricity rates do not pay the whole bill

Although Ontario electricity rates are high, they are not high enough to pay the full cost of today's electricity system. The unit cost of electricity shown in **Figure 8.1** includes all costs of the system, but not all of these costs show up in rates, as some are paid for by taxes.

The following measures are paid for by taxpayers and reduce electricity costs:

- A rebate on the provincial portion of the HST for all residential and small business customers;
- Subsidies for distribution rates for about 800,000 customers in rural and remote areas;
- The Ontario Electricity Support program which lowers electricity costs for low-income customers;
- An Affordability Fund to fund conservation measures for customers who are slightly above the low-income threshold;
- The Northern Industrial Electricity Rate Program which reduces electricity rates for large industrial customers in northern Ontario.

Ontario's 2017 budget includes an estimate of \$1.438 billion in 2017-18 spending on "electricity cost relief programs" which is assumed to include the first four items above (**Can Ministry of Energy confirm whether this assumption is correct?**), as well as \$120 million for the Northern Industrial Electricity Rate Program.⁵⁵

In addition, the Fair Hydro Plan is borrowing an average of \$2.5 billion per year to reduce current electricity bills, to be repaid in future years.⁵⁶ Over the full period of the Fair Hydro Plan (through 2045), this borrowing will add roughly \$21 billion in extra interest charges to the cost of Ontario electricity.⁵⁷

Putting these numbers together, we can estimate that almost 20% (\$4 billion out of \$21 billion) of the current cost of electricity service is not paid by today's electricity customers.

Conclusion

Ontario's electricity rates have risen sharply since 2005, although they have dropped following the introduction of the Fair Hydro Plan, partly because some electrical system costs are paid for through taxes, and some have been deferred until later. Rates are higher than many Canadian and U.S. jurisdictions, but below several higher-cost North American locations, and most of Europe.

Average Ontario home energy costs were middle of the pack. This is due to higher than average use of low-cost natural gas for home heating; a trend that has steadily increased since 2006. It is important to note the important exception to this average: Ontarians dependent on electric resistance for home heating.

High electricity costs provide a major incentive to reduce the use of electricity (especially during peak hours). But, such reductions may not be possible for the most vulnerable members of the population, at least not without government assistance. High electricity costs can also drive a switch to less expensive (but more carbon intensive) fuels, where possible.

The next question will attempt to explain what has driven up electricity costs, and **question #15 (ELECTRIFICATION)** will outline the impact of Ontario's current and forecasted electricity prices on the province's Climate Change Action Plan goals of electrification.

¹ Hydro Quebec, 2017 comparison, at 4.

² To update with IESO data for 2016. Values adjust for inflation (i.e., they are in real dollars). Were the year 2005 selected as a starting point rather than 2006, the increase would have been much smaller (only about 25%). Part of the reason for this unusual drop in electricity service cost between 2005 and 2006, is due to the fact that "unusual weather and tight supply conditions led to very high demand and record market prices for power, adding about \$3B to the cost of electricity bill." (IESO, Ontario Planning Outlook, Module 1, at slide 40.)

Table 1.1 Average unit cost and total cost of electricity service (Ontario, 2005-2016, real dollars).

Avg. unit cost of electricity	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	\$115.1	\$101.5	\$107.9	\$110.7	\$118.4	\$121.5	\$122.5	\$122.7	\$132.8	\$135	\$143.6	\$143.6
Total cost of electricity service (real 2016 billions)	18.3	15.5	16.6	16.7	16.7	17.6	17.7	17.7	19.3	19.6	20.5	21.3

Source: IESO, *Ontario Planning Outlook, Module 1: Ontario's Electricity System, 10-Year review*, (August 2016) slide 42; IESO information request (2018).

³ The IESO also considers the debt retirement charge as a separate category that makes up the province's cost of electricity service; however, for simplicity here it is considered a subcategory of 'generation' (as it represents debt servicing for generation capital costs).

⁴ Independent Electricity System Operation, *Ontario Planning Outlook, Module 1* at slide 9.

⁵ Independent Electricity System Operator, *Ontario Electricity Demand 2012 Annual Long Term Outlook* (2012) at 14-15, 21,22. <http://cms.powerauthority.on.ca/sites/default/files/news/Q2-2012LoadForecast.pdf>

⁶ Ontario Energy Board, *Defining Ontario's Typical Electricity Consumer*, EB-2016-0153 (Toronto: 14 April 2016) at 2.

⁷ Ontario Energy Board, *Defining Ontario's Typical Electricity Consumer*, EB-2016-0153 (Toronto: 14 April 2016) at 1.

⁸ The Ontario Energy Board assumes the percentage of consumption during time-of-use periods to be as follows:

	2012-2016	2017
off peak	64	65
mid peak	18	17
on peak	18	18

⁹ Ontario Energy Board, *The Fair Hydro Act, 2017* (News release, 15 June 2017) online: www.oeb.ca/newsroom/2017/fair-hydro-act-2017.

¹⁰ Across Canada 38% of households are heated by electricity, and 43% by natural gas, compared to Ontario where 16% of households are heated by electricity and 66% by natural gas (Natural Resources Canada, *Survey of Household Energy Use 2011* (NRCAN: 2014) at Table 6.1); The general trend of this data is supported by more current data from Natural Resources Canada (*Comprehensive Energy Use Database, Residential sector: Ontario*, Table 5: Space Heating Secondary Energy Use and GHG Emissions by Energy Source), which states that in 2015, residential sector space heating in Ontario was provided by 25.5% electricity and 58.1% natural gas, and in Canada, 35% electricity, and 42% natural gas; The Toronto Atmospheric Fund estimates that almost 24% of multi-unit residential households in Ontario are heated with electricity, and that MURBs have the highest portion of electric heating of the residential sector. (Toronto Atmospheric Fund, *Pumping Energy Savings: Ontario EMURB Market Characterization Study* (TAF: February 2016, at ii).

¹¹ The Ontario Energy Board uses 750 kWh to represent the average monthly residential Ontario electricity usage. Enbridge reports that a typical residential customer uses about 2,400 cubic metres of natural gas a year for home and water heating. Assuming gas space and water heating efficiency of about 80%, it would take about 1650kWh monthly to heat the same typical home using electric heat, for a total electricity bill of approximately 2400kWh. This is about 3.2 times as much electricity as the OEB average. Enbridge, “Your Energy Dollars Go Further with Natural Gas”, online: www.enbridgegas.com/homes/accounts-billing/residential-gas-rates/natural-gas-provides-great-value.aspx.

¹² According to OEB’s rate calculator, the average Enbridge natural gas bill for January is \$155.86, based on the average electricity bills for a Toronto Hydro consumer, electricity resistance heating would cost 44% more than heating with natural gas in the winter (based on the assumption that electric resistance heating requires 4 times more electricity than average).

¹³ ICF, *Marginal Abatement Cost Curve for Assessment of Natural Gas Utilities’ Cap and Trade Activities* (EB 2016-0359) (20 July 2017) at A-4. https://www.oeb.ca/sites/default/files/OEB_MACC%20Report_20170720.pdf

¹⁴ Government of Canada, National Energy Board, *Market Snapshot: Fuel poverty across Canada – lower energy efficiency in lower income households* (30 August 2017) online: www.neb-one.gc.ca/nrg/ntgrtd/mrkt/snpst/2017/08-05flpvrt-eng.html?&wbdisable=true; *Contra*, the following Fraser Institute report uses 10% of total expenditures as its definition for energy poverty, on the basis that total expenditure is more accurately reported than income (*Energy Costs and Canadian Households* (Fraser Institute, 2016) at 13, online: www.fraserinstitute.org/sites/default/files/energy-costs-and-canadian-households.pdf).

¹⁵ To verify whether gross/net

¹⁶ Statistics Canada, 2016 Census of Population. Statistics Canada. 2017. Various geographies. Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released September 13, 2017.

Median annual income (2015, Stats Can)	median monthly income (2015 Stats Can)	Average monthly residential electricity bill (750 kWh, Toronto Hydro) (2017, OEB rate calculator)	Average monthly residential natural gas bill (Jan, 419 m ³ , Enbridge) (2017 OEB rate Calculator)	Avg monthly elec & nat gas bill
\$74,287	\$6,191	\$120.92	\$155.86	276.78
Stats Can, 2015		• OEB bill calculator, 2017		4.5% of \$6,191

¹⁷ Government of Canada, National Energy Board, *Market Snapshot: Fuel poverty across Canada – lower energy efficiency in lower income households* (30 August 2017) online: www.neb-one.gc.ca/nrg/ntgrtd/mrkt/snpst/2017/08-05flpvrt-eng.html?&wbdisable=true; However, the Fraser Institute Report found: “in 2013, 7.5% of Ontarians to be energy poor, compared to 20.6% in Atlantic Canada and 12.9% in Saskatchewan, and a Canadian-wide average of 7.9%” (*Energy Costs and Canadian Households* (Fraser Institute, 2016) at 15. Online: www.fraserinstitute.org/sites/default/files/energy-costs-and-canadian-households.pdf.)

¹⁸ Government of Canada, National Energy Board, *Market Snapshot: Fuel poverty across Canada – lower energy efficiency in lower income households* (30 August 2017) online: www.neb-one.gc.ca/nrg/ntgrtd/mrkt/snpst/2017/08-05flpvrt-eng.html?&wbdisable=true

[eng.html?&wbdisable=true](#); *Energy Costs and Canadian Households* (Fraser Institute, 2016) at 19. Online: www.fraserinstitute.org/sites/default/files/energy-costs-and-canadian-households.pdf.

¹⁹ SEE ECO Energy Conservation report...

²⁰ The Ministry of Energy has recently directed the IESO to improve access to low-income electricity conservation programs across the province. <http://www.ieso.ca/-/media/files/ieso/document-library/ministerial-directives/2017/directive-cff-partnering-green-ontario-fund-cdm-programs-20170804.pdf?la=en>

²¹ Ontario Energy Board, *Ontario Electricity Support Program, Questions and Answers*, online:

ontarioelectricitysupport.ca/FAQ?lang=en. (Accessed 22 November 2017)

²² news.ontario.ca/mei/en/2017/10/ontario-launches-new-program-to-help-reduce-electricity-costs.html

²³ As a general rule, Ontario and the rest of Canada experience similar increases in their CPI for a representative basket of goods and services, of which electricity is only one of several dozen items.

²⁴ Fraser Institute, *Evaluating Electricity Price Growth in Ontario* (Toronto, 2017) at 3. [based on Statistics Canada data – but how if not public??]

²⁵ Hydro Quebec, *Comparison of Electricity Prices in Major North American Cities, Rates in effect April 1, 2016* (2016) at 4 (Average price for residential customers assuming a monthly consumption of 1,000 kWh), at 5 (Large-power customers are those that have a power demand of 5,000 kW or more, and are assumed to consumer 3,060,000 kWh/month.)

²⁶ Ontario Energy Board, *The Fair Hydro Act, 2017* (15 June 2017) online: www.oeb.ca/newsroom/2017/fair-hydro-act-2017.

²⁷ The format of Ontario electricity bills is specified by regulation (Ontario Regulation 275/04, Information on Invoices to Low-Volume Consumers of Electricity, under the *Ontario Energy Board Act, 1998*). This regulation sets up the different headings that appear on an electricity bill and explains what charges/costs will be included under those headings.

²⁸ 750 kWh: www.oeb.ca/sites/default/files/uploads/Report_Defining_Typical_Elec_Customer_20160414.pdf page 5. 91% of eligible customers on time-of-use pricing:

www.oeb.ca/oeb/Documents/SMdeployment/Itr_LDC_End_of_TOU_Reporting_Requirements_20130725.pdf ;

www.oeb.ca/oeb/Documents/SMdeployment/Monthly_Monitoring_Report_August2012.pdf

²⁹ Instead of the three different electricity rates based on time-of-use periods (“off-peak”, “mid-peak”, “on-peak”), the small number of customers on tiered rates will see two rates, one for electricity use below a threshold (600 kWh in the summer, 1000 kWh in the winter), and a second (higher) rate for electricity use above this threshold. Customers on retail contracts will see the “Electricity” portion of their bill split into two items - the electricity rate set as per their contract, plus a line for “Global Adjustment” costs that account for many of the costs. All customers pay the Global Adjustment, but for residential and small business customers on tiered or time-of-use rates, the Global Adjustment is already embedded in these rates and not displayed separately. Medium and large customers such as commercial, institutional and industrial facilities will also see the Global Adjustment as a separate line item on the bill. These costs now account for the majority of the “Electricity” portion of the bill.

³⁰ Tiered rates are also regulated. Retailer rates, on the other hand, are not regulated by the OEB and are set out in the energy contract signed between the customer and the retailer, although the OEB provides consumer protection oversight.

³¹ www.energy.gov.on.ca/en/smart-meters-and-tou-prices/

³² www.oeb.ca/sites/default/files/background_rpp_20170420.pdf

³³ The delivery charge includes: a customer service charge from LDCs to operate meter readings and customer service; LDC-specific distribution charges with they have to apply for and receive approval from the OEB; transmission charges from Hydro One to operate and maintain their transmission lines; and a line loss charge to account for the electricity lost during transmission and distribution.

³⁴ Ibid

³⁵ The regulatory charge also covers renewable connection costs from LDCs and the Standard Supply Service Charge which is an administrative charge approved by the OEB for customers that buy electricity directly from LDCs. As of June 1, 2017, the Rural and Remote Electricity Rate Protection (RRRP) and the Ontario Electricity Support (OESP) charges were removed from this line item and moved to the tax base.

³⁶ As of March 31, 2017, total debt and liabilities that still have to be repaid were \$21.1 billion. However, unfunded liabilities were only \$3.2 billion. The Ontario Electricity Financial Corporation will use other revenue sources to pay down the remaining debt once the Debt Retirement Charge is removed from all electricity bills. www.oefc.on.ca/debtmanage.html

³⁷ www.fin.gov.on.ca/en/guides/drc/101.html

³⁸ news.ontario.ca/mei/en/2016/10/ontario-passes-legislation-to-reduce-electricity-costs-for-families-and-businesses.html

³⁹ Financial Accountability Office of Ontario, *Home Energy Costs* (25 August 2016) at 1, online: [www.fao-on.org/en/Blog/Publications/home_energy](http://www.fao.on.org/en/Blog/Publications/home_energy).

⁴⁰ Also, decreasing OEB average electricity use per person/household

www.oeb.ca/oeb/Documents/Documents/Report_Defining_Typical_Elec_Customer_20160414.pdf

⁴¹ NRCAN, Comprehensive Energy Use Database data sources listed online: oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/sources.cfm.

⁴² Most jurisdictions are strongly motivated to attract and keep large businesses for employment and tax reasons, and they can be proportionately less expensive to serve than households.

⁴³ Ministry of Energy, *Backgrounder: Ontario's Industrial Conservation Initiative (ICI)* (News release, 15 September 2016) online: news.ontario.ca/mei/en/2016/09/ontarios-industrial-conservation-initiative-ici.html

⁴⁴ Here 'large power consumers' is a term borrowed from the referenced Hydro Quebec report, where it is defined as consumption over of 3,060,000 kWh and a power demand of 5,000 kW. In Ontario, residential customers are those with a peak demand of less than 50kW, any peak demand above that is considered to be a Class B customer, and any commercial or institutional customer with a peak demand above 1,000kW, or industrial customer with a peak demand of 5,000 kW or greater is eligible to register as a class A consumer under the Industrial Conservation Initiative (ICI). The province estimates that ICI participants can achieve electricity bill savings of up to 33%.

⁴⁵ [MENG TO CONFIRM THIS IS THE LIKELY REASON FOR THE DIFFERENCE WITH HQ STUDY?] Ministry of Energy, *Ontario Energy Report, Q3 2017*, at 15, online: www.ontarioenergyreport.ca/pdfs/6188_IESO_Q3OER2017_Electricity_EN.pdf.

⁴⁶ Ontario Energy Board, *Ontario Energy Report, Q3 2017*, at 15, online: www.ontarioenergyreport.ca/pdfs/6188_IESO_Q3OER2017_Electricity_EN.pdf.

⁴⁷ European Commission, *Eurostat* (ec.europa.eu/eurostat/statistics-explained/images/c/cf/Electricity_prices_for_household_consumers%2C_second_half_2015_%28%C2%B9%29_%28EUR_per_kWh%29_YB16.png); Hydro Quebec, *Comparison of Electricity Prices in Major North American Cities (rates in effect April 2016)*, at 4 and 26.

⁴⁸ Many large-power customers in Ontario participate in the Industrial Conservation Initiative (ICI) conservation program, which substantially lowers their electricity bills. These cost reductions (and any cost reductions from optional programs) are not reflected in the chart.

⁴⁹ As evidenced by total expenditure based GDP:

Stats Can: Table 384-0038 Gross domestic product, expenditure-based, provincial and territorial, annual (dollars x 1,000,000)

Provincial and Territorial Gross Domestic Product by Income and by Expenditure Accounts – 1902 (Final consumption expenditure)										
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
ONTARIO										
Chained	\$438,08	\$450,03	\$464,40	\$466,54	\$482,06	\$489,51	\$495,04	\$501,46	\$513,27	\$526,38
(2007) dollars	0	9	1	3	1	4	1	2	2	8

⁵⁰ Ontario's service industry went from represent 74% of the province's GDP in 2007 to 77% of the GDP in 2015, whereas Ontario's industrial sector went from 20% to 15%, the manufacturing sector went from 16% to 12%, and its goods producing sector went from 26% to 22.5%. (Statistics Canada, *CANSIM table 379-0028: Gross Domestic Product (GDP) at basic prices, by North American Industry Classification System (NAICS)*)

⁵¹ Ontario Ministry of Finance, *Ontario's Long-Term Report on the Economy*, 2017, at 103-105).

⁵² Emily Capeluck, *Explanations of the Decline in Manufacturing Employment in Canada*, (Centre for the Study of Living Standards, October 2015) at 31; online: www.csls.ca/reports/csls2015-17.pdf.

⁵³ A 2017 study from the Fraser Institute argued that high electricity prices may also be to blame (at least in the electricity-intensive steel and paper manufacturing sectors) for the fact that manufacturing jobs in Ontario did not recover after the 2008 recession at the same pace as neighbouring jurisdictions.

The study's findings are based on two key assumptions: (1) applicable industrial electricity rates, and (2) applicability of findings from a 2013 American study (regarding the elasticity of employment in certain U.S. industries to energy prices. Theoretically the American study's findings on the elasticity of employment in certain US industries to energy prices hold constant for variables other than electricity costs that might affect job losses; however, it does not account for Ontario-specific and more recent socio-political trends that may have affected job losses in these sectors. For example: the decline in demand for newsprint, as reported by one Ontario paper manufacturer www.cbc.ca/news/canada/sudbury/iroquois-falls-struggles-to-cope-with-resolute-paper-mill-closure-1.2864106

It is also unclear whether the assumption made about applicable industrial electricity rates is appropriate for Ontario's steel and paper industries. The study assumes an average between class A and class B industrial rates. However, companies in these industries are likely to fall primarily in class A (Ontario's 300 largest power consumers pre-2015), which has lower rates.

Ross McKittrick and Elmira Aliakbari, Fraser Institute, *Rising Electricity Costs and Declining Employment in Ontario's Manufacturing Sector* (October 2017) at 25-27.

Another report published in 2017 by McMaster University's Automotive Policy Research Centre concluded that Ontario's automotive industry has not seen its competitiveness with North America's top 10 leading car-manufacturing jurisdictions impacted by the rising cost of electricity.

Greig Mordeu and Kelly White, *Electricity Pricing in Ontario and its Effect on Competitiveness: an Automotive Manufacturing Case Study* (Automotive Policy Research Centre, March 2017) at 14; online: aprc.mcmaster.ca/sites/default/files/pubs/electricity-report-mordeu-white-mar-8.pdf.

⁵⁴ The ICI was extended to consumers with a peak demand of 1 MW to 500 kW in targeted manufacturing and industrial sectors (including greenhouses). (more information available at IESO, *Conservation E-Blasts: Industrial Conservation Initiative* (3 May 2017) online: www.ieso.ca/sector-participants/conservation-delivery-and-tools/conservation-e-blasts/2017/05/industrial-conservation-initiative-update).

⁵⁵ Government of Ontario, *2017 Ontario Budget: Budget Papers* (Ministry of Finance, 2017) at 23, 240. <https://www.fin.gov.on.ca/en/budget/ontariobudgets/2017/budget2017.pdf>

⁵⁶ Financial Accountability Office of Ontario, *An Assessment of the Fiscal Impact of the Province's Fair Hydro Plan* (spring 2017) at 4; online: <http://www.fao-on.org/web/default/files/publications/Fair%20Hydro/Fair%20Hydro%20Plan.pdf>

⁵⁷ FAO, p. 1.