

Energy in Ontario: A Primer for AMO Members

January 2017

Overview

Energy is generated in Ontario from various sources, and includes public and private companies. There are three major components of the system: generation (producing the power), transmission (getting the power across the province through high-voltage lines) and distribution (piping the power into homes and businesses).

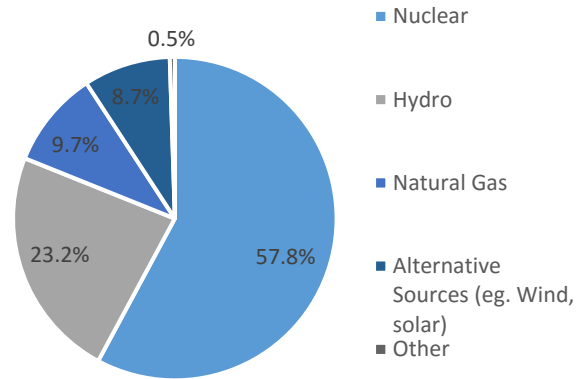
The primary form of energy is electricity, which is generated from nuclear, hydro, natural gas, and renewable sources. Ontario Power Generation manages the production of the majority of electricity in Ontario, which is complemented by private power generation companies. Electricity passes through Ontario's five transmission companies (the largest being Hydro One) which move it from generation sites to distribution companies, many of which are municipally-owned. Local distribution companies (LDCs) own and operate the distribution networks that take electricity from the transmission system or other local sources of generation and deliver it to consumers. Most large municipalities, and many small ones, have their own municipally-owned LDC, such as Hydro Ottawa. Ontario has approximately 70 municipally-owned LDCs of widely varying size, sophistication and capabilities. In areas not served by a LDC, Hydro One is the local distributor.

Energy is also produced from natural gas for heating and cooling, which is provided through the private market. There are two major natural gas distributors, Enbridge and Union Gas, both of which may be owned by the same parent company in the coming year. The current duopoly is regulated by the Ontario Energy Board (OEB).

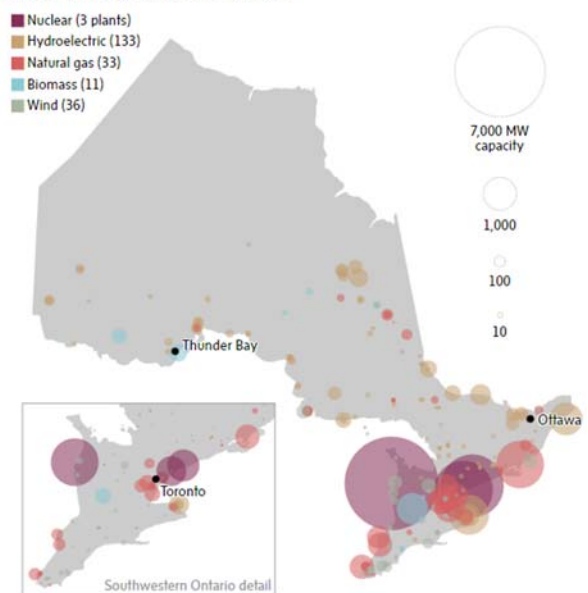
The production, transmission, and distribution of energy is planned for and managed by the Ontario Ministry of Energy, the Independent Electricity System Operator (IESO), and the Ontario Energy Board.

- The Ministry of Energy sets the policy direction, with technical input from IESO, and produces a Long-Term Energy Plan. The current Plan was established in 2013, and it is currently under revision.
- IESO is a crown corporation and is responsible for regional energy planning in the province, through its 21 planning regions. It undertakes planning for electricity generation, demand management and conservation, price oversight, and creates a technical plan to inform the Ministry's policy direction. IESO is also responsible for electricity wholesale, which involves coordination with neighbouring jurisdictions as part of an integrated North American electricity market.
- The Ontario Energy Board approves the IESO's technical plan, provides licenses to market participants, including IESO, generators, transmitters, distributors, wholesalers, and electricity retailers, sets electricity rates, and oversees the IESO's planning process.

Electricity Generation in Ontario (Source: Ontario Energy Board, 2015)



Ontario's power generation infrastructure

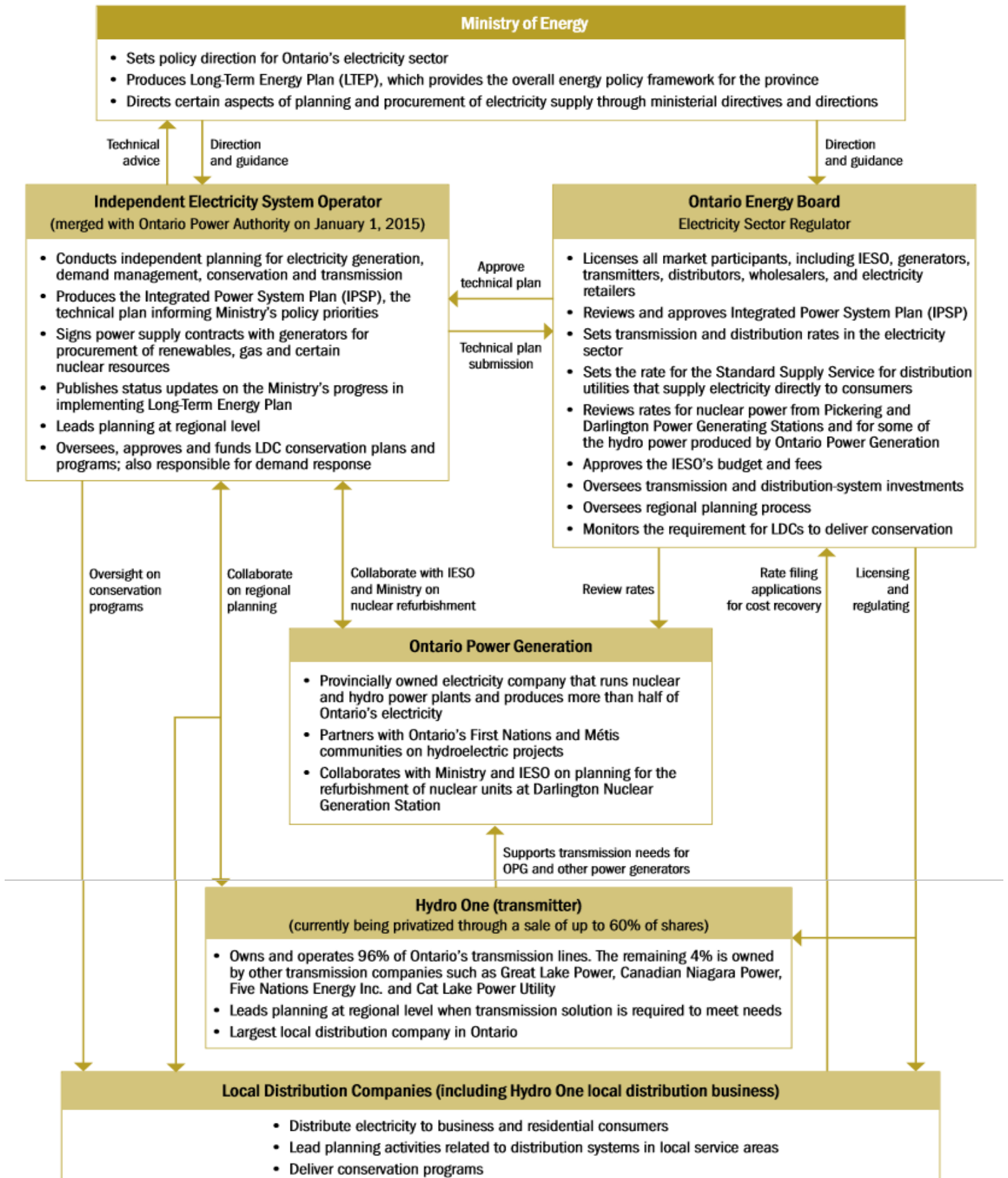


Note: Data last updated by the Canadian Electricity Association on Jan. 3, 2013. Capacity scale applies only to main map.

THE GLOBE AND MAIL. SOURCE: CANADIAN ELECTRICITY ASSOCIATION

Figure 1: Roles and Responsibilities of Key Entities Involved in Electricity Power System Planning

Prepared by the Office of the Auditor General of Ontario



Source: Ontario Auditor General Report, 2015

Other Key Players

Municipal Governments: Prepare and implement mandatory corporate energy Conservation and Demand Management (CDM) plans, own local distribution companies, use energy in the operation of public facilities, advocate for the energy concerns of their residents, participate in development of the Long-Term Energy Plan, and participate in regional electricity planning. Some also prepare and implement community energy plans, or participate in market based commodity procurement, such as that offered by AMO's Local Authority Services (LAS).

Local distribution companies (LDCs): Entities that own a distribution system for the local delivery of energy (gas or electricity) to consumers. Ontario has the largest number of LDCs in Canada, at approximately 70, some of which serve as few as 1,200 people. In some cases, multiple LDCs serve residents in a single municipality. LDCs are licensed by the Ontario Energy Board (OEB), which also requires them to prepare conservation plans.

Electricity Distributors Association (EDA): The EDA is an incorporated not-for-profit entity with members encompassing approximately 70 regulated electricity distribution companies in Ontario, as well as commercial partners, affiliated companies, and associated entities.

National Energy Board: an independent federal regulatory tribunal established in 1959 which regulates pipelines that cross international borders or provincial boundaries, international and inter-provincial power lines, imported gas, and oil and gas exploration and production activities in Canada. It conducts environmental assessments during the review of applications for facilities and activities, and monitors energy supply, demand, production, and trade.

Ontario Electricity Financial Corporation (OEFC): In Ontario, electricity utilities that are at least 90% publicly owned are exempt from corporate taxes. Instead, they pay Payments in Lieu of Taxes (PILs) to the OEFC. PILs which replicate federal and provincial corporate taxes and property taxes payable by private sector companies, are used to help pay down the stranded debt of the former Ontario Hydro.

Non-Utility Generators (NUGs): Private power developers (the largest being Bruce Power) that supply the non-OPG portion of electricity generation in Ontario.

Municipal Issues in Ontario Energy

Municipal concerns about energy are two-fold. First, as large consumers of energy for public facilities, energy prices impact municipal budgets. Second, energy policies impact large industrial consumers and residential customers, who are both critical ratepayers in the community.

Costs

As large consumers of energy for public facilities, energy prices hit the municipal bottom line. Energy policies also impact large industrial customers, who are critical ratepayers in the community.

Energy in Ontario is more expensive compared to other provinces, but not as expensive as it is in the United States and Europe. The cost of electricity in Ontario is 13.2 cents/kWh, compared to 7.381 cents/kWh in Manitoba, and 5.71 cents/kWh in Quebec. This equates to an approximate median cost of \$130 for a residential bill in Ontario, compared to \$227 in New York, and \$65 in Winnipeg.¹ Off-peak rates in Ontario have increased by 149% in the past ten years, which is significant, considering that inflation during that period was 18%.² Businesses and families in Ontario's municipalities, particularly those in northern Ontario, also face significant challenges as energy costs increase. For residents and social housing providers, high energy prices can lead to housing insecurity. Across the province, high energy rates and connection fees are resulting in a negative impact on attracting and retaining industry. Some businesses have left for neighbouring jurisdictions with lower energy prices. From 2004 to 2014, the amount that residential and small-business electricity consumers pay for the electricity commodity portion (includes Global Adjustment fees) of their bill increased by 80%, from 5.02 cents/kWh to 9.06 cents/kWh.³

¹ Adrian Morrow and Tom Cardoso, "Why does Ontario's electricity cost so much? A reality check," The Globe and Mail, January 9, 2017.

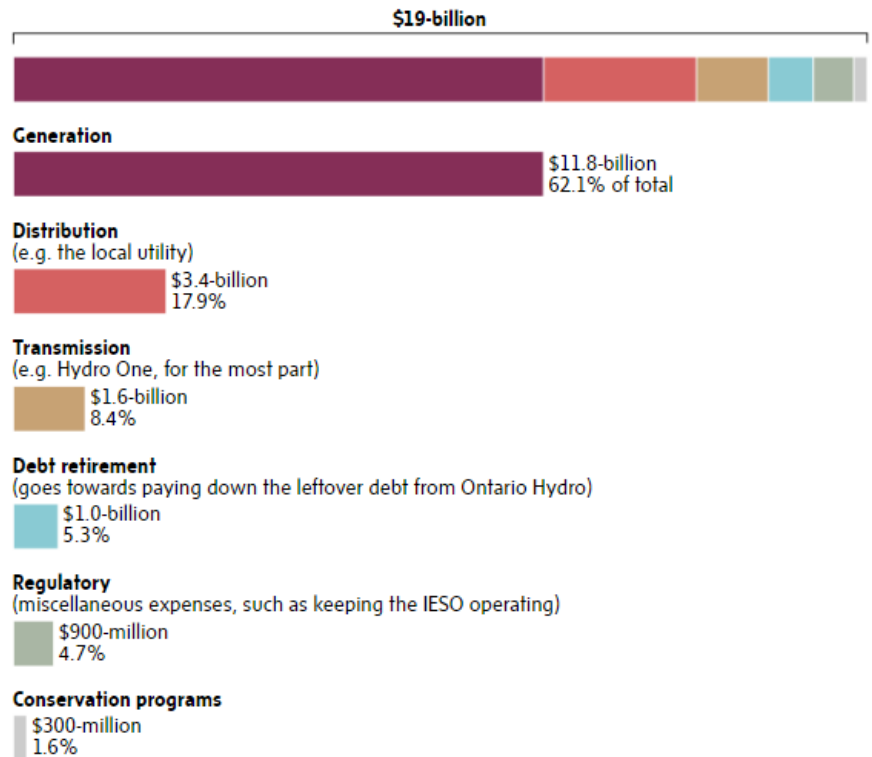
² Morrow and Cardoso, 2017.

³ Ontario Auditor General Report, 2015.

Electricity bills include more than the cost for energy used. Charges include:

- Global Adjustment: covers the difference between the market rate for electricity and what is paid to private electricity generators based on fixed contracts, which may include capital costs,
- Distribution and transmission: these are delivery charges, which are transitioning to a fixed charge over the next four years,
- Debt Retirement Charge: pays down the debt of the former Ontario Hydro (residential and small general service customers are exempt from this charge since January 1, 2016),
- Regulatory charge: covers the cost of IESO to plan and administer the wholesale electricity system and maintain the reliability of the provincial grid, the cost of the Rural or Remote Rate Protection which keeps distribution rates in rural and remote parts of the province at levels similar to those paid by the rest of the province, and some of the cost of connecting renewable generation to the distribution grid.

Cost components of Ontario's electricity system, 2014



THE GLOBE AND MAIL, SOURCE: OFFICE OF THE AUDITOR GENERAL OF ONTARIO

Pricing also includes a pricing model based on demand, which higher charges for energy used in times of high demand, and lower charges in off-peak times.

Electricity cost increases are a result of a number of factors, including:

- Upgrade costs for aging infrastructure and importing electricity to fill the need during the upgrades,
- Paying private companies to build power plants through twenty-year fixed deals, which includes payments for surplus, unused energy,
- Costs associated with the conversion of coal plants to biomass facilities,
- Debt retirement for Ontario Hydro's over-budget nuclear construction projects,
- High Feed-In Tariff (FIT) rates for wind and solar generation,
- Lack of capacity to connect renewable generators,⁴
- Conservation efforts during surplus power periods, leading to expensive electricity curtailments and exports,⁵
- Steady electricity demand across the province. If demand grew, fixed costs (which make up the most significant share of electricity system costs) would be shared between more users, resulting in a lower cost per user.

Ontario gas prices are set at the Dawn Hub, a natural gas storage facility in southwest Ontario. Dawn Hub prices follow Henry Hub (U.S.) prices, especially as American shale gas comprises a large percentage of supply.⁶ Natural gas prices are expected to stay stable and low in the coming years; however, global demand for natural gas is growing.⁷ While natural gas is a low-cost heating option, access is limited in rural and northern Ontario, which is a concern in many communities.

Provincial Cost Mitigation Efforts

The Ontario government has recently introduced a number of cost mitigation initiatives. These include:

⁴ Ontario Auditor General, 2015.

⁵ Ontario Auditor General, 2015.

⁶ Mowat Institute, Background Report on the Ontario Energy Sector, 2016.

⁷ Mowat Institute, 2016.

- Rural or Remote Rate Protection: keeps distribution rates in rural and remote parts of the province at levels similar to those paid by the rest of the province, and some of the cost of connecting renewable generation to the distribution grid.
- Sale of Hydro One shares: Beginning in 2015, the Ontario government sold shares of Hydro One. To date, 30 percent of the company has been sold on the stock market to fund transit plans and to pay down debt.
- *Ontario Rebate for Electricity Consumers Act, 2016*: reduces electricity costs by eight percent on the amount before tax for residential consumers, farms, and small businesses (including some small municipal accounts), with additional reductions for rural electricity consumers.
- Ontario Electricity Support Program: subsidises electricity bills for low-income Ontarians.
- In 2013, the Ontario government decided to stop building more nuclear reactors, which resulted in reduced energy prices.

Shift to a Low-Carbon Economy

In the past years, the provincial government has introduced policy initiatives based on energy conservation and increasing the use of renewable energy sources. These include the *Green Energy Act, 2009* (including the Large Renewable Procurement program, 2015-2016) and the Climate Change Action Plan (2016-2020). IESO requires LDCs to develop conservation plans to achieve reduction targets.

- The *Green Energy Act, 2009* was intended to expand renewable energy production, encourage energy conservation, and create green jobs. It created feed-in-tariff rates for different types of energy sources, including the microFIT program for small non-commercial systems under 10 kilowatts and FIT, the larger commercial version which covers a number of project types with sizes in the megawatts.
- The Large Renewable Procurement program, which replaced the large Feed-In Tariff (FIT) program, covers renewable energy projects generally larger than 500 kilowatts (kW) and was designed to balance between community engagement and achieving value for ratepayers. The most recent phase of the program was cancelled, on the basis of an understanding of high cost and excess production.
- The Ontario Green Button Initiative allows consumers to access their electricity data and securely share their data with apps, so they can make informed decisions and take action on energy conservation.
- The Climate Change Action Plan established targets to reduce greenhouse gas emissions in the transportation, industry, buildings, and other sectors between 2016 and 2020. This will require increased use of renewable energy sources and conservation efforts.

Some municipal governments have already developed plans to reduce greenhouse gas emissions, increase renewable energy sources, and increase conservation. Others will need support to understand how to achieve these goals, and to support the transition. The shift towards a low-carbon economy could provide opportunities for municipal governments in terms of cost savings, and the ability to use local assets such as agricultural biomass and residential organic material or solar exposure to respond to local energy needs.

Municipal Energy Planning and the Future

Some municipal governments have developed energy plans to work towards conservation and energy infrastructure planning. Some municipal governments lack the staff, technological capacity and financial resources to develop energy management plans. There is a provincial grant to assist with municipal energy planning, but since municipal governments must pay a share, it remains unattainable for some.

On the provincial scale, AMO has recommended that to improve planning, electricity, natural gas, and other sources of energy should be planned for in an integrated manner, on a long-term basis. A life-cycle cost analysis should be undertaken for energy projects, to demonstrate to Ontarians the costs and benefits of planned investments, and how specific projects fit into our energy system. No cost-benefit analysis has been undertaken for the Ministry of Energy's planning initiatives in 2010 and 2013. Local generation projects should be supported to meet local community energy needs, recognizing that municipal ownership of energy generation and distribution reduces the need to transmit power long distances, creates local jobs, keeps energy dollars in the local economy and contributes to a stable energy system.

AMO and LAS are working to create opportunities to meet both cost and low-carbon goals. This includes changes to LED lighting and electric vehicle fleet management tools.

Key Events Relating to Electricity System Planning in Ontario

(Source: Adapted from Auditor General's Report 2015)

1998	The <i>Ontario Electricity Act, 1998</i> , repeals the <i>Power Corporation Act</i> and ends the life of Ontario Hydro. Hydro One is created instead. The Act also creates the IESO. Changes are made to the <i>Municipal Act</i> , with the effect of consolidating a large number of municipalities and consequently reducing the number of municipal utilities.
2004	Government passes <i>Electricity Restructuring Act (Act)</i> . Act renames Independent Electricity Market Operator the Independent Electricity System Operator (IESO) and amends IESO's duties to short-term forecasting of electricity demand and resources only. Act also creates Ontario Power Authority (OPA) to address long-term power system planning issues and conduct independent planning for electricity generation, demand management, conservation and transmission. OPA is tasked with developing an integrated long-term electricity plan (IPSP), a 20-year technical plan for achieving the province's energy goals. OPA is to submit IPSP to Ontario Energy Board (OEB) for review and approval and update the plan every three years.
2005	OPA issues Supply Mix Advice Report to Minister of Energy.
2006	Minister of Energy issues first Supply Mix Directive to OPA. The Global Adjustment Fund (GAF) is created by the Ontario Energy Board, as directed by the premier to cover the difference between the market rate for electricity and what is paid to private electricity generators based on fixed contracts. The GAF now costs customers seven cents per kWh, a charge on top of the three cents it actually costs to generate power.
2007	OPA submits first Integrated Power System Plan (IPSP) to OEB.
2008	OEB suspends its review of IPSP in October after Minister of Energy issues amended Supply Mix Directive in September. Global recession begins toward the end of 2008.
2009	<i>Green Energy Act</i> encourages renewable energy generation, energy conservation, and creation of clean energy jobs. Ontario launches Feed in Tariff (FIT) Program.
2010	Minister of Energy releases first Long-term Energy Plan (LTEP).
2011	Minister of Energy issues new Supply Mix Directive and directs OPA to prepare updated IPSP. OPA forwards draft IPSP to Ministry for review but it is never submitted to the OEB.
2012	In April, Minister of Energy introduces legislation to merge OPA and IESO and change the process for long-term power system planning. Merger is put on hold when Premier resigns in October.
2013	Minister of Energy releases updated LTEP.
2014	Bill 194, an act to implement budget measures, is introduced, calling for OPA and IESO to be amalgamated. Coal is eliminated as an energy source in Ontario.
2015	January 1, 2015: <i>Electricity Act, 1998</i> , is amended and post-merger IESO is tasked with power system planning for Ontario. June 4, 2015: The government passes the <i>Building Ontario Up Act</i> , under which Hydro One Inc. and its subsidiaries are deemed not to be agencies of the Crown. As such, as of December 2015, no independent Officer of the Legislative Assembly has the authority to oversee Hydro One's operations (for example, the Auditor General can no longer conduct performance audits of Hydro One or its subsidiaries). November 2015: Shares of Hydro One are sold.
2016	The Province cancels the Large Renewable Procurement program intake in order to reduce energy cost increases. Darlington nuclear energy is closed for refurbishment until 2026. <i>Ontario Rebate for Electricity Consumers Act</i> reduces electricity costs by eight percent on the amount before tax for residential consumers, farms, and small businesses. Additional reductions will be provided to rural electricity consumers. Ontario and Quebec sign an agreement according to which Quebec will store hydroelectric power until Ontario needs it, and Ontario will buy electricity from Hydro Quebec for the next seven years to cover the energy generation lost from the closing of the Darlington nuclear energy plant.