

1. Electricity 101: How Electricity Works

Electricity is an essential part of our daily lives. But have you ever thought about how it gets to your home or business? We'll help you understand how electricity is generated and delivered.

a) A History of Electricity in Ontario

Confused as to how our electricity system works and how it has evolved over time? See how this timeline detailing how Ontario's electricity sector has been managed, owned, and juggled since the mid-1900s:

2. How Rates Are Set

Setting pricing works differently for utility companies than most businesses. Learn more about utility regulation and how rates are set.

a) Utility Regulation: History, Standards and Benefits

As a regulated investor-owned utility, Cooperative Hydro Embrun provides services that are essential to our society. These services and their costs are regulated.

b) Ratemaking 101: What Goes into the Ratemaking Process

Cooperative Hydro Embrun's electric retail rates are set by the OEB.

c) Electricity's Cost Drivers: Factors that Affect Rate Pricing

Many factors drive the cost of providing electricity to our customers. Those include the cost to generate and deliver it.

d) Rate Pricing History

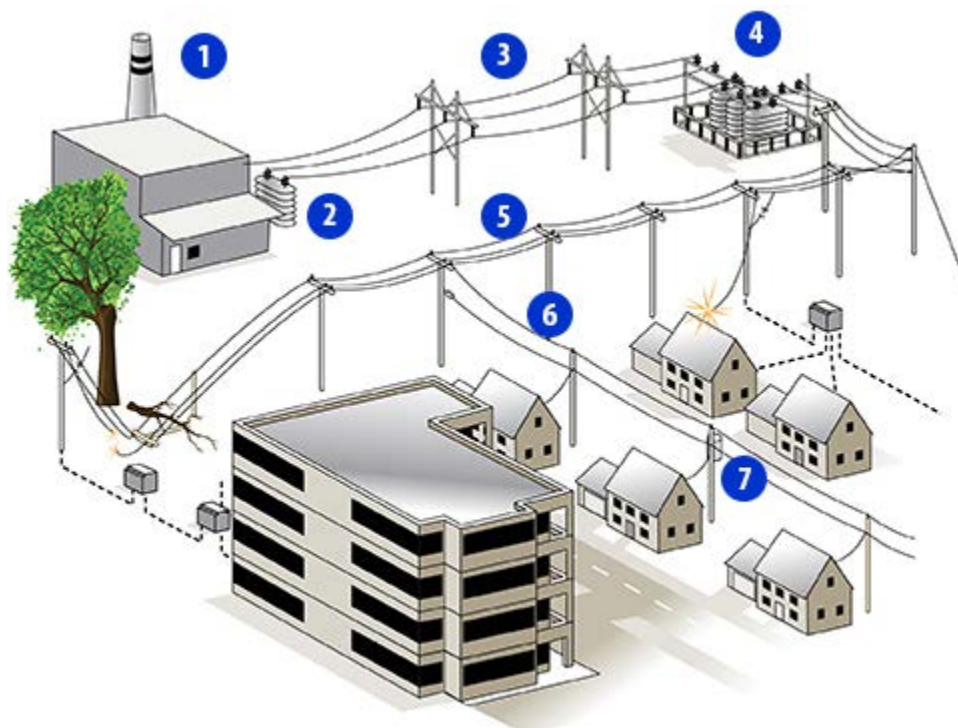
Cooperative Hydro Embrun adjusts its rates on a yearly basis in accordance with the OEB's rules. See how the utility's rates have changed since 2000.

e) Retail Energy Contract

1. Electricity 101: How Electricity Works

Electricity is a secondary energy source, which means it's produced from another energy source. These primary energy sources can be non-renewable (like coal and natural gas) or renewable (like wind and solar power). More than 80 per cent of the province's energy needs are met by fossil fuels while conservation efforts have been targeted at electricity, which is the smallest and cleanest of our major energy sources. About half Ontario's electricity is from nuclear generation, which does not pollute the air, and other power comes from hydroelectric sources such as Niagara Falls, along with natural-gas fired power plants, wind and solar.

How Electricity is Generated and Delivered



1. Electricity is produced in a generating plant, where a primary source of energy is used to rotate magnets within metal coils to create a current.
2. From there, the high-voltage electricity moves through a transmission substation where it is amped up to send long distances.
3. The power travels over transmission lines also known as the grid.
4. The transmission lines send the electricity to local substations that decrease the voltage to a level that residential and business customers can use.
5. The stepped-down electricity moves through distribution lines.
6. From distribution lines, electricity moves to secondary lines that deliver it to your neighborhood.
7. Then, the power heads to the transformer on the pole near your house or in the box in your yard and on to your individual meter.

a) A History of Electricity in Ontario

For most of the 20th century, the publicly owned (Crown corporation) Ontario Hydro was the major force in Ontario's electricity sector. Ontario Hydro dominated all aspects of the province's electricity sector, serving as the primary generator and transmitter of power. It also had authority to regulate and set the rates at both the wholesale and retail levels. The OEB was created in 1960 with a limited mandate to set rates for the sale, distribution and storage of natural gas.

In the late 1990s, the government decided to restructure the electricity sector. These regulatory reforms included the breakup of Ontario Hydro, the creation of a wholesale electricity market and giving the OEB responsibility for regulating part of the sector.

Timeline

1950s: Ontario has a public electricity utility, the Ontario Hydro OEB, made up of small local systems. Coal-fired power stations are built as population and industry grow, and electricity needs outpace existing hydro-electricity capacity.

1960: The Ontario Energy Board is founded as an impartial public agency responsible for regulating local distribution companies and for ensuring that the distribution companies fulfill their obligations to connect and serve customers. The OEB currently approves the rates that utilities can charge their customers, creates policy, and approves construction.

1970: All of Ontario's power systems are combined into one synchronized grid, with the exception of remote communities. Natural gas prices rise due to crisis in the Middle East and nuclear generation comes to the forefront.

1973: The Ministry of Energy is created with the mandate to manage the province's electricity system.

1971: Expansion of electricity generation: The Pickering Nuclear Generating Station comes into service.

1974: The existing Ontario Hydro OEB is recreated as Ontario Hydro, a crown corporation governed by a board of directors. The corporation is not intended to generate profits or pay taxes, but to provide energy at cost.

1977 - 1989: The Bruce Nuclear Generating Station and later, the Darlington Nuclear Generating Station come into service. The building of these nuclear plants is costly and results in a debt of over \$38.1 billion, causing electricity rates to increase.

1989: Ontario Hydro initiates a 25-year demand-supply planning exercise.

1992: Ontario Hydro faces a downturn in the economy and falling demand, but the demand-supply plan is not implemented. Consumer rates rise by 40%.

1993: The Ontario government freezes energy prices and they remain so for nearly a decade.

1995 - 1996: The Macdonald Committee is created to advise on electricity competition and provide recommendations on the restructuring of Ontario's electricity industry.

October 1998: The Energy Competition Act authorizes the restructuring of Ontario Hydro and the eventual opening of wholesale and retail electricity markets in the province.

April 1, 1999: Due to the Energy Competition Act, Ontario Hydro is restructured into 5 separate companies:

Ontario Power Generation (OPG) – A commercial company that generates electricity and competes with other smaller generating companies in the Ontario marketplace. Examples of other generating companies in the province include: Bruce Power, Algonquin Power, Hamilton Renewable Power Inc., Energy Ottawa, Sky Generation, and Brookfield Renewable Power.

Ontario Hydro Services Company (later to become Hydro One) - A commercial company that owns and maintains transmission and distribution lines to move electricity across the province. Examples of other smaller distribution companies include Toronto Hydro Electric System, Veridian, and Northern Ontario Wires Inc.

Independent Market Operator (later to become the Independent Electricity System Operator) - A crown corporation responsible for directing the flow of electricity across the network owned by Ontario Hydro Services Company (Hydro One) and other

transmission companies. It also manages the competitive wholesale electricity market and administers an integrated North American electricity network.

Electrical Safety Authority - A private non-profit corporation having administrative authority mandated by the Government of Ontario to enhance and promote public electrical safety, ensure compliance with regulations, promote awareness, and educate.

Ontario Electricity Financial Corporation – A crown agency charged with managing the \$38.1 billion in total debt and other liabilities inherited from the former Ontario Hydro. A portion of the \$38.1 billion is supported by the value of the assets of Ontario Hydro successor companies, leaving \$19.4 billion in stranded debt. This \$19.4 billion is to be paid down by Ontario consumers through a Debt Retirement Charge on their monthly bills.

May 1, 2000: Ontario Hydro Services Company is re-launched as Hydro One, a corporate holding company with five subsidiaries: Hydro One Networks Inc., Hydro One Remote Communities Inc., Hydro One Markets Inc., Hydro One Telecom Inc., and Ontario Hydro Energy Inc.

May 1, 2002: Ontario opens its electricity market so that private companies can compete, allowing customers to choose between continuing to buy electricity from their electricity distributor or from an independent electricity retailer licensed by the Ontario Energy Board.

2003: The transmission grid is old, fragile, and composed of aging generation plants and coal stations causing air pollution. This poor infrastructure results in a blackout, which rolls through eastern Ontario in the summer. The government promises to strengthen the system.

2004: Electricity Restructuring Act is passed, aiming to reinvigorate the province's electricity sector in order to encourage new electricity supply, promote energy conservation, and provide stable prices at a level reflecting the true cost of electricity.

2004: Ontario Power Authority (OPA), an independent non-profit corporation, is established and charged with assessing the long-term adequacy of electricity resources, forecasting and managing demand, achieving targets set by government for conservation and renewable energy, and preparing an integrated electricity system

plan. Included in its mandate is facilitating the removal of coal in the province's energy supply mix.

2005: The Independent Marketing Operator (IMO) is renamed the Independent Electricity System Operator (IESO), and is an independent, not-for-profit entity, directed by a board of directors appointed by the government of Ontario. Its fees and licenses are set by the Ontario Energy Board.

2005: Ontario stimulates private investment in new electricity generation by offering new generators long-term fixed-price contracts at above-market rates.

2006: Government of Ontario imposes a charge (or rebate) on all electricity consumers called the Global Adjustment Charge (also known as the Provincial Benefit) to cover the difference between the market rate for electricity and what is paid to private electricity generators based on the fixed contracts. Customers buying electricity under the Regulated Price Plan, pay an estimate of the Global Adjustment, which is already built into the rate for electricity set by the Ontario Energy Board. Customers buying from an electricity retailer see the Global Adjustment displayed as a separate line item on their bill, based on their consumption.

Global adjustment charge subsidies between 2006 and 2011 inclusive:

45% nuclear generation

34% natural gas generation

8% energy efficiency programs & hydro generation

6.7% coal power plants

6% renewable energy generation (primarily wind and solar)

Global adjustment charge subsidies in July 2014*:

63% nuclear & natural gas generation

29% renewable energy generation (hydro, solar, biomass & landfill, wind)

6.7% conservation efforts

0.06% Industrial Electricity Incentive Program

*Based on reports provided by IESO.

2006: Renewable Energy Standard Offer Program is established, offering a number of fixed 20-year feed-in tariffs for hydro, wind, solar (PV) and biomass projects. This program would later be expanded under the Green Energy Act of 2009 to include higher rates and various changes to the connection process to simplify the development process.

2007: Ontario introduces its Climate Change Action Plan, which includes greenhouse gas emissions reduction targets. It is reported in 2014 that Ontario's greenhouse gas emissions have been reduced by 5.9% since 1990

2009: The Green Energy Act is passed, aiming to attract new investment, create green jobs, and provide clean renewable power to Ontario. The renewable energy Feed-in Tariff (FIT) Program is part of this legislation.

2010: The five-year Ontario Clean Energy Benefit is created, providing customers a 10% discount off the total cost of electricity charges on their bill. It is intended to help with the increased costs of updating infrastructure and implementing clean power sources.

2011: The Government updates its Supply Mix Directive to the Ontario Power Authority to include conservation targets, refurbishment of nuclear plants, continued phase-out of coal-powered generation, increased capacity of renewables, etc.

2012: Electricity rates for consumers continue to rise due to system upgrades, generation plant refurbishments, investments in transmission and distribution costs, conservation and renewable energy efforts, and the replacement of coal-fired power.

2012: Industrial Electricity Incentive Program is created to use up surplus energy produced in Ontario by encouraging businesses to ramp up their industrial production in exchange for discounted electricity rates.

2013: Ontario's Long-Term Energy Plan is released, detailing five principles: cost effectiveness, reliability, clean energy, community engagement, and emphasis on conservation and demand management.

2013: Import and export of surplus Ontario electricity is a hot issue, with the province exporting a large amount of its energy to neighboring provinces and states at rates that do not include the Global Adjustment charged to Ontarians.

2014: Over 1,900 MW of new wind, solar, biofuel and hydro power is being fed into the province's transmission and distribution systems.

January 1, 2015: The Ontario Power Authority (OPA) merges with the Independent Electricity System Operator (IESO) to create a new organization combining both mandates, under the IESO name.

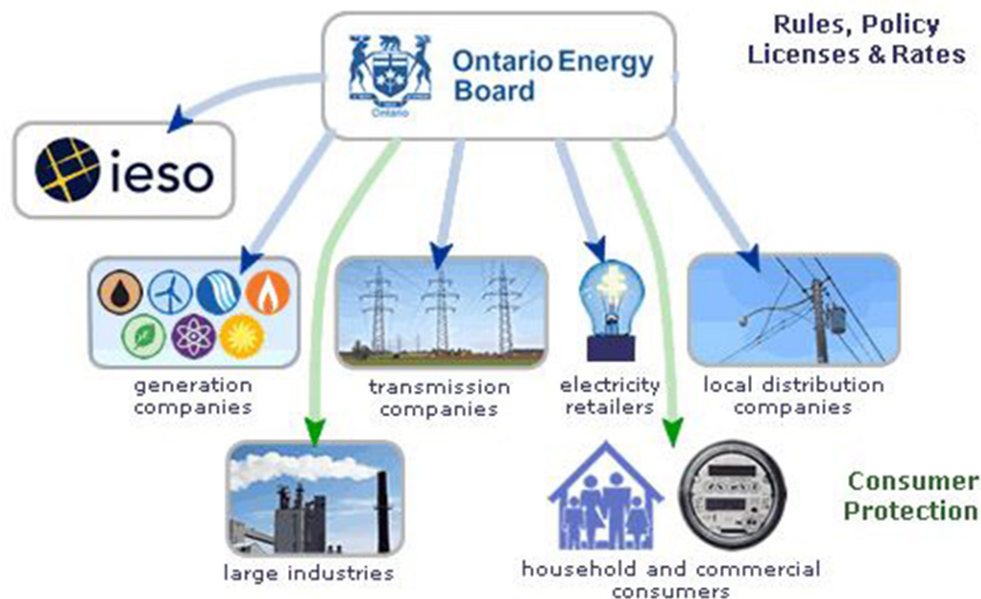
Spring 2015: The Debt Retirement Charge (DRC) is still being paid by customers at a rate of 0.7 cents per kilowatt-hour of electricity consumed (about \$70 per year for most consumers). The government announces plans to remove the DRC cost from residential electricity bills after December 31, 2015. The stranded debt is still over \$2.5 billion.

Fall 2015: Electricity prices are raised by the Ontario Energy Board. Reasons cited for the rate hike: increased costs from Ontario Power Generation (OPG) nuclear and hydro-electric power plants, expenses related to renewable energy generation systems, and cost-recoveries sought by the OPG.

2. How Rates Are Set

a) Utility Regulation: History, Standards and Benefits

Structure of Utility Regulation



As a regulated customer-owned utility, Cooperative Hydro Embrun provides services that are important to our town. These services and their costs are regulated by the Ontario Energy Board.

Why is the energy sector regulated?

Most industries in Canada are subject to some form of regulation governing what they can and cannot do. The energy sector, however, is more closely regulated than many other industries because of the unique characteristics surrounding energy supply and delivery.

For example, unlike other industries in which there are numerous companies competing to sell their products and services, electricity and natural gas distribution and transmission are considered to be “natural monopolies.” This is due, in part to the inefficiency of having duplicate facilities. Natural monopolies include infrastructure industries, such as electricity and natural gas delivery that are capital intensive and vital services. Since there is a significant economic “barrier to entry” in initially constructing the infrastructure, there is little or no competition and a firm in a natural monopoly position could price its products and services significantly above costs.

The primary goal of energy sector regulation, therefore, is to ensure that the public good is served in a marketplace that is not competitive.

What Does Regulation Do?

Through the regulatory process, the OEB strive to balance the need of customers, the LDC and customers. Regulation helps ensure:

- Consistent standards for safety and quality of service
- Safe and reliable electricity at just and reasonable rates
- Balanced interests for customers and shareholders by setting rates that give the LDC an opportunity (though not a guarantee) to earn a reasonable return on its investment after recovering prudently incurred expenses

How is Cooperative Hydro Embrun Regulated?

Regulation begins with established standards for safety and quality of service.

Regulations established by the OEBs cover a wide range of areas and issues, including:

- Billing practices
- Reliability monitoring
- Renewable energy
- Rate and other charges

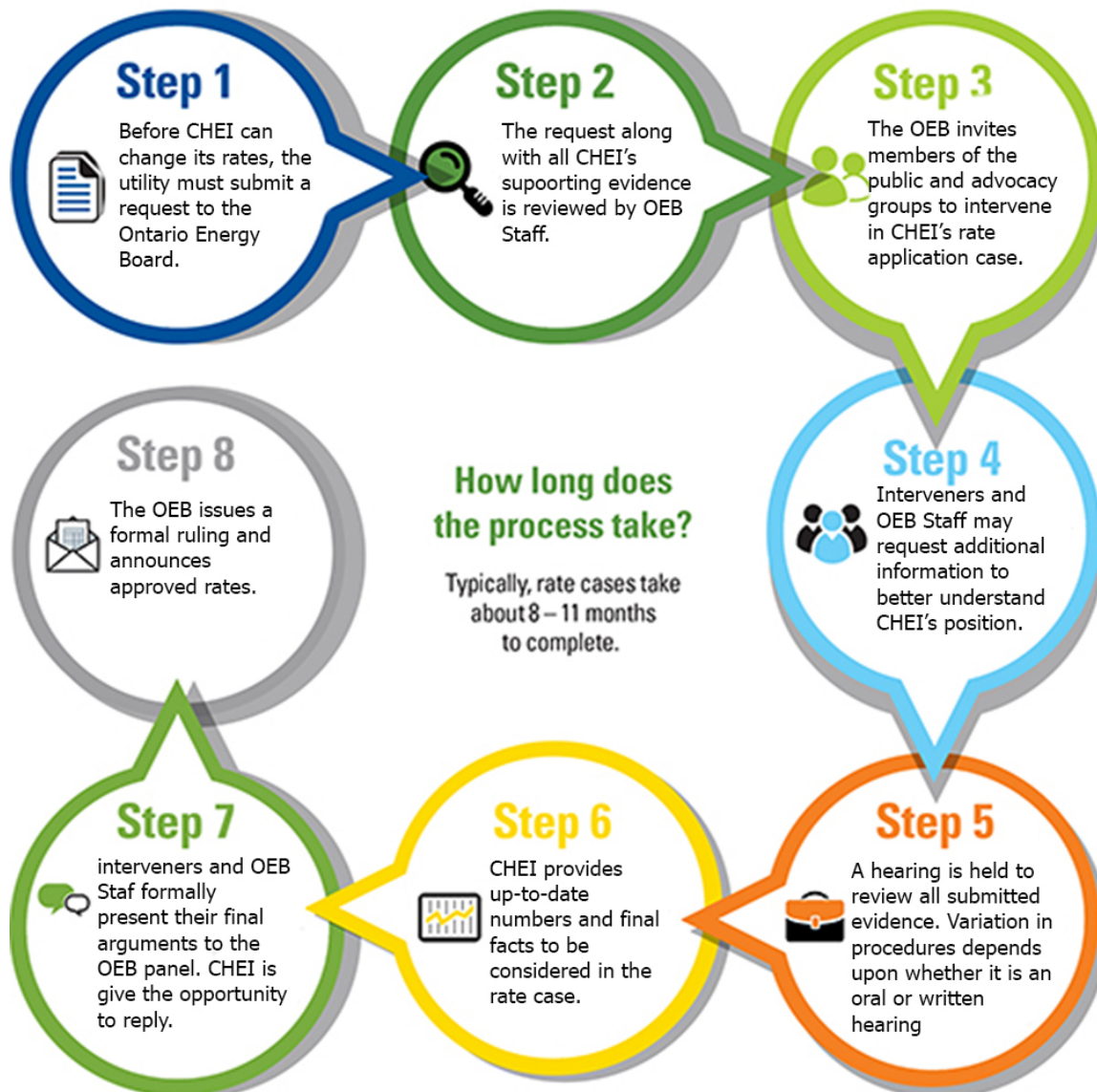
The OEB Staff provides oversight and perform investigations to ensure companies comply with those standards.

LDCs can propose prices that cover its costs and provide an opportunity to earn a fair return on investment. Those prices, or rates, are reviewed and approved by the OEBs through a legal rate case process rather than market forces. Rates provide the revenue needed to cover both business operations and the service debits incurred in building out the system. Operation costs include the maintenance of electric distribution and transmission, administration and the costs to provide for skilled workers who maintain the distribution system. All these efforts are in place to ensure we can continue to provide safe, reliable and affordable electricity to our customers.

b) Ratemaking 101: What Goes into the Ratemaking Process

Before Cooperative Hydro Embrun can increase rates, Cooperative Hydro Embrun must complete a process called a rate case. The rate case process gives the regulator, advocacy groups and the public the opportunity to review the request and learn why Cooperative Hydro Embrun has requested a rate increase.

Electric utility rate case process at a glance



What are interveners? Advocacy in Ontario's Energy Sector

While Ontario does not have a public consumer advocate, energy consumer organizations are still active in OEB hearings. The OEB Act (1998) provides an opportunity for interested parties to participate in administrative hearings and processes by presenting arguments and evidence, providing expert witnesses, and by challenging utility arguments. The OEB compensates such intervenors, funded through assessments levied on utilities, for expenses and professional fees. From April 2014 to March 2015 intervenor cost awards totaled \$5.25 million, funded through regulated rates. Table 1 lists the most active intervenors in order of cost awards received. They are mainly large purchasers of electricity or natural gas, power producers, environmental groups, vulnerable customer advocates, and commercial/rental property owners. Intervenors representing residential consumers account for a minority of overall intervenor cost awards.

Table 1. Intervenors in Ontario Energy Board Hearings (April 2014 – March 2015) .

Intervenor	Number of awards	Total cost awards
School Energy Coalition	27	\$933,125.36
Vulnerable Energy Consumers Coalition	60	\$701,177.58
Canadian Manufacturers & Exporters	25	\$691,782.82
Energy Probe Research Foundation	38	\$610,690.70
Building Owners & Managers Association	17	\$438,548.66
Consumers Council of Canada	16	\$328,779.15
Association of Major Power Consumers in Ontario	7	\$285,982.09
Association of Power Producers of Ontario	8	\$270,447.80
Federation of Rental-Housing Providers of Ontario	11	\$227,440.12
Industrial Gas Users Association	15	\$186,111.45
Total		\$4,674,085.73

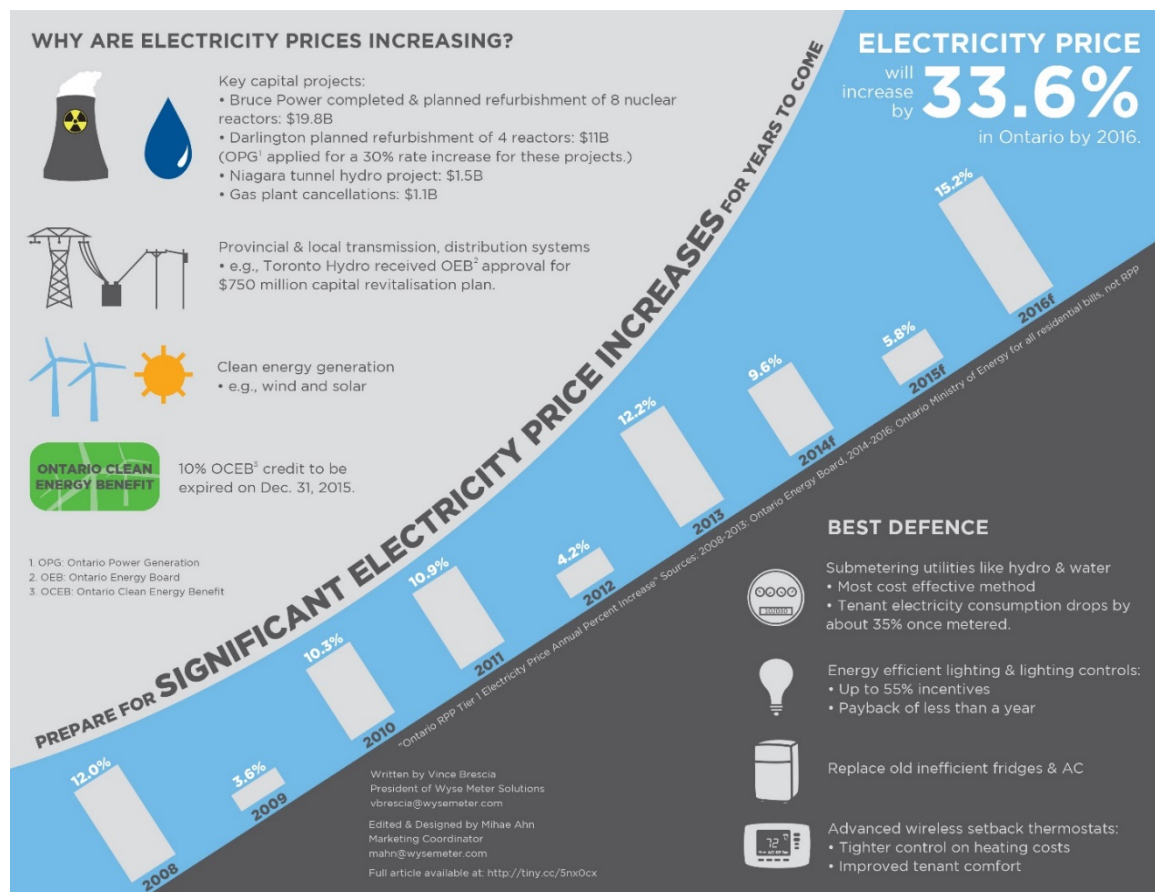
c) Electricity's Cost Drivers: Factors that Affect Rate Pricing

Many factors drive the cost of providing electricity to our customers, including the cost to generate and deliver it.

Electricity rates reflect a number of components, including fuel costs, transmission, facility investments and environmental compliance. The prices paid for these components vary over time; the costs to install and operate other components represent additional operational expenses.

Commodity Prices (Electricity Pricing)

Increased costs from Ontario Power Generation (OPG) nuclear and hydro-electric power plants, expenses related to renewable energy generation systems, and cost-recoveries sought by the OPG.



Global Adjustment

Global Adjustment (GA), which is a non-market surcharge set by the province to fund payments to electricity producers for above-market revenue guarantees:

In 2015, the average HOEP was 2.36 cents per kilowatt hour, while the IESO paid wind producers as much as 13 cents per kilowatt hour. The remaining 11-cent difference was then passed on to the consumer in the form of the Global Adjustment fee.

Solar producers, many of which signed contracts with the government for as long as 20 or 30 years, were paid as much as 80 cents per kilowatt hour for the energy they produced, despite the fact that fair market value for this energy was the same 2.36 cents per kilowatt hour. Here, too, the 78-cent difference was passed on to consumers

The easiest way to explain it, said Gallant, is that when energy consumption drops due to conservation, the Global Adjustment fee must be increased to make up the difference. So the less power Ontarians use, the higher their electricity costs must be in order to cover the minimum revenues energy producers are guaranteed.

Grid Upgrade and Modernization

It's necessary to provide constant maintenance and upgrades of Ontario's electric infrastructure.

- The grid needs constant upkeep to maintain safe, consistent service.
- Upgrading the grid improves reliability and helps reduce outages related to aging infrastructure.

Transmission Costs

Building additional transmission capacity is necessary to ensure that electricity gets from the generating plants to the customers who require it.

Other Factors

A variety of other factors also affect the cost of electricity, including:

- Provincial conservation mandates

- Meeting electricity safety standards
- Increased regulatory costs
- Inflation in the price of goods and materials
- Increase in fees levied by others and passed through to the customer on the electric bill

d) Rate Pricing History

Rate Year	Monthly Service Charge	Volumetric Rate	kWh	Distribution Rate	Rate Increase	Note
2016	\$18.25	\$0.0106	1000	\$28.85	0.98%	IRM
2015	\$14.77	\$0.0138	1000	\$28.57	1.46%	IRM
2014	\$14.56	\$0.0136	1000	\$28.16	6.26%	Cost of Service
2013	\$13.70	\$0.0128	1000	\$26.50	0.65%	IRM
2012	\$13.63	\$0.0127	1000	\$26.33	0.84%	IRM
2011	\$13.51	\$0.0126	1000	\$26.11	0.08%	IRM
2010	\$13.49	\$0.0126	1000	\$26.09	12.41%	Cost of Service
2009	\$12.81	\$0.0104	1000	\$23.21	4.13%	IRM
2008	\$11.99	\$0.0103	1000	\$22.29	0.04%	IRM
2007	\$11.98	\$0.0103	1000	\$22.28	0.91%	IRM
2006	\$11.88	\$0.0102	1000	\$22.08	-1.87%	Cost of Service
2005	\$10.10	\$0.0124	1000	\$22.50	7.60%	RUD model
2004	\$11.01	\$0.0099	1000	\$20.91	12.36%	RUD model
2003	\$11.01	\$0.0076	1000	\$18.61	0.00%	RUD model
2002	\$11.01	\$0.0076	1000	\$18.61	18.08%	RUD model
2001	\$9.36	\$0.0064	1000	\$15.76	3.41%	RUD model
2000	\$9.04	\$0.0062	1000	\$15.24		

Cost of Service: this is a more complex review in which utilities apply for rates based on how much it costs them to deliver electricity and serve their customers

IRM is an simple formulaic rate increases - typically less than inflation. This encourages the utilities to manage their costs efficiently. This approach uses a formula that accounts for inflation (Gross Domestic Product-Implicit Price Index) and encourages productivity improvements.

e) The Different Components of Your Electricity Bill

The electricity bill for a residential Ontario consumer contains several components:

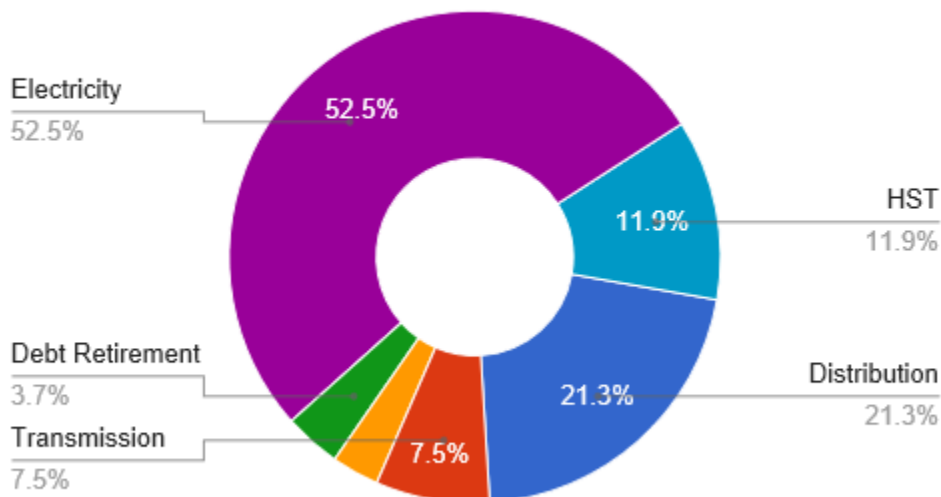
Electricity Charges: The electricity supply may be priced at different rates if you are on the RPP. Blended into the RPP rates, or charged separately if you are on a retail contract, is the Global Adjustment, which varies monthly.

Delivery Charges: This includes the costs of both electricity transmission and distribution. Some charges are fixed, and some vary depending on the amount of electricity consumed. These charges include a customer service charge, a distribution charge, and a transmission charge. All charges are approved by the OEB.

Regulatory Charges: This includes charges to cover the cost of the services provided by the Independent Energy System Operator (IESO), and some renewable energy-related costs acquired by local utilities. These charges are part of the Wholesale Market Service Charge, which is approved of by the OEB. Also included in regulatory charges is a Standard Supply Service Charge, which covers a portion of the administrative costs for local utilities to supply power to those on the RPP

Tax: electricity bills are subject to the HST

Cost per kWh, for 800 kWh consumption



f) Does it Make Sense to Switch to an Electricity Retailer?

Saving money on your monthly expenses is important to you and your family, and one way to save is by reducing your household electricity bill. You are presented with different choices when it comes to purchasing electricity, and we want you to understand each option,

Purchase Electricity from your Local Hydro Utility

You may choose to buy your electricity through Cooperative Hydro Embrun's Regulated Price Plan (RPP), Tiered pricing or Time-of-Use pricing.

If you decide to buy your hydro from your local utility, the electricity rate that you pay is set by the government of Ontario (the RPP rate). This price generally changes every 6-months, on May 1 and November 1.

Since 2009, utilities across Ontario replaced meters used by residential customers to introduce Time-of-Use meters, so called, "Smart Meters". The utility companies use a different pricing formula for customers with time-of-use meters, since these meters can not only report on how much electricity you use but also when you use it. 90% of Ontario's Hydro users are now billed based on time-of-use.

The main points of the RPP are:

- You are charged a regulated price per kilowatt hour (kWh) by Cooperative Hydro Embrun for the electricity you consume.
- The price is set by the Ontario Energy Board, the independent regulator of Ontario's energy sector, and remains stable for the summer and winter season for RPP and stable throughout the year for Time-of-Use rates.
- Cooperative Hydro Embrun does not earn a profit on the electricity it purchases for you.
- You pay the cost of the electricity that Cooperative Hydro Embrun buys in the market or Hydro One on your behalf.

You may also choose to buy your electricity from an electricity retailer. Electricity retailers purchase large "blocks" of wholesale electricity from power generating companies, and then sell it to consumers.

Purchase Hydro from an Ontario Electricity Retailer

Ontario Electricity Retailers cater to consumers who want longer term electricity price protection. Electricity retailers in Ontario can provide a fixed electricity rate for up to five years. For residential consumers, electricity retailers generally offer one fixed price per kWh, regardless of when the electricity is used and how much hydro is consumed.

When comparing fixed electricity rates offered by energy retailers with the RPP rate charged by your local utility there is one very important difference that you must be aware of known as the Global Adjustment. All of the extra fees on your hydro bill (such as delivery fees, admin, debt retirement, etc.) will generally be the same regardless of whether you purchase hydro from your local utility or an electricity retailer. The one exception is the Global Adjustment. This will be added to you bill only if your electricity is supplied by a retailer (since this charge is already embedded in the RPP rate). Take a look at this chart which shows some historical Global Adjustment rates.

The main points of a retailer contract are:

- You pay the retailer a "fixed-price per kilowatt-hour", as mutually agreed upon in a contract offered by the retailer;
- The price offered is typically guaranteed for a specified number of years, although in some cases the price could change during the contract period.

Make sure you know what you're agreeing to

We recommend that you do the following before signing a contract to purchase electricity from companies other than Toronto Hydro:

- Ensure the retailer is licensed by the Ontario Energy Board to sell electricity. This can be verified on the OEB website.
- Read the contract offer carefully so you are aware of all terms and conditions.
- Find out what price the retailer is charging for electricity
- What are the administration costs? Look for them and other additional costs on top of the commodity charge to get the full picture of what you're signing up for.
- Discuss the contract termination process and any charges you might be responsible for, as well as the terms for contract renewal.
- Ask questions if anything is unclear.