

THE PAST, PRESENT AND FUTURE OF ENERGY CONSERVATION IN ONTARIO

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This article summarizes the key components of Ontario's past and present activities in energy conservation. It then uses this background to identify some of the likely key elements and drivers of future activities. Before going further, it is useful to first define energy conservation and identify some of its distinctive challenges as well as its major benefits.

Different jurisdictions use various terms such as energy efficiency, energy conservation, demand response, demand side measurement (DSM), conservation and demand management (CDM). For the purposes of this article, energy conservation is the all-encompassing term that includes the following three main elements:

- **conservation behaviour** – using existing technology more efficiently (eg a light switch and programmable thermostat)
- **energy efficiency** – using more energy efficient technology (eg LED light bulbs and LEED buildings)
- **demand response** – using less energy at peak periods (eg using electrical appliances at off-peak periods or shedding industrial load at on-peak periods)

In comparison to the much higher profile

associated with energy supply, conservation suffers from a few challenges. Most importantly, it is hard to see: it is in the walls and inside appliances. It is also harder to measure than energy supply, but can be done using widely accepted protocols. And it requires all sectors to participate. But the benefits to society are too important to ignore. As we currently waste approximately 68 per cent of the primary energy consumed,¹ the potential is huge. The environmental benefits of not using energy in the first place are obvious. Not so obvious are the economic and employment benefits. A recent study conducted for NRCan found that the most aggressive conservation scenario would result in an increase in GDP of \$582 billion, add up to 350,000 people to the workforce, grow provincial tax revenues by \$2.7 billion and cut CO₂ emissions by 92 MT/year over the next 15 years.²

Those who have tried to follow the evolution of electricity conservation in Ontario over the last ten years can be excused for being confused, as there have been four distinct initiatives:

- Ontario Energy Board (OEB) Third Tranche funding for Local Distribution Companies (LDCs)
- Ontario Power Authority (OPA) programs that were delivered by LDCs

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1 Sankey Diagram of Canada's Energy Systems, *Canada's Energy Systems in 2010*, online: Canadian Energy Systems Analysis Research (CESAR) < <http://www.cesarnet.ca/visualization/sankey-diagrams-canadas-energy-systems?scope=Canada&year=2010&modifier=none&display=value&hide=all&scalevalue=0.014651030728638501>>.

2 Leslie Malone et al, "Energy Efficiency: Engine of Economic Growth in Canada – A Microeconomic Modeling & Tax Revenue Impact Assessment" (March 2014), online: Acadia Center/ENE <http://acadiacenter.org/wp-content/uploads/2014/10/ENE_ExecSummary_EnergyEfficiencyEngineofEconomicGrowth_EasternCanada_EN_2012_0611_FINAL2.pdf>.

as well as other channel partners

- Ontario Ministry of Energy which drove the province-wide roll out of smart meters
- LDCs whose programs will be approved by the Independent Electricity System Operator (IESO who were merged with OPA) and whose targets will be monitored by the OEB

This article will put these and other initiatives into a historical context and will use the experience gained from them to identify key elements of future initiatives.

THE PAST

Although not documented, it would be safe to assume that before the use of fossil fuels, First Nations and early settlers did their best to conserve energy as they had to cut firewood, walk/paddle or feed animals to keep warm and move about. The adoption of s. 92A (1) of the *Constitution Act, 1867*, by way of the 1982 amendments specifically assigned the provinces with the jurisdiction to legislate on matters relating to non-renewable and forestry resources which includes conservation.³ This is part of the reason why this article is focussed on Ontario. The World Wars brought increased attention to the need to conserve food, resources and energy with gasoline rationing introduced in April 1942; some Canadians decided to put their cars in storage for the duration of the war.⁴

In 1973, the federal Department of Energy, Mines and Resources (now Natural Resources Canada) created the Canadian Office of Energy Conservation that has offered various information and incentive programs since then, operating more recently as the Office of Energy Efficiency. Also that year [1973], the Science Council of Canada called on all Canadians to begin the transition to a “conservator society”.⁵ In Ontario, the Ministry of Energy began developing policies and programs in 1975.

In 1980, the Royal Commission on Electric Power Planning (known as the Porter Commission) recommended that future planning should be reoriented to emphasize demand management.

Ontario Hydro set a target of 1000 MW of load shifting and 1000 MW of conservation in 1982. In 1989 it included a budget of \$3 billion in conservation programs as part of its Demand/Supply Plan that was subsequently withdrawn. During this process, it began offering demand-side management programs that were able to reduce electricity consumption by 1,200 MW before it was discontinued in 1993;⁶ this was also the time when the new Darlington nuclear plant began operating at a time when there was a surplus of capacity.

In 1990, the *Ontario Energy Efficiency Act* provided the province the ability to require minimum energy performance standards (MEPS) on the sale of specified energy consuming products. In 1992, the federal *Energy Efficiency Act* provided the federal government the ability to require MEPS on products traded across provincial or international boundaries. To date, about 80 products in Ontario have MEPS; updated requirements introduced in 2013 were estimated to result in savings of about 2 TWh by 2030.⁷

Ontario’s first Building Code was introduced in 1975 and, like the *Energy Efficiency Act*, required new buildings (both low rise and high rise) and major renovations to meet minimum energy performance standards. Despite attempts to remove these provisions in the late 90s, they remained and are now among the highest in North America⁸ and were estimated to save 550 MW when fully implemented.⁹

The Ontario Energy Board established the original regulatory framework that governed demand-side management programs by the two natural gas utilities in Ontario in 1993. Using California’s example, the conservation programs

³ *Constitution Act, 1867* (UK), 30 & 31 Vict, c 3, s 92A.

⁴ WW2, online: The Canadian Military Heritage Project <<http://www.rootsweb.ancestry.com/~canmil/ww2/home/ration.htm>>.

⁵ Science Council of Canada, “Natural Resource Policy Issues in Canada”, (Ottawa: Science Council of Canada, 1973) at 39.

⁶ Rebecca Mallinson, “Electricity Conservation Policy in Ontario: Assessing a System in Progress”, York University Faculty of Environmental Studies (Toronto: March 2013) at 148 [Mallinson].

⁷ Ontario, Office of the Premier, News Release, “Ontario Regulations Coming into Force on January 1 2013” (Toronto: 31 December 2012) at 8.

⁸ Canadian Energy Efficiency Alliance, Press Release, “New Energy Efficiency Code in Ontario— Best in North America!” online: CEEA <<http://energyefficiency.org/new-energy-efficient-building-code-in-ontario-best-in-north-america/>>.

⁹ Chief Energy Conservation Officer, *2006 Ontario Power Authority Annual Report*, “Ontario – a new era in electricity conservation” (Toronto: OPA, 2006) at 65.

were required to meet a cost effectiveness test called the Total Resource Cost Test. This test has been criticized for a number of reasons, foremost being that it does not include environmental or social externalities.¹⁰ To date, savings from these programs are estimated to be more than 1,000 million m³ from 2007 to 2012.¹¹

In 2004, the Ontario government granted electricity distributors an increase in their rates by \$163 million by way of the third installment of their incremental market adjusted revenue requirement (MARR) provided they invested an equivalent amount in CDM funding. Most Local Distribution Company's (LDCs) in Ontario then launched a range of conservation programs which were estimated to have reduced peak demand by 357 MW.¹²

Also in 2004, the Electricity Conservation & Supply Task Force issued its report which called for the creation of a "conservation culture", the creation of a conservation champion and, like the Porter Commission, recommended that demand reduction be evaluated on a level basis with supply alternatives.¹³

The Conservation Bureau was established within the Ontario Power Authority in 2005; over the next 10 years, it launched a broad range of conservation programs delivered by LDCs as well as various associations and private companies. These programs were funded by all electricity ratepayers with approval provided by ministerial directives. Its initial target of 1350 MW by 2007¹⁴ was achieved and total savings to 2013 are estimated to be 1900 MW and 8.6 TWh.¹⁵ In recognition of the challenges associated with conservation mentioned earlier (hard to see and measure), over 150 conservation events were celebrated each year

and a detailed Evaluation, Measurement & Verification protocol was developed.

One final noteworthy initiative was the installation, completed in 2013, of smart "time-of-use" meters and time-of-use rates for all 4.3 million residential customers, the first jurisdiction in North America to make this important investment. Although an independent study concluded that Ontario's roll-out aligned with best practices in four out of six characteristics, it found the 1.9:1 ratio of peak to off-peak prices to be far below the optimal ratio of 4.9:1.¹⁶

THE PRESENT

Following consultations, the Ontario government released its Long-Term Energy Plan, "Achieving Balance" in 2013.¹⁷ Although called an energy plan, it is almost entirely an electricity plan, with no mention of conservation of natural gas or oil. It noted that conservation will be the first resource to be considered for electricity planning and set a target of 30 TWh by 2032 (16 per cent reduction in forecast gross demand) with 7 TWh by 2020 and 2500 MW of demand response. It also released "Conservation first: A Renewed Vision for Energy Conservation in Ontario"¹⁸ which, like the Long-Term Energy Plan made no mention of natural gas or oil conservation. It did however make clear the government's commitment to conservation first and that the Local Distribution Companies (LDCs) would have an expanded role with more autonomy and programming choice. In 2015, LDCs will be submitting their conservation programs individually or in groups to the Independent Electricity System Operator, which now includes OPA, for approval.

¹⁰ Mark Winfield, "An Efficient Balance? Applying the Total Resource Cost Test to CDM Initiatives of local Electricity Distribution Companies in Ontario: Assessment and Recommendations for Reform", York University Faculty of Environmental Studies (Toronto: June 2009) at 35.

¹¹ Ontario Energy Board, *Demand Side Management Framework for Natural Gas Distributors (2015 – 2020)* (Toronto: OEB, December 2014) at 10 [*OEB Guidelines*].

¹² Chief Energy Conservation Officer, "Taking Action – Supplement: Conservation Results 2005-2007", (OPA: Toronto, 2008).

¹³ Pratt, Courtney & Electricity Conservation and Supply Task Force, *Tough Choices: Addressing Ontario's Power Needs-Final Report to the Minister (2004)*; See also Mallinson, *supra* note 7 at 161.

¹⁴ Chief Energy Conservation Officer, Annual Report 2008: *Be the Change to a Culture of Conservation*, (Toronto: OPA, November 2008) at 1, 17.

¹⁵ Ontario Ministry of Energy, *Conservation First: A Renewed Vision for Energy Conservation in Ontario* (Toronto: Ministry of Energy, December 2013) at 17 [*Conservation First*].

¹⁶ The Brattle Group, *Assessing Ontario's Regulated Price plan: A White Paper*, Toronto: OEB, 2011.

¹⁷ Ontario, Ministry of Energy, *Achieving Balance: Ontario's Long Term Energy Plan*, (Toronto: Ontario Ministry of Energy, December 2013) [*Achieving Balance*].

¹⁸ *Conservation First*, *supra* note 15.

In recognition of some of the limitations of the TRC test, the government now allows a 15 per cent adder to be added onto the benefits of a conservation program. This was an attempt to account for at least some of the externalities that are not included in current program evaluations.

An analysis of Ontario's electricity conservation targets found that, while its past targets were more aggressive, its 2030 target would rank 17th compared to targets set by US states.¹⁹

Although most well known for promoting the use of renewable energy, the *Green Energy Act* of 2009 also included a few important conservation initiatives. It required the Environmental Commissioner of Ontario to report on Ontario's progress on conservation and to make recommendations on what further action is required. Recent annual reports have noted that further investments should be made in natural gas conservation programs, that there is a total lack of conservation programs for oil and oil products such as transportation fuel and that there should be a greater price differential between off peak and on peak electricity rates.²⁰

Another important initiative of the *Green Energy Act* required all public agencies (municipalities, universities, schools and health care (MUSH)) to submit energy consumption/green house gas emissions by 2013 and a plan to reduce energy/GHG by 2014. Despite there being no penalty for non-compliance, over 90 per cent of all such organizations have submitted their data and more than 80 per cent have submitted their plans. This is expected to result in major investments and savings in these sectors in the future.

In late 2014, the Ontario Energy Board issued CDM Guidelines for electricity distributors and DSM Guidelines for natural gas distributors.²¹ While the electricity guidelines focused on achieving the government's target of 7 TWh by 2020, the natural gas guidelines had no such target. One of the most important features of the natural gas guideline is that it

recommended DSM budgets increase from \$65 million to \$155 million/year.²²

Unlike the electricity and natural gas conservation programs that are funded by their respective ratepayers in Ontario, at the federal level all energy conservation activities are funded out of general revenue. This has resulted in the cancellation of federal incentive programs (such as EcoEnergy for home energy retrofits) with a focus on providing product information/labelling, support for various tools (such as EnerGuide rating for homes), Minimum Energy Performance standards (MEPS), etc.

THE FUTURE

Although as is clear from the previous two sections that much has been achieved, much more remains to be done. Here are some of the most important developments needed for the full potential for conservation to be realized in Ontario.

- **Culture of Conservation** – As noted earlier, the need for a move to a conserver society was first identified in 1973 and a culture of conservation was first promoted in 2004. In 2011, the Canadian Council of Chief Executives (composed of 150 CEOs of largest enterprises in Canada) called for the building of a culture of energy conservation in Canada.²³ While limited progress has been made, much remains to be done before saving energy comes as natural to Canadians as dressing warmly in the winter. All mandatory as well as voluntary programs should all be framed in such a way that they are seen as being part of a move to this new culture.
- **Customer/Tenant Engagement** – One of the principal vehicles for bringing about a new culture of conservation is the direct engagement of energy customers and tenants in voluntary energy conservation programs.

¹⁹ *Mallinson, supra* note 7 at 32.

²⁰ Environmental Commissioner of Ontario, "Looking for Leadership: Annual Greenhouse Gas Progress Report – 2014", (Toronto: Environmental Commissioner of Ontario, 2014) at 33.

²¹ *OEB Guidelines, supra* note 11.

²² *Ibid* at 17-18.

²³ Canadian Council of Chief Executives, "Energy-Wise Canada: Building a Culture of Energy Conservation", (December 2011) online: Canadian Council of Chief Executives, < <http://www.ceocouncil.ca/wp-content/uploads/2011/12/Energy-Conservation-Paper-FINAL-December-20111.pdf>>.

Important progress has been made here by a number of leaders but there is vast scope for progressive programs.

- **Supply Subsidies** – While conservation is already cost effective (in Ontario, every \$1 invested in energy efficiency avoided \$2 in costs to the electricity system),²⁴ it would be an even more valuable if traditional energy supplies were not subsidized. A recent study by the International Monetary Fund estimated the direct support to energy producers to be over \$1.5 billion and over \$30 billion in uncollected tax on externalized costs such as carbon emissions.²⁵ And as more provinces join BC, Quebec, Alberta (to a more limited extent) and soon Ontario in having a price on carbon, the advantage of carbon free conservation will be even larger. The federal government may be forced, politically, to establish a national carbon pricing program, as recommended by the Canadian Council of Chief Executives.²⁶
- **Smart Energy Network** – As the electricity grid and other energy networks get smarter, conservation should play a larger role and take advantage of new smart technologies. Future smart appliances will know when energy prices are lower and shift demand automatically. The waste heat energy from some appliances (refrigerators, dishwashers, etc) will be used to preheat water for others. These new technologies will automate behaviour change. And the ratio between on peak and off peak electricity rates should be increased to closer to the optimal level of 4.9:1.
- **Integration of Electricity/Natural Gas Conservation Programs** – Energy consumers do not want to hear about one type of program offered by electricity users and a different one offered by gas utilities.
- **Existing Buildings** – While great

progress has been made in encouraging builders of both new homes and commercial buildings to voluntarily certify their buildings to higher standards (e.g. EnergyStar and LEED, respectively), much less progress has been made on existing buildings. With 1-1.5 per cent of new stock being added each year, existing buildings will continue to make up the majority of our building stock. Initiatives are underway at both the local and provincial level to require reporting on building performance which will drive energy efficiency retrofits.

- **Evaluation, Measurement & Verification** – Ontario has become a leader in the development and implementation of independent program evaluations and has allocated up to 5 per cent of program budgets. This is particularly important as measuring energy efficiency requires the use of comprehensive protocols.
- **Codes & Standards** – Easily forgotten, mandatory minimum energy efficiency codes and standards continue to play a critical role in reducing energy demand. Energy planners love this approach as they are reliable.
- **Transportation** – And finally, it is critical that major initiatives be undertaken in transportation which is responsible for 34 per cent of energy consumption in Ontario.²⁷

While it is clear that a good start has been made in conserving energy in Ontario, it is equally clear that there remains a great deal more to do. Creating a true “Culture of Conservation” will take leadership and engagement by all sectors of society. ■

²⁴ *Conservation First*, *supra* note 15 at 1.

²⁵ Mitchell Anderson, “IMF Pegs Canada’s Fossil Fuel Subsidies at \$34 Billion”, *The Tyee* (15 May 2015), online: The Tyee <<http://theyee.ca/Opinion/2014/05/15/Canadas-34-Billion-Fossil-Fuel-Subsidies/>>.

²⁶ Canadian Council of Chief Executives, “Framing an Energy Strategy for Canada: Submission to the Council of the Federation”, (July 2012) at 10, online: Canadian Council of Chief Executives <<http://caid.ca/FraEneStrCanSub2012.pdf>>.

²⁷ Ontario, Ministry of the Environment and Climate Change, *Ontario’s Climate Change Discussion Paper 2015* (Toronto: Ministry of Environment and Climate Change, 2015) at 30.