Studies in Ontario Electricity Policy Series | Paper No. 4

Electricity Conservation Policy in Ontario:

Assessing a System in Progress

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by
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March 2013

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The Sustainable Energy Initiative Studies in Ontario Electricity Policy series presents new research by SEI Faculty and Graduate Students on current issues in energy and electricity policy in Ontario. The studies provide much greater detail and depth of analysis than is possible in traditional academic journal articles, although they have provided the basis for such articles, and are intended to inform and encourage debates about the future of the province's energy strategies.

Acknowledgements

I would like to thank all of the LDC representatives, industry insiders, and ministry and government agency representatives who allowed me to interview them for this paper. Their insights were invaluable and very much appreciated. In addition, I would like to thank my MRP Supervisor, Mark Winfield, and my family and friends for their patience, encouragement, and support throughout this process.

Foreword

Energy Conservation and Demand Management (CDM) is a central element of SEI's definition of sustainable energy, as it represents a major opportunity to avoid the need for high-impact, high-risk and high-cost energy supply options and to improve Ontario's energy productivity.

The province's reengagement with CDM is still relatively new, having begun less than a decade ago. Although progress has been made as a result of the efforts of local distribution companies and the Ontario Power Authority in reducing peak electricity demand and electricity consumption, only a small fraction of the province's electricity CDM potential has been realized so far. The province's policy framework around CDM remains in flux, and its long-term commitment – particularly in an environment of declining electricity demand and surplus electricity generation – seems uncertain.

The recent Speech from the Throne recognized that "conservation is the cheapest source of energy available," and stated that "Ontario will continue to be a leader in smart-grid technology and energy conservation." It is in this context that SEI offers the fourth in its Studies in Ontario Electricity Policy series of policy studies.

In this paper, MES student Rebecca Mallinson presents a comprehensive assessment of the province's electricity CDM policy framework, and makes a series of concrete recommendations on how to translate the province's renewed commitment to CDM into meaningful and lasting results.

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Executive Summary

Electricity Conservation Policy in Ontario: Assessing a System in Progress

Conservation is Ontario's most attractive and least expensive electricity resource. The cost of reducing Ontario's demand for electricity using conservation programs is approximately 3¢/kWh[i]. This is cheaper than meeting demand using nuclear power, hydroelectricity, wind power, or gas-fired power stations[ii]. In addition, every kWh of electricity saved through conservation is a kWh of electricity that does not contribute to greenhouse gas emissions, pollution from smog-forming chemicals, nuclear waste, or any of the other negative environmental impacts associated with generating electricity. Furthermore, as a job-creation tool, investing in conservation creates more direct jobs than equivalent investments in wind energy, bioenergy, solar power, or hydroelectricity[iii]. In short, electricity conservation is a worthwhile investment and should be Ontario's first response when dealing with electricity demand.

Every kWh of electricity saved through conservation is a kWh of electricity that does not contribute to greenhouse gas emissions, pollution from smog-forming chemicals or nuclear waste.

This report assesses how well Ontario's policies support, facilitate and drive electricity conservation in the province. It analyzes Ontario's policies in terms of six themes:

1. Treating conservation as a priority resource
2. Making a long-term commitment to conservation
3. Clearly and appropriately defining roles and responsibilities
4. Ensuring that financial and incentive structures support policy objectives
5. Offering a comprehensive suite of conservation programs
6. Adopting robust evaluation, measurement and verification (EM&V) processes

These six themes are based on characteristics of successful conservation strategies and best practices in other jurisdictions in Canada and the United states[iv]. For each theme, the report poses and answers a series of yes-no questions that are used to assess how Ontario's conservation policies align with

i *Restoring Balance: A Review of the First Three Years of the Green Energy Act, Annual Conservation Progress Report - 2011 (Volume Two),* Environmental Commissioner of Ontario, 2012, p. 42.

ii *Final Conservation Results 2009/2010,* Ontario Power Authority, 2011, p. 10.

iii *Building the Green Economy: Employment Effects of Green Energy Investments for Ontario,* R. Pollin & H. Garrett-Peltier, 2009, p. 10.

iv For example, *Successful Strategies for Energy Efficiency: A Review of Approaches in Other Jurisdictions and Recommendations for Canada*, Bailie et al., 2006; *States Stepping Forward: Best Practices for State-Led Energy Efficiency Programs*, Michael Sciortino of the American Council for an Energy-Efficient Economy (ACEEE), 2010.

best practices. At the end of the theme-by-theme analysis, the report identifies four major problem areas with respect to electricity conservation policy in Ontario:

1. A lack of prioritization and long-term commitment to conservation in Ontario's energy planning process.
2. Overly rigid roles for Ontario's local electricity distribution companies in designing and delivering conservation programming.
3. Legislation that grants powers but does not require action on conservation.
4. A lack of attention and support for building a culture of conservation in the province.

In all, the report offers 20 recommendations for changes to conservation policy in Ontario. Four of its key recommendations are:

1. Make the following changes to Ontario's power system planning process:

a. Limit the Minister of Energy's ability to issue planning directives to the Ontario Power Authority (OPA).

b. Set Ontario's energy policy objectives in legislation.

c. Make one of Ontario's energy policy objectives a commitment to pursue all available cost-effective conservation resources before employing electricity generation assets to meet demand.

d. Have the Ontario Energy Board review the province's power system plans on the basis of whether they address Ontario's energy policy objectives, as laid out in legislation.

The starting point for Ontario's current energy planning process are the Minister of Energy's supply mix directives, which dictate the mix of electricity resources to be included in the OPA's power system plans. Other directives are issued by the minister from time to time as well. The directive system has made energy policy and planning vulnerable to frequent swings in direction. Articulating the province's energy objectives in legislation and making one of those objectives a commitment to using conservation first, before other electricity resources, would increase policy stability and ensure that conservation is prioritized in energy planning over the long term.

2. Allow the province's local electricity distribution companies greater flexibility in the roles they can play in designing and delivering conservation programming.

Under Ontario's current policies, local electricity distribution companies are all assigned the same conservation program delivery roles and are effectively prevented from designing their own conservation programs. This fails to recognize the diversity in size and capability of Ontario's power utilities, and fails to exploit the experience that many utilities have with creating innovative programs tailored to local market conditions.

One of Ontario's energy policy objectives should be a commitment to pursue all available cost-effective conservation resources before employing electricity generation assets to meet demand.

It is not sufficient for legislation to grant government the power to promote conservation – legislation needs to require action on conservation.

3. **Modify conservation-related legislation so that it requires engagement in conservation activities rather than simply granting the authority to engage in or require conservation activities.**

   In many instances, legislation in Ontario grants the province and the Ministry of Energy the power to engage in conservation activities or the power to require other entities to engage in conservation activities. However, decisions about whether or not to use these powers are left to the discretion of the government. This means that if the government elects not to exercise its conservation-related powers, then business in the province could continue as usual, without any gains for conservation. Legislation should mandate action on conservation for these reasons.

4. **Re-commit to building a culture of conservation in Ontario.**

   Building a culture of conservation means raising conservation awareness and education in Ontario to a level where Ontarians automatically consider the energy-use implications of their everyday actions and decisions. It means convincing Ontarians – both energy consumers and energy policy players – that conservation is Ontario's best, most cost-effective energy option. It also means creating an energy-use environment where Ontarians are supported in their efforts to conserve energy and discouraged from consuming energy wastefully. In this vein, phasing out the Ontario Clean Energy Benefit (which artificially lowers the price of electricity, and thus removes an incentive for Ontarians to conserve) would be an important step in aligning Ontario's electricity pricing policies with the goal of building a culture of conservation in the province.

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Section 1: Introduction

The passing of the *Green Energy and Green Economy Act* (*GEAGEA*) in the spring of 2009 changed the electricity conservation policy landscape in Ontario. This paper attempts to understand and assess this post-2009 *GEAGEA* CDM policy framework by exploring the following questions:

1. What does Ontario's post-GEAGEA electricity conservation policy framework look like?
2. To what extent does this new framework enable, foster, and support electricity conservation in Ontario?
3. How might CDM policy in Ontario be changed to better enable, foster, and support electricity conservation in the province?

How might CDM policy in Ontario be changed to better enable, foster, and support electricity conservation in the province?

However, before exploring these questions, some terms should first be defined, and some of the assumptions that underlie the questions should be addressed. Namely, 'what is meant by *CDM policy framework*?', 'what is understood in the term *conservation*?', and 'why should we care about conservation at all, let alone wanting more of it?'

1.1 CDM policy framework

In this report, the term *CDM policy framework* refers to the high-level policy environment within which CDM activities take place. In Ontario, the CDM policy framework consists of legislation, regulations, CDM targets, and strategic direction as outlined in such documents as the Ministry of Energy's Long Term Plan and Ministerial directives, as well as the OEB's CDM Code, and the OPA's Master Agreements and EM&V protocols. The CDM policy framework exists to determine who does what, how activities are funded, how the responsible agencies decide what to do, and how they measure their performance. The framework also determines the roles of the various stakeholders in designing the framework itself, and in designing and planning CDM programs (Navigant, 2006, p. 7). For a detailed description of the policy documents that make up Ontario's current CDM policy framework, please see Appendix A.

1.2 Defining conservation

First, although energy conservation activities can target the use of natural gas, oil, and other fuels, this paper examines energy conservation policy only with respect to electricity. Second, in this report, with respect to electricity, the term **conservation** is understood as a highest order term that encompasses several different types of conservation activities, including behaviour change, energy efficiency, demand response, fuel switching, and distributed generation (Environmental Commissioner of Ontario [ECO], 2010a, p. 12). However, certain key players in the energy sector have or have had their own preferred terms for referring to this concept. Such terms include **Demand-Side Management**

(DSM), which was used by Ontario Hydro in the 1980's and 1990's,and **Conservation and Demand Management** (CDM), which is the preferred term of the Ontario Power Authority (OPA). As a result, in this report, the terms conservation, DSM, and CDM are used interchangeably.

However, there is some value in delving into these terms in a bit more detail because doing so highlights some important concepts. In his 2006 Annual Report, Ontario's Chief Conservation Officer, Peter Love, distinguishes between the conservation and demand management components of CDM by saying that **conservation** aims to reduce the overall amount of electricity used (*consumption* of electricity), while **demand management** aims to influence the volume and timing of electricity use (*demand* for electricity). Although *consumption* and *demand* may at first seem like identical concepts, they are not. **Consumption** refers to the volume of electricity that is used over time, and is measured in kWh (the units of Energy). **Demand**, on the other hand, refers to the amount of electricity needed at any given point in time, and is measured in kW (the units of Power). For example, in the case of a bathroom shower, water *demand* is the amount of water you draw from the shower head at any given moment by adjusting the tap to achieve a stronger or weaker flow, and water *consumption* is the amount of water that would accumulate in the bathtub over the course of your shower if you plugged the drain to catch it[1].

Although *consumption* and *demand* may at first seem like identical concepts, they are not.

Nevertheless, whether conservation activities target consumption or demand, such activities can be divided into the following five categories:

1. **Conservation Behaviour** refers to changes in consumer behaviour that reduce the amount of electricity consumed over time using technology already in place. Examples include turning off lights and unplugging appliances while not in use, setting thermostats higher in the summer, and changing business processes in an office.
2. **Energy Efficiency** refers to switching to technologies and measures that deliver greater or equal levels of service using less energy. Examples include replacing incandescent light bulbs with compact fluorescents, and replacing a low-efficiency air conditioner with a high efficiency model.
3. **Demand Management** refers to the altering of consumption patterns so that overall electricity use remains the same, but peak electricity demand is reduced. Examples include peak clipping and load shifting — moving electricity use from one time of day to another in order to reduce electricity use when electricity costs are highest or when high demand has the potential to jeopardize system reliability.
4. **Fuel Switching** refers to switching from electricity as a source of energy to other fuels for a given application, such that a reduction in total energy consumption is achieved — for example, switching from an electric hot water heater to a gas-fired or solar thermal hot water heater.

1 By the same analogy, your electricity demand when reading under a standard fluorescent light bulb is 15 Watts at any given moment. If you read for an hour under that bulb, your electricity consumption over the course of the hour would be 15Wh (15Watts x 1 hour = 15Watt-hours, or 0.015kWh).

5. **Distributed generation** refers to producing electricity at the location where it is used ("on-site"). With **self-generation**, consumers generate electricity at the source to meet all or part of their energy needs, thus displacing energy demand they would otherwise make on central electricity generation stations via the transmission and distribution grid. Examples include installing on-site solar PV panels, micro wind turbines, or a diesel or gas-fired generator[2]. With **cogeneration**, the 'waste' heat produced in the generation of electricity can be put to use for heating needs, displacing energy that would have otherwise need to be generated to deliver that same heating service[3]. (ECO, 2010a, p. 12; Ontario Power Authority [OPA], 2011d, p. 4; Love, 2006, p. 9-10).

Collectively, activities of the types mentioned above, which reduce electricity use, are referred to in this report as conservation activities, or as conservation and demand management (CDM) activities.

Consumption refers to the volume of electricity that is used over time.

Demand refers to the amount of electricity needed at any given point in time.

1.3 Why do we care about conservation and demand management?

Like hydroelectric generation or gas-fired generation, conservation is an electricity resource — it can be used to reduce demand for electricity, just as generation resources can be used to meet demand for electricity. However, there are costs and benefits associated with each type of electricity resource, and conservation has the advantage of being the most attractive and least-costly electricity resource available — not just economically, but also in terms of environmental and social costs and benefits.

For example, in 2008, a group of researchers from York University and the University of Waterloo assessed each of Ontario's electricity resource options in order to determine their relative attractiveness based on their sustainability and likely contributions to a desirable and durable future (Winfield et al., 2010). Their assessment criteria included core social, environmental, and economic sustainability requirements[4] as well as trade-off rules for dealing with conflicts between objectives, where achieving one desirable result seemed to require sacrificing another. The researchers found that among all the electricity resources examined[5], "CDM options tend[ed] to offer the greatest potential to

2 The Chief Conservation Officer's 2006 Annual Report considers self-generation to be conservation if an installation's capacity is under 10kW (Love, 2006, p. 10); however, the Minister of Energy's March 31, 2010 directive to the OEB defines conservation as "inclusive of load reduction activities from initiatives, such as geothermal heating and cooling, solar heating and fuel switching, but exclusive of initiatives that are associated with the OPA Feed-In Tariff Program and the OPA Micro Feed-In Tariff Program" (DuGuid, 2010d, p. 3).

3 The Chief Conservation Officer's 2006 Annual Report considers cogeneration to be conservation if an installation's capacity is under 10MW (Love, 2006, p. 10).

4 The core sustainability criteria used to assess electricity resource included 1) socio-ecological system integrity, 2) livelihood sufficiency and opportunity, 3) intragenerational equity, 4) intergenerational equity, 5) efficiency, cost-effectiveness, and resource maintenance, 6) socio-ecological civility and democratic governance, 7) prudence, precaution and adaptation, and 8) immediate and long-term integration (Winfield et al, 2010, pp.4120-4122).

5 The electricity resources examined included nuclear, coal, natural gas, hydroelectric, wind, bioenergy, and solar PV generation options, as well as conservation and demand management, and transmission electricity resources (Gibson et al., 2008, pp. 71-120).

advance sustainability with respect to all eight core criteria, while avoiding the need for major trade-offs" (Gibson et al., 2008, p. 119). Some of the reasons why CDM compares so favourably to other electricity resources are that it boasts numerous environmental, economic, and employment benefits.

1.4 Environmental benefits

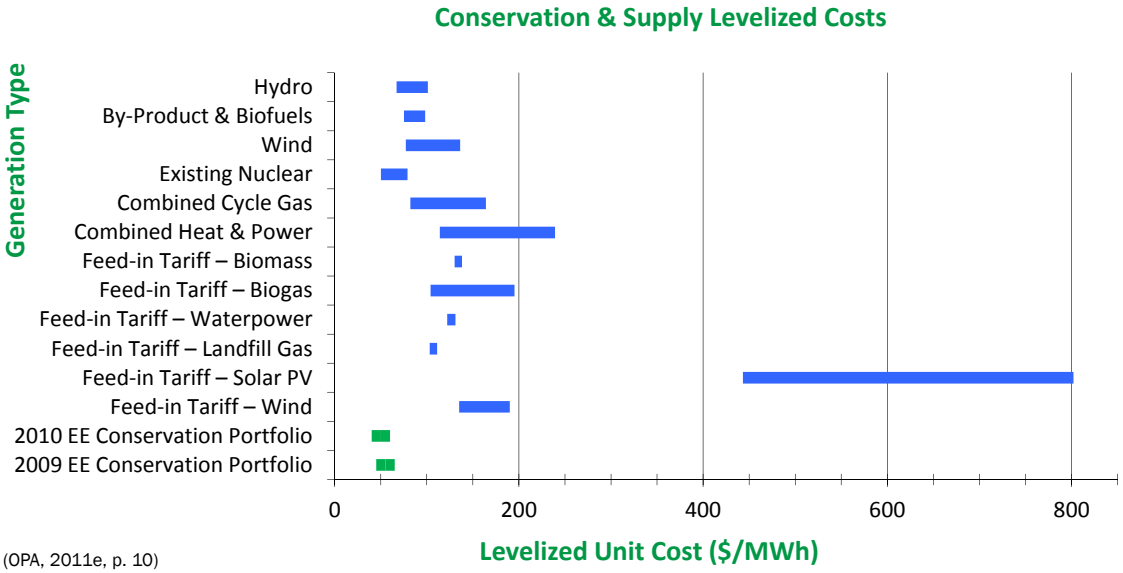
Environmentally, conservation is the least costly electricity option because it avoids the environmental and health impacts associated with generating, transmitting, and distributing electricity. This includes impacts like smog, acid rain, nuclear waste, habitat destruction, and greenhouse gas emissions. This last impact is of particular importance because the world's climate is changing due to an excess of fossil-fuel generated carbon dioxide in the atmosphere. In order to avoid runaway climate change, with catastrophic increases in global temperatures in the future, atmospheric CO_2 levels must be stabilized, and this will require significantly reducing anthropogenic CO_2 emissions from current levels (Harvey, 2010, p.16-17). Conservation has the potential to deliver immediate and lasting reductions in CO_2 emissions, which is particularly important in the ramp-up time required to transition energy systems from CO_2-producing fossil fuel-based systems to systems based on renewable sources of energy.

Conservation has the advantage of being the most attractive and least-costly electricity resource available — not just economically, but also in terms of environmental and social costs and benefits.

1.5 Economic benefits

Conserving electricity is generally less expensive than generating electricity. In other words, it costs less to avoid using a kWh of electricity than it costs to produce an additional kWh of electricity. For example, the OPA's 2009-2010 Conservation Results report calculated the levelized costs of conservation versus supply resources, and found that at a cost of around $50/MWh (or $0.05/kWh), the OPA's conservation portfolios for 2009 and 2010 were the province's least expensive energy resources (see Figure 1.1 below) (OPA, 2011e, p. 10).

Figure 1.1: 2009 & 2010 Portfolio of CDM Programs Compared to Electricity Supply Resources



(OPA, 2011e, p. 10)

Other studies by numerous consulting firms and non-profit agencies have also come to similar conclusions about the low cost of conservation relative to supply-side resources (OPA, 2008b, p. 4; OPA, 2008c, p. 4; Winfield, 2004, p. 19; Friedrich et al., 2009, p.4). However, beyond a kWh to kWh comparison of the costs of conservation versus generation, CDM also yields economic benefits for the electricity system as a whole and for society as a whole.

To illustrate, one need only consider that Ontario has a mixed-source electricity system, in which not every kilowatt costs the same amount to produce. Base-load electricity supply is provided by relatively inexpensive sources (i.e. hydro and existing nuclear); intermediate supply is provided by more costly sources (e.g. natural gas combined cycle generators); and peak demand is met by relatively expensive sources (e.g. natural gas simple cycle generators) (OPA, 2008c, p. 1). As a result, when demand peaks, so too does the cost of producing electricity. Therefore, by lowering demand, particularly peak demand, CDM activities allow demand for electricity to be met at a cheaper per kWh cost than would otherwise be the case.

Conservation programs could result in over 57,000 person-years of additional employment in the province from 2007 to 2027.

Furthermore, since demand in Ontario alternates between periods of very high demand and relatively low demand, Ontario's electricity system is sized to meet the needs of electricity consumers when demand is at its peak. As a result, much of the generation capacity that is built into the system sits idle during periods of low demand. By reducing both overall consumption and peak demand, conservation and demand management measures allow electricity system planners to avoid or delay the capital costs associated with building out the electricity system.

1.6 Employment benefits

In addition to saving electricity consumers money through lowered system and rate costs, CDM also yields benefits for the wider economy. In 2008, IndEco Strategic Consulting Inc. and Econometrics Research Ltd. performed a macroeconomic analysis of the conservation programs proposed in the Ontario Power Authority's 2007 IPSP (which called for a 6300MW reduction in peak demand by 2027). The consultants took into account such factors as initial expenditures, net output generated by those expenditures, employment, taxes, and imports, (all with respect to both conservation programs and reduced electricity generation), and modelled the economic impact of energy conservation activities in the province. The results of this modelling indicated that not only would the conservation programs result in over $16.4 billion in net avoided costs over the 20-year program implementation period, but they would also result in over 57,000 person-years of additional employment in the province from 2007 to 2027 (IndEco, 2008, pp. 43-45).

Similarly, a 2009 study estimating the direct, indirect, and induced employment effects of green energy investments calculated that conservation and demand management creates 9 direct jobs and 5.2 indirect jobs for every $1 million of investment - a higher rate of direct job creation than any of the other energy options examined (e.g. hydroelectric, wind, bioenergy, and solar PV generation) (Pollin & Garrett-Peltier, 2009, p. 10).

Such results are in keeping with the observation that in addition to generating savings and preserving resources, conservation activities have significant spill-over effects into other sectors of the economy. For example, labour-intensive energy efficiency retrofits create jobs directly out of the need for construction workers, trade professionals, and their managers, and manufacturing and supply jobs are created indirectly out of the need for materials used in conservation measures. Still more jobs are generated or 'induced' as the larger workforce spends those additional paycheques in their local economies (McKinsey & Co., 2009, p. 99). By helping to increase the efficiency with which organizations use energy, conservation measures can also help to make organizations more competitive, which, in turn, helps to keep jobs in Ontario.

1.7 The size of the CDM resource

Having established that conservation is desirable, the question then becomes how much potential for conservation exists in the province, and how much is attainable? A number of studies have investigated this question, and although they vary in what types of conservation they consider and what base consumption forecasts they use, they all seem to indicate that the untapped CDM resource is significant. For example, in 2004 the Pembina Institute released a report entitled *Power for the Future: Towards a Sustainable Electricity System for Ontario*, which modelled the potential impact of a set of policies aimed at removing barriers to cogeneration in the industrial and commercial sectors, and at accelerating the uptake of energy efficient technologies and industrial processes through financial incentives and financing programs. The study investigated the impact on three types of conservation: 1) energy efficiency, 2) cogeneration in the industrial and commercial/institutional sectors, and 3) switching from electricity to natural gas for heating in the residential and commercial sectors. It found that the policies modelled could result in a reduction in electricity consumption of 73.5TWh per year by 2020, or a reduction of 40% relative to the business-as-usual consumption forecast used in the modelling (Winfield et al., 2004, p. 16).

Studies indicate that the untapped CDM resource in Ontario is significant.

Another study, commissioned by the Ontario Power Authority in 2005, assessed the potential for electricity savings from new efficiency improvement programming alone (not including savings from codes and standards, existing energy efficiency programs, fuel-switching, distributed generation, or other types of conservation). The authors of the study modelled the energy efficiency savings under different CDM program scenarios and found the achievable potential for savings from energy efficiency to be between 17.2TWh and 28.5TWh per year in 2025, depending on the aggressiveness of the CDM program approach. This represents between 10 and 16.7% of the base case consumption forecast used in the modelling (ICF, 2005, p.34). To put that in context, Darlington nuclear power station has a capacity of a 3512MW (OPG, 2011a), which makes its maximum yearly output just under 30.7TWh.

Having established, first, that pursuing conservation is desirable, and, second, that there is potential to achieve lots of conservation in the province, we move on to how well Ontario's current policy framework positions the province to take advantage of this conservation potential.

Section 2: Research methods

My analysis of Ontario's current CDM policy framework is structured and guided by my research into the following three questions: 1) What does Ontario's CDM policy framework look like?, 2) What criteria should be used to assess the effectiveness of Ontario's policy framework?, and 3) What insights do industry insiders have into how well Ontario's CDM policy framework is working and how it might be changed to better enable, foster, and support CDM in the province? Each of these segments of research is described below.

1) What does Ontario's CDM policy framework look like?

In this first stage of research, I reviewed the history of CDM in Ontario from 1980 to the present, using such techniques as newspaper searches, reviewing energy-related legislation, and looking at reports written at various key points during that 30-year period. Next, I undertook a detailed review of the Green Energy and Green Economy Act, looking for electricity conservation-related clauses, and what changes they made to Ontario's CDM policy framework. This lead to a review of several additional pieces of legislation, numerous regulations, codes, and contracts governing the funding and delivery of CDM programming. A brief history of CDM policy in Ontario from 1980 to 2009 can be found in Appendix B, and Appendix A contains a summary of Ontario's current CDM policy framework.

2) What criteria should I use to assess the effectiveness of Ontario's policy framework?

To answer this question, I investigated the characteristics of successful CDM policy frameworks in order to develop a set of criteria for evaluating the likely effectiveness of Ontario's CDM policy framework. This involved reading several studies and reports on best practices or successful CDM policy strategies employed in other jurisdictions. In these studies, I looked for common themes that would allow me to construct a set of best practice criteria to apply to Ontario's CDM policy framework. (These criteria are outlined in the next section, and the most influential of the studies that inform them are summarized in Appendix C).

3) What insights do industry insiders have into Ontario's CDM policy framework?

This portion of my research involved interviewing industry insiders on their perceptions of Ontario's new CDM policy framework, and asking for insights into what they felt were the new framework's strengths and weaknesses, particularly with respect to the best practice themes identified in my research into successful strategies employed in other jurisdictions. Interviewees included representatives from large and small local distribution companies, the Ministry of Energy, the IESO, the EDA, and former employees of Ontario Hydro and the Ontario Power Authority.

Analysis of Ontario's CDM policy framework

All of the above types of research together then shaped the analytical portion of this paper, in that I applied my assessment criteria to Ontario's CDM framework guided by the insights of my interviewees, and based on my knowledge of Ontario's current and historical CDM policies. The result is an analysis of Ontario's current CDM policy framework that at its most reductive can be condensed into a series of yes/no questions grouped according to six assessment criteria themes. While summarising answers to the assessment questions into simple yes's and no's is overly reductive, the aim of such a reduction is to help show where Ontario's policy framework conforms to best practices and to identify problem areas where the framework might benefit from modification.

Section 3: CDM policy framework assessment criteria

The assessment criteria used in this paper to evaluate Ontario's CDM policy framework were developed out of the observations and recommendations in several reports that examine conservation policy in various jurisdictions in Canada and the United States[6]. These reports identify what they consider to be best practices or key characteristics of successful conservation policy, and it is from organizing these characteristics and best practices into categories that I decided on the following six themes for assessing Ontario's CDM policy framework:

1. Treating CDM as a **priority resource**
2. Making a **long-term commitment** to CDM
3. Clearly defining **roles and responsibilities**
4. Aligning **funding and incentive structures** with policy objectives
5. Creating a **comprehensive** CDM **program portfolio**
6. Using well-defined evaluation, measurement & verification (**EM&V**) **protocols**

Each of these categories is broken down into a series of questions, which are discussed below[7].

1. Treating CDM as a priority resource

The theme of treating CDM as a priority resource will be explored using the following questions:

1.1 Is CDM recognized and treated as a resource in energy policy?

Conservation is a resource that deals with demand by lowering it. Electricity generation is a resource that deals with demand by supplying electricity to meet it. Both demand-side and supply-side electricity resources (i.e. conservation and generation) achieve the result of matching supply and demand — they just come at the problem from different directions. Even though generation and conservation can solve demand-supply problems in equivalent ways, generation is easier to identify as an electricity resource because generation assets

6 For summaries of the reports that most influenced the development of the assessment criteria, please see Appendix C.

7 For convenience, the assessment criteria questions are presented in scorecard format in Appendix C.

occupy physical space (e.g. wind farms and nuclear power plants), whereas conservation assets are invisible (e.g. demand response capacity, energy efficiency savings potential, etc.). Nonetheless, conservation is an electricity resource with vast potential[8]. However, until energy policy makers and power system planners recognize CDM as an available electricity resource, its potential will remain unrealized.

1.2 Is CDM integrated into energy planning and given priority over other energy resources?

The rationale for giving CDM priority over other electricity resources in power system planning is that if, as discussed in the introduction to this paper, CDM represents the least-cost electricity option — both economically and environmentally — then it should be prioritized over more costly electricity resource options. To be explicit, all available cost-effective CDM should be pursued before employing electricity generation resources to meet demand. This approach, of prioritizing CDM over other energy resources, has been a successful driver of conservation in California, which in 2003 adopted a loading order stipulating that the state's growing energy needs should be met first with energy efficiency and demand response, second through the addition of renewable energy and distributed generation, and lastly through the addition of clean fossil-fuelled energy sources and infrastructure improvements (California Energy Commission [CEC], 2007, p. 3).

Setting specific and challenging goals leads to higher performance than setting easy goals or "do your best" goals.

1.3 Does the framework set aggressive, binding targets for both energy (GWh) and demand (MW) savings?

The rationale for setting aggressive targets for energy savings from CDM is that research shows that setting specific and challenging goals leads to higher performance than setting easy goals, "do your best" goals, or setting no goals at all (Locke et al., 1981, p. 125). Therefore, it is not unreasonable to expect that aggressive targets for CDM could drive energy sector players to achieve greater energy and demand savings than they would in response to less ambitious savings targets.

The rationale for making targets binding rather than voluntary is that research has indicated that voluntary approaches to environmental protection (e.g. voluntary emissions reduction targets for pollutants) can result in sub-optimal performance by participants (Khanna, 2001, p. 318).

1.4 Does Ontario have a clearly defined CDM strategy and action plan with milestones?

Research shows that people are more likely to achieve difficult goals when they form implementation intentions (Gollwitzer & Branstatter, 1997). Planning is the setting out of a course of action intended to culminate in the achievement

8 To give just one example, starting in 2008, McKinsey & Company undertook an examination of the potential for greater efficiency in non-transport uses of energy in the United States. They found that roughly 23% of the country's projected annual energy consumption could be avoided in 2020 if an array of cost-effective energy efficiency measures were deployed on a country-wide scale (McKinsey & Company,2009, p. 7).

of a goal. It requires planners to form intentions about when, where, and how to enact behaviours that will lead the achievement of a goal (Aarts et al, 1999, p. 972). Therefore, the rationale for having a clearly defined CDM strategy and action plan is that it requires planners to form implementation intentions, and thus makes it more likely that Ontario's CDM goals will be achieved.

2. Making a long-term commitment to CDM

A long term commitment to CDM is important because, a "sophisticated, well-functioning market [for CDM goods and services] will not be created overnight — it will take years of consistent, sustainable action and investment to create the necessary trust and capability" (Love, 2006, p. 16). Furthermore, the full benefits of conservation and demand management can take time to be felt[9]. Therefore, a long term commitment to CDM is required so that energy efficiency programs are not aborted before all of their positive impacts become evident.

The theme of long-term commitment will be investigated by asking the following questions:

2.1 Is long-term, rate-based funding for CDM provided?

A long-term commitment to CDM is required so that energy efficiency programs are not aborted before all of their positive impacts become evident.

One of the key components of a CDM policy framework is how CDM will be funded. In order to make a long term commitment to CDM, a policy framework must include a long term commitment to *funding* CDM activities. Experience in leading jurisdictions shows that one of the best ways to provide consistent long term funding for CDM is to use a rate-based funding mechanism like a public benefits charge (Bailie et al, 2006, p.12). The rationale for drawing CDM funding from the rate-base rather than the tax-base is that tax-based funding can fluctuate greatly from year to year as a result of government budgets being continually revised. Funding from electricity rates, on the other hand, can remain fairly consistent over time, and so is more compatible with making a long-term commitment to CDM. Not surprisingly, therefore, many leading jurisdictions, like California, New York and Vermont employ rate-based funding for CDM programming (Bailie et al, 2006, p.12).

2.2 Are CDM players who design and deliver CDM programs provided with sufficient policy stability to plan and make investment decisions?

In 2005, ICF Consulting reviewed two decades of energy efficiency program implementation data for several jurisdictions in the United States. The performance data showed very pronounced annual variations in savings, which were associated with similarly pronounced fluctuations in program funding (ICF, 2005, pp. 21-23). As a result of these findings, the consultants concluded that achieving CDM savings at a level close to 100% of achievable CDM potential would require unprecedented consistency in CDM policy and investment in CDM (ICF, 2005, p. 23).

9 For example, a study of energy efficiency scenarios in Massachusetts indicated that under an aggressive 10 year energy efficiency portfolio scenario, ratepayers in Massachusetts would only begin to see bill savings three to four years into the program because cost savings associated with the energy efficiency portfolio would initially be offset by annual program expenditures (Cappers, 2010, p. 16).

An effective CDM policy framework should therefore provide electrical utilities and other players in the energy sector with sufficient policy stability that they have the confidence to make long term plans and long term investments in CDM and in personnel capable of designing and delivering CDM programs. In the words of one LDC representative, "when you have long term commitment to CDM, you end up fostering creativity and innovation because the people have been doing CDM over a long time and are inculcated in a philosophy of conservation, rather than just doing short term programming and cherry-picking CDM programs that have worked elsewhere" (Mallinson, 2011f, p. 5).

2.3 Is funding provided for the research and development of new energy efficiency technologies?

Long term commitment also entails investing in the next generation of energy efficient technologies and processes so that further gains can be made over time as existing energy efficient options become the norm. Therefore, an effective CDM policy framework should ensure that some funding is allocated to researching, developing, piloting, and commercializing new energy efficiency technologies and processes (McKinsey & Co. pp. xiii, 109).

2.4 Do building codes and appliance standards have regular review cycles?

The general rationale behind instituting energy standards for buildings and appliances is that such regulations "encourage or compel organisations or individuals to take measures which they might not otherwise take, in order to achieve some benefit for society or for themselves" (Hitchin, 2008, p. 16). In the case of buildings and appliances, minimum energy standards prevent the lowest performing products from entering the market (Hitchin, 2008, p. 18). Regularly updating codes and standards ratchets up minimum levels of energy efficiency as more efficient options become widely available, effectively locking in marketplace gains in energy efficiency that have been achieved through CDM programming and other initiatives. Thus, having regular review cycles for codes and standards is an important aspect of an effective CDM policy strategy (ICF, 2005, p. 23).

Regularly updating codes and standards helps to lock in marketplace gains that have been achieved through CDM programming.

2.5 Are there processes in place to change and update CDM plans as information, technologies, and circumstances change over time?

A policy framework that makes a long term commitment to CDM should also be able to accommodate changes to programs and portfolios, as well as the framework itself, over time as information, technologies, and circumstances (e.g. market penetration) change. In acknowledgement that change should and will happen over time, therefore, a policy framework making a long term commitment to CDM should include change processes.

2.6 Does the framework support market transformation as a long term policy goal?

Defining market transformation

Although implementing energy-saving measures is generally cost effective, market barriers can prevent or impede the adoption of CDM measures by consumers. Market transformation-oriented CDM strategies aim to change the structure or functioning of markets over the long term, in order to reduce market barriers to the adoption of CDM measures to the point where publically funded interventions to increase consumer uptake of CDM are no longer needed[10]. When a desired conservation practice or product dominates the market, market transformation can be said to have occurred (Love, 2006, pp.7-8). The advantage of market transformation is that it ensures that energy and demand savings are sustained over time and do not disappear once CDM programs end (Love, 2006, pp. 8-9).

What do market transformation-oriented activities look like?

Market transformation-oriented CDM activities work to develop market conditions that support the buying and selling of energy-saving goods and services. Therefore, they seek to develop:

1. a knowledgeable consumer-base that creates demand for energy saving products and services,
2. a supply-chain capable of delivering energy saving products, and
3. a skilled workforce capable of performing energy-saving services and delivering CDM programs.

Examples of market transformation-oriented CDM activities therefore include the following:

Activities aimed at increasing demand for energy-saving products and services:

- marketing and awareness campaigns aimed at changing social norms[11],
- monitoring and auditing programs that increase consumer awareness of how they use energy
- educational programs for both current and future consumers[12]

Activities aimed at increasing the supply of energy-saving products:

- codes and standards that set minimum efficiency requirements for products
- research and development into energy-saving products
- incentives for manufacturers, distributors, and retailers who bring energy-saving products to the market

10 (i.e. to the point where conservation becomes such an integral part of life and such a business-as-usual choice for consumers that they engage in CDM activities even in the absence of subsidies or other interventions (Blumstein, 2010, p. 6234)).

11 (i.e. societal attitudes and conventions that influence people's behaviour)

12 Educational programs for children not only instill a culture of conservation in the next generation of energy users, but they also put pressure on parents to conserve energy in the present.

Activities aimed at increasing the supply of energy-saving services:

- education and training for builders, contractors, building managers, and energy service professionals
- educational programs for the next generation of energy service professionals (e.g. co-op, apprenticeship, and internship programs for college and university students)

Many (but not all) of the above examples of CDM activities contribute to achieving market transformation by focusing on skills and knowledge. Such activities use education and training to build the capability of consumers to manage their energy use, the capability of decision-makers along the supply chain to choose energy-saving options, and the capability of workers to deliver energy-saving services and to develop and deliver CDM programs. As a result, such activities can be referred to as "capability building" CDM activities (Love, 2006, pp. 8-9).

Market transformation vs. resource acquisition

As a CDM strategy, market transformation is often contrasted with 'resource acquisition', which refers to 'acquiring' energy or demand savings as a substitute for procuring new energy supply (Blumstein, 2010, p. 6234). In contrast to the long-term focus of a market transformation CDM strategy, a resource acquisition strategy focuses on obtaining immediate energy or demand savings from individual consumers (Blumstein, 2000, p. 138)[13]. Resource acquisition CDM activities typically take the form of financial incentives for the purchase of energy efficient appliances, equipment, or building materials, or payments to large consumers for reducing their energy use or demand (i.e. demand response programs) (Love, 2006, pp. 8-9).

Although market transformation and resource acquisition have been viewed as alternative — and even opposing — CDM strategies, they are increasingly being seen as complementary because resource acquisition programs can create conditions that lead to market transformation, and market transformation programs can create conditions that promote participation in resource acquisition programs (Blumstein, 2005, p. 1053; Blumstein, 2010, p. 6234). For instance, a CDM program that provides incentives to manufacturers to bring more efficient appliances to market (i.e. a market transformation strategy) can create conditions that allow increased consumer participation in a CDM program that provides consumers with incentives to purchase more energy efficient appliances (i.e. a resource acquisition strategy) (Blumstein, 2010, p. 6236)[14].

Although market transformation and resource acquisition have been viewed as alternative – and even opposing – CDM strategies, they are increasingly being seen as complementary.

13 One way to distinguish between the two approaches is to say that market transformation addresses market barriers, while resource acquisition addresses market hurdles. Where market barriers are persistent obstacles that discourage the adoption of CDM measures (e.g. lack of energy efficient products and services in the market, or lack of trained workforce to deliver CDM services), market hurdles are temporary obstacles to the adoption of CDM measures (e.g. high initial cost, long payback period, or low return on investment) (OPA, 2011d, p. 9).

14 Similarly, the availability of incentives to purchase high efficiency appliances (a resource acquisition strategy) can lead to increased demand for high efficiency appliances, and result in more manufacturers, distributors and retailers bringing high efficiency appliances to market (a market transformation effect).

However, resource acquisition programs suppose that the infrastructure or conditions necessary to deliver CDM goods and services to consumers already exist in the marketplace and that consumers simply require an incentive to avail themselves of such goods and services. Where markets lack the capability to deliver CDM products and services, resource acquisition activities will meet with limited success. As a result, resource acquisition is not all or even most of what needs to be done to achieve market transformation (Blumstein, 2010, p. 6235).

As stated by Ontario's Chief Conservation Officer in 2006,

> "Creating a culture of conservation and achieving sustainable energy savings require a comprehensive approach to conservation. Not only must energy savings be sought (i.e., resource acquisition), but capability in the market must also be built and enhanced to ensure ongoing capacity for conservation, and the market must be transformed so that it is saturated with energy-efficient products and services" (Love, 2006, p. 34).

Therefore, a CDM policy framework that makes a long-term commitment to conservation should support not just resource acquisition, but also capability building and market transformation-oriented activities.

2.6.1 Is responsibility for market transformation assigned to an appropriate entity?

One strategy that has been used to prioritize market transformation in other jurisdictions (e.g. the Northwestern United States) is to make activities like social marketing and education & training the responsibility of a specially designated market transformation entity (Blumstein, 2010, p. 6236).

2.6.2 Is the OPA's strategic approach to CDM explicitly market transformation-oriented?

If market transformation is a long-term CDM policy goal under the current CDM policy framework, then the province's current CDM strategy should explicitly aim to achieve market transformation.

2.6.3 Do the metrics used to set targets and measure success encourage market-transformation-oriented activities?

The types of targets that are set and the metrics that are used to measure success will influence the types of CDM activities that are pursued. If targets are set purely in terms of kW or kWh of savings, and success is measured purely in terms of kW's or kWh's of savings achieved, then quantifiable savings in kW and kWh are what will be pursued. This can be problematic because by their very nature, capability building and market transformation activities yield savings indirectly over the long term, as the logical outcome of changes in market conditions (OPA, 2011d, p. 9). This can make investments in such activities appear less attractive than investment in resource acquisition activities, which produce immediate savings that are easy to quantify[15]. Therefore, targets and

15 For example, it is much simpler to calculate the savings one can expect as a result of replacing an old air conditioner with a higher efficiency model than it is to estimate the savings achieved by training building managers to employ energy-saving strategies on the job.

performance metrics that create a bias in favour of quantifiable savings make it unlikely that resource acquisition and capability building activities will be pursued in an optimal balance (Blumstein, 2010, p. 6234).

One means of addressing the difficulty of directly attributing savings to capability building and market transformation activities is the practice of allocating savings to utilities based on a variable that is easily measured. (However, care must be taken in the choice of the variable used as a proxy for savings; otherwise, misplaced-incentive problems can occur[16]). Another approach to addressing this problem would be to adopt targets for capability building and market transformation activities that are outcome-oriented rather than savings-oriented (e.g. number of mid-stream incentive program participants recruited, number of energy managers trained, number of school children engaged, etc.).

2.6.4 Do tests used to screen programs for inclusion in CDM program portfolios encourage market transformation-oriented activities?

As mentioned above, when it comes to CDM program evaluation, the metrics used to measure achievement determine what has value. The same holds true for the metrics used to screen programs for inclusion in program portfolios.

2.6.5 Has the framework produced a portfolio of CDM programs that emphasizes market transformation-oriented activities?

One indication of whether the current CDM policy framework supports market transformation is whether it has produced a mix of CDM programs that includes both resource acquisition programs and capability building and market-transformation-focused programs.

3. Clearly defining roles and responsibilities

One of the main components of a CDM framework is defining who does what. Therefore, the roles and responsibilities of the various players involved should be clearly defined and communicated. The theme of roles and responsibilities will be explored using the following four questions:

3.1 Are the roles of the different CDM players clearly defined?

While various assignments of roles and responsibilities can be effective, lack of clarity can hinder a CDM policy framework's effectiveness (Navigant, 2006, p. 7). Four key roles that are particularly important to define are the roles of oversight agency, responsible agency, implementing agency, and evaluation agency.

An **oversight agency** receives and approves reports (e.g. approves overall CDM plans and budgets, and receives program evaluation reports), and provides high-level guidance on the shape of the policy framework, determines the tests to be used to screen programs for implementation, and directs or provides

16 For a discussion of misplaced incentive problems that can occur when using a non-energy variable as a proxy for energy savings, see section 12 in Appendix D.

guidance on evaluation, measurement and verification (EM&V) activities. As a result, the role of oversight agency is usually filled by a government department or a regulator. In some cases, oversight responsibilities are divided between the two (Navigant, 2006, p.7).

The **responsible agency** designs the overall CDM plan, decides which programs and measures will be implemented, undertakes or supervises program EM&V activities, and reports to the oversight agency. The responsible agency role is usually filled by local electricity distributors (LDCs), by a government department, or by a special purpose entity like New York's NYSERDA or Vermont's Efficiency Vermont (Navigant, 2006, p. 8).

The **implementing agency** is responsible for executing CDM programs — either by implementing programs itself or by contracting the implementation out to such third parties as LDCs or energy service companies (ESCO's). Often, the entity fulfilling this role also takes on the role of responsible agency as well, but whether this is appropriate depends on the jurisdiction's history of CDM and the agency's relationship with would-be CDM program participants. Where local electricity distributors have a history of successfully delivering CDM and have good relationships with their customers, they are likely to perform well in the dual role of responsible agency and implementing agency (Navigant, 2006, p.8).

An **evaluation agency** is an impartial entity that evaluates, critiques, and publically reports on the structure and efficacy of the overall CDM policy framework, as well as the actions of the above three agencies in terms of performing their assigned duties under the framework. As such, the evaluation agency has the ability to require reports from any and all of the oversight, responsible and implementation agencies.

3.2 Are the roles defined in the framework appropriate for the players involved?

Not only should roles be clearly defined, but they should exploit the strengths of various players, should support players in areas of weakness, and should be defined in such a way as to be administratively efficient. In short, they should be appropriate as well as clear.

3.3 Does the framework facilitate cooperation between the various CDM players?

Given that there is more than one CDM player under Ontario's CDM policy framework and the players are required to interact, it makes sense that the CDM policy framework should facilitate cooperation and the sharing of information among players in order to take advantage of administrative efficiencies and to enhance the delivery of CDM programs.

3.4 Does the framework include processes for incorporating the input of key stakeholders?

Participation by stakeholders during the policy development process can bring important perspectives and ideas to the process, such as insights into the capacity of industry players to engage in CDM activities. Involving

key stakeholders in the policy-development process can also help secure commitment and buy-in from key program participants, and can sometimes identify and proactively deal with design problems that may not be evident without the benefit of multiple points of view (Navigant, 2006, p. 13). For these reasons, the input of key stakeholders should be actively sought and incorporated into the processes of developing CDM programming, EM&V protocols, codes and standards, and the CDM policy framework itself.

4. Aligning funding and incentive structures with policy objectives

The next theme to be explored is the question of whether the CDM funding and incentive structures within Ontario's policy framework support the province's goals of encouraging changes in energy use behaviour, driving investment in CDM, and achieving energy and demand savings targets. This theme will be investigated using the following questions:

4.1 Is adequate funding provided to achieve the targets that have been set?

Regardless of whether or not one considers the government's CDM targets ambitious or adequate, it is obvious that in order for CDM efforts to be successful, the funding allocated to CDM activities needs to be sufficient to meet the targets that have been set.

4.2 Does the framework provide utilities with incentives for meeting and exceeding CDM targets, and remove disincentives for engaging in CDM?

One of the challenges utilities face when engaging in CDM activities is that utility profits have historically depended on the volume of electricity sold. Therefore, successful conservation programs that decrease the amount of electricity sold can decrease a utility's revenue. This provides utilities with a strong disincentive to invest in CDM (McKinsey, 2009, p., 102; Concentric, 2010, p. 124). Fortunately, there are several mechanisms available for removing barriers and providing incentives to encourage utilities to engage in CDM. Based on a survey of the experiences of regulators and utilities since the 1980's, the Pembina Institute suggests that a successful CDM strategy should employ mechanisms aimed at achieving the following three key outcomes: 1) recovery of program costs, 2) compensation for lost revenues, and 3) financial incentives for utilities engaging in CDM (Peters & Papineau, 2004, p. 5).

Utility profits have historically depended on the volume of electricity sold

Recovery of program costs

When utilities make investments in generation resources or expansions to their distribution networks, they can typically recover such investments over time through increased revenue as a result of the increased electricity sales resulting from their investments. By contrast, the expenses associated with CDM programs cannot be recouped by utilities in the form of increased electricity sales because successful CDM programs actually reduce electricity sales.

Therefore, a mechanism for recovering the costs of creating and running CDM programs must be provided to utilities — otherwise running CDM programs is likely to be avoided as a strictly money-losing proposition.

Compensation for lost revenues

To understand why it is necessary for utilities to be compensated for lost revenues due to their CDM activities, it is important to understand that customer billing usually involves a combination of volumetric charges (i.e. charges that accrue based on the volume of electricity used) and fixed charges (i.e. charges that don't vary with system use). Volumetric charges include both energy charges, which recoup the costs of procuring energy, and distribution rates, which cover a utility's non-energy costs (e.g. the costs of capital, labour, and other inputs required to operate a utility system (Lowry & Makos, 2010, p. 4)). Because energy charges typically track the costs of procuring energy fairly closely (Lowry & Makos, 2010, p. 3), a utility's profits typically rely on distribution rate revenue being greater than distribution and customer service costs (Lowry & Makos, 2010, p. 11) [17]. Since the lion's share of the distribution rate revenue is still typically collected through volumetric charges, if electricity usage declines, so too does the utility's distribution rate revenue, and with it, profits (Lowry & Makos, 2010, p. 11).

Allowing utilities to recover the program costs and lost revenues associated with CDM activities removes the financial *disincentive* for utilities, but it still doesn't provide an *incentive* to engage in CDM.

Revenue decoupling

One way of addressing this issue is to move towards revenue decoupling rate design. Revenue decoupling refers to breaking or weakening the dependence of a utility's revenue on the volume of electricity it sells (Lowry & Makos, 2010, p. 4). Revenue decoupling mechanisms keep a utility's earnings constant over time by adjusting rates when actual electricity sales do not match sales projections[18]. In this way, revenue decoupling ensures that successful CDM programs will not directly cause a decrease in utility earnings (Blumstein, 2010, p. 6233). Common revenue decoupling mechanisms include lost revenue adjustment mechanisms (LRAM's), true-up plans, and straight fixed variable ("SFV") pricing (Lowry & Makos, 2010, p. iii).[19]

Providing incentives and penalties

Allowing utilities to recover the program costs and lost revenues associated with CDM activities removes the financial disincentive for utilities to engage in CDM, but it still doesn't provide an *incentive* for utilities to engage in CDM (Shirley & Schwartz, 2009, p. 5). The purpose of providing utilities with incentives is to motivate them to pursue CDM aggressively so that they meet and exceed CDM goals. Different approaches to providing utilities with incentives for CDM can and have been used in various North American jurisdictions (Concentric, 2010,

17 In addition, a utility's distribution and customer service costs do not typically decrease in direct proportionality to reductions in customer electricity use (e.g. when a customer decreases his or her use of electricity, that does not reduce the cost to the utility of maintaining the customer's account or maintaining the wires that carry electricity service into his or her house).

18 In cases where sales are greater than expected, rates are lowered, and in cases where sales fall short of expectations, rates are increased.

19 For descriptions of lost revenue adjustment mechanisms (LRAM's), true-up plans, and straight variable pricing (SVP), see section 5 in Appendix D.

p. 27). Three prevalent approaches include performance target incentives, rate of return adders, and shared savings mechanisms (National Action Plan for Energy Efficiency [NAPEE], 2007, p. 6-1)[20].

4.3 Do electricity pricing policies send price signals that encourage consumers to engage in CDM?

As might be expected with any resource, research shows that consumers modify their use of electricity in response to price: increasing use as the price falls and decreasing use as the price rises (Alberini et al., 2011, p. 871; Long, 1993, p. 238). For example, in 2010, Alberini et al examined energy use data from 69,000 homes in the United States' 50 largest metropolitan areas between 1997 and 2007. They found that households responded strongly to energy prices both in the short and long term, and that electricity use was characterized by relatively high price elasticity of demand[21] (Alberini et al, 2011, p. 880). Therefore, policies that artificially lower the price of electricity are likely to have a detrimental effect on conservation efforts, whereas policies that require electricity prices to at least cover the costs of providing electricity to consumers should encourage consumers to decrease electricity use as the costs of generation, transmission and distribution increase.

Policies that artificially lower the price of electricity are likely to have a detrimental effect on conservation efforts.

By the same logic, policies that make electricity more expensive during periods of high demand should encourage consumers to shift their energy use away from high demand periods. This supposition is supported by numerous studies on Time-of-Use (TOU) and critical peak (CPP) electricity pricing (Mountain, 1993; Newsham & Bowker, 2010; Herter and Wayland, 2010)[22].

4.4 Does the framework attempt to address financial barriers to consumer investment in CDM, (e.g. high first costs and inability to access capital)?

Numerous studies have observed what appears to be an 'energy-efficiency gap' in the marketplace, meaning that energy users seem to implement energy saving measures at rates far below what would be expected given the cost-effectiveness of those measures (Weber, 1997, p. 833; Brown, 2001, p. 1198; Howarth & Andersson, 1993, p. 263). Several barriers contributing to this gap have been identified by such studies: among them, the high upfront costs of implementing energy-saving measures, and the lack of access to affordable financing (Fuller, 2009, p. 23; Persram, 2011b, pp. 10-12).

20 For descriptions of performance target incentives, rate of return adders, and shared savings incentive mechanisms, see Section 5 in Appendix D.

21 Price elasticity of demand is a measure of how changes in price influence the use of a commodity, in this case, electricity (Electric Power Research Institute [EPRI], 2008, p.1). Price elasticity of demand is the percentage of a change in commodity usage that can be attributed to a one-percent change in the price of that commodity. If price elasticity were equal to -1, then, all other influences being equal, a 10% increase in the price of a commodity would result in a 10% decrease in its use (10% x [-1] = -10%) (EPRI, 2008, p. 1). In the case of electricity, the study by Alberini et al (2011) found that electricity had a price elasticity of demand between −0.667 and −0.860, meaning that every 10% increase in the price of electricity should result in a decrease in electricity use of between 6.67% and 8.6% (Alberini et al, 2011, p. 870).

22 For definitions of time-of-use and critical peak electricity pricing and descriptions of how these pricing schemes impact conservation electricity use behaviour, see Section 6 in Appendix D.

Up-front costs

Energy efficient products and services typically cost more than their standard efficiency or low-efficiency counterparts, which acts as a barrier to investment in CDM measures (Zhao, 2012, p. 296). One method of reducing the initial outlay of capital required to implement conservation measures is to provide financial incentives that cover some or all of the cost of purchasing an energy efficient product or service. Financial incentives can take different forms, such as tax credits, purchasing rebates, or grants (Zhao et al., 2012, p. 292). While research indicates that willingness to invest in energy-savings measures varies with the type of measure and with the size of the incentive being offered (Zhou et al., 2012, p. 294)[23], generally, studies show that financial incentives do increase the pace of investment in CDM measures (Stern et al, 1985, p. 136). This makes a case for programs that provide incentives to offset or eliminate the incremental cost of energy-saving products and services.

Lack of access to affordable financing

Lack of access to affordable financing is consistently identified as a major barrier to increased engagement in CDM projects.

Affordable financing encourages investment in CDM because it allows the electricity consumer to spread the cost of investment over time, thus reducing the size of the initial capital outlay required. However, lack of access to affordable financing is consistently identified as a major barrier to increased engagement in CDM projects like building retrofits to increase energy efficiency (Efficiency Valuation Organization [EVO], 2009; Morrison Park Advisors, 2010; Rodney Wilts, personal communication, Dec. 2, 2010; Persram, 2011b, p. 1; Porter, 1980, v. 1, pp. 142-143). Factors such as lack of available capital, tying up equity capital, and high interest rates can make conventional financing options unattractive for CDM projects (Morrison Park Advisors, 2010, p. 7). Some alternatives to conventional financing include performance contracts with energy service companies (ESCO's), government grants, subsidies and loans, credit-enhanced capital pools, property-assessed financing, and utility-based on-bill financing (Kaiser, Olatubi & Pulsipher, 2005, p. 873; Zhao et al., 2012, p. 292; Morrison Park Advisors, 2010, pp. 8, 23, 26; Persram, 2011a).

5. Creating a comprehensive CDM program portfolio

The following questions will be used to explore the theme of comprehensive CDM program offerings.

5.1 Has the framework produced CDM programs that cover all sectors and geographic areas in the province?

Potential for improvements in energy efficiency exist for nearly all energy consuming devices and processes, so opportunities for energy savings exist in all sectors of the economy, scattered across an astounding variety of users and end-uses (McKinsey & Company, 2009, p.14). Therefore, it follows that a policy framework seeking to achieve significant energy savings should provide a

23 This observation is consistent with the views of some behvioural theorists, who suggest that incentives may also function as attention-getting devices, so the size of the incentive needs only to be large enough to attract attention to the need for the CDM measure (Stern et al, 1985, p. 135). This could account for different CDM measures of equivalent economic benefit needing different incentive levels to induce uptake.

comprehensive portfolio of CDM program offerings targeted at a wide variety of energy users across all economic sectors and geographic regions of the province (The Leadership Group, 2008, p. 6-7).

5.2 Has the framework produced programs targeted at hard-to-reach customer segments like low-income consumers, First Nations communities, and very small businesses?

A comprehensive approach to CDM programs is important not only because comprehensive programming stands to exploit a wide variety of opportunities to save energy, but also because it offers all energy users in the province access to energy saving opportunities regardless of their economic status or geographic location. One challenge in implementing CDM programs, however, is that program participation is limited to consumers who are aware of the programs and how to participate in them — and not all customers have the same access to such information, or the same ability to participate in the programs they do know about. One way to increase the penetration of programs into hard-to-reach customer segments is to tailor programs' marketing, instruments, and incentives to particular target groups (Peters, 2006, p. 17). Segments of electricity consumers who are commonly harder to reach include low-income customers, First Nations communities, and very small businesses (The Leadership Group, 2008, p. 6-7). Therefore, a comprehensive and inclusive program portfolio should include programs that target these hard-to-reach consumers (Quantum Consulting Inc., 2004, p. S-17).

One challenge in implementing CDM programs is that participation is limited to consumers who are aware of the programs and how to participate in them.

5.3 Does the framework encourage the development of innovative programs?

One of the best practices identified in several reports as characteristic of successful CDM policy frameworks was that they foster the development of innovative CDM programming (Quantum Consulting, 2004; Sciortino, 2010; McKinsey & Co., 2009). For example, in its survey of state-led energy efficiency programs, the American Association for an Energy Efficient Economy (ACEEE) observed that one of the key features of leading state programs was that they leveraged existing utility programs and coordinated with utilities to supplement the existing programs with innovative and effective offerings (Sciortino, 2010, p. 6). Similarly, in their 2009 report on unlocking the energy efficiency potential in the United States, McKinsey & Co. recommended implementing CDM portfolios that integrate proven, piloted and emerging CDM strategies, and argued that sustaining innovation is necessary to realizing future gains in energy productivity (McKinsey & Co., 2009, p. xii-xiii, 96).

5.4 Does the framework produce programs tailored to local markets using information about local users, energy end-uses and market conditions?

Tailoring programs to local conditions was also identified as a successful CDM strategy in several reports. For example, in their survey of best practices among energy efficiency programs throughout the United States, Quantum Consulting observed that much of a program's success can depend on understanding the market within which it will be implemented (Quantum Consulting, 2004, p. S-17).

This observation is supported by research which indicates that identical CDM programs can receive different levels of reception and achieve different levels of success based on the prospective clientele to which the program is being presented (Stern et al, 1985, p. 139-140). This suggests that implementation (e.g. promotion to the clientele, ability to gain trust, and success in simplifying the decision process and in assuring reliable work) is a very important factor in a program's effectiveness (Stern et al, 1985, p. 139-140). Therefore, understanding and tailoring programs to local market conditions should increase a program's chance of success, fostering effective relationships with relevant market actors and allowing program designers to recognize which lessons from other areas will transfer to the local market (Quantum Consulting, 2004, p. S-17).

5.5 Does the framework clearly define which activities and programs qualify to meet the targets?

Much of a program's success can depend on understanding the market within which it will be implemented.

The rationale for this criterion is that clarity about which types of activities qualify to meet CDM targets avoids stakeholders investing time and energy in designing CDM programs that they will not be able to implement or that will not contribute towards their targets.

5.6 Does the policy framework allow participation in CDM programs to be simple?

Real or apparent complexity can act as a barrier to participation in CDM programs. Therefore, processes for applying to programs, reporting results, invoicing for incentives, etc., should be as simple and streamlined as possible (given the need for appropriate quality control, verification, and evaluation) (Quantum Consulting, 2004, p. S-21).

6. Using well-defined EM&V protocols

One aspect that was highlighted nearly universally in the reports summarizing best practices in CDM policy and program design was the need for well-defined processes for monitoring and evaluating program effectiveness and for measuring and verifying program results (McKinsey & Co., 2009; Sciortino, 2010; Navigant Consulting, 2006; Bailie et al., 2006, etc.). The theme of evaluation, measurement, & verification (EM&V) protocols is explored using the following questions:

6.1 Does Ontario have well-defined protocols for tracking, evaluating, verifying, and reporting on program results?

Clearly defined EM&V protocols allow program designers to see how well programs perform and how much it cost to deliver them, which is information that can then be used to improve program design and appropriately allocate CDM funding (OPA, 2011d, p. 2; McKinsey & Co., 2009, p. 107; Bailie et al., 2006, p. 19). Real or perceived inaccuracies and uncertainty in estimating energy savings are at the root of many critiques of energy conservation policies (Bailie et al., 2006, p. 19), so the ability to produce verified results showing the real effects of programs can be a powerful tool in gaining buy-in to CDM from

the public and other stakeholders. As such, clear EM&V processes are critical to establishing conservation as a credible and reliable resource.

While it is true that precisely measuring energy savings from CDM policies and programs can be very difficult, the International Energy Agency (IEA) asserts that the evaluation techniques that have been developed and refined over the past 30 years are capable of estimating energy savings with an acceptable level of precision (Geller & Attali, 2005, p. 30). Key evaluation techniques that the IEA advocates applying to all energy efficiency programs include 1) directly measuring "before and after" savings, 2) estimating "free ridership" and net savings by surveying participants and non-participants, and 3) analyzing utility bills (Geller & Attali, 2005, p. 30).

Real or perceived inaccuracies and uncertainty in estimating energy savings are at the root of many critiques of energy conservation policies.

6.2 Are EM&V protocols applied consistently across the province and updated regularly?

Consistency is a key quality of any good EM&V system (McKinsey & Co., 2009, p. 107). Standardizing EM&V processes so that all parties use the same set of metrics and assumptions allows program results to be compared and legitimately aggregated towards a provincial target. Protocols should also be updated as better information becomes available (Bailie et al., 2006, p. 19).

6.3 Does an audit office review and report on energy savings?

Potential conflicts of interests arise when the people evaluating and verifying program savings are the same people who are implementing the programs delivering those savings — particularly when monetary incentives are awarded based on verified results. Therefore, it is important that program results should be reviewed or audited by a disinterested third party. This aids in assuring stakeholders that the costs and benefits of CDM activities have been transparently assessed and that program results are legitimate.

6.4 Do cost-effectiveness tests and performance metrics assign value to program results in a manner that is consistent with social and environmental policy objectives?

The section on long term commitment will assess whether or not cost-effectiveness tests and performance metrics support the policy objective of market transformation, so this question will address only whether the current framework's cost-effectiveness tests and performance metrics support the following two social and environmental policy objectives: 1) the government of Ontario's objective of providing low income Ontarians with access to energy-saving measures (Duguid, 2010b, p. 2), and 2) the government's goal of securing an environmentally sustainable energy supply (Office of the Premier of Ontario, 2005).

Programs for low-income consumers

Programs targeting low-income consumers typically do not perform well when their cost-effectiveness is assessed using a total resource cost (TRC) test (Winfield & Koveshnikova, 2009, p. 41). Therefore, different metrics (e.g. decreased arrears management costs, etc.) may be needed to assess their cost-effectiveness and evaluate their performance (Concentric, 2010, p.100). As a

consequence, policy makers who assign importance to offering low-income CDM programs often stipulate that the cost-effectiveness of low-income programs will be assessed differently from other programs, or that other criteria will be considered when deciding whether or not to pursue such programs (Winfield & Koveshnikova, 2009, p. 41). One common approach is to screen low-income programs using a Social Cost Test (SCT), which differs from a TRC test in that it uses a different discount rate (a lower, societal discount rate rather than a market rate), and includes the costs and benefits of such externalities as avoided environmental degradation, energy security, and national security concerns (CPUC &CEC, 2001, p.18; Winfield, 2009, p. 22). Policy-makers may also specify that low-income programs need only pass a lower cost-effectiveness threshold (e.g. of 0.6-0.75 as opposed to 1.0) (Concentric, 2010, p. 6), or may use an adder or a multiplier when assessing the cost effectiveness of low-income programs, so that in TRC test calculations, benefits are increased by a set percentage or amount (Winfield & Koveshnikova, 2009, p. 35). Still another approach is to waive the need for low-income programs to pass cost-effectiveness tests altogether.

One problem with using the most common cost-effectiveness tests to screen programs is that they lack the mechanisms to capture the costs of environmental externalities.

Environmental sustainability

One problem with using the most common cost-effectiveness tests to screen programs (e.g. TRC, RIM, PCT, PAC, etc.[24]) is that they lack the mechanisms to capture the costs of environmental externalities, so they don't take the environmental sustainability of prospective programs into account during screening. As with low-income programs, one common approach to capturing the environmental impacts of a program in a cost-effectiveness test is to use a Societal Cost Test, which typically uses adders in its cost-effectiveness calculations in order to represent the externalized costs of things like environmental damage and the negative health impacts caused by power generation (CPUC &CEC, 2001, pp. 19-21).

6.5 Is the budget and time devoted to EM&V activities appropriate?

It has been established that performing EM&V on CDM activities is of critical importance to the success of CDM programs and policies; however, evaluating CDM program effectiveness by its very nature involves a trade-off between careful measurement and evaluation on the one hand, and simplicity and cost minimization on the other (Geller & Atali, 2005, p. 30). Therefore, EM&V protocols should also include guidelines on how much funding, time and effort are appropriate to devote to EM&V activities, so that the time and effort devoted to such activities strikes an appropriate balance between the need for accuracy, the needs to minimize costs and produce evaluation results in a timely manner[25]. For a discussion of how much time and energy is appropriate to devote to EM&V activities, see section 9 of Appendix D.

24 Total Resource Cost Test, Ratepayer Impact Measure test, Participant Cost Test, Program Administrator Cost test.

25 The level of detail with which program data is tracked influences the amount of time and labour (e.g. data entry burden) required from program staff who would otherwise be conducting program activities. As a result, a very comprehensive tracking system is likely to be of little value if staff does not have adequate time to support it, and EM&V processes that are so detailed that they cause a slowdown in pursuing CDM are unlikely to merit their expense (Quantum Consulting, 2004, p. S-20; McKinsey & Co., 2009, p. 107).

Section 4: Treating CDM as a priority resource

The first theme up for discussion is the issue of whether Ontario's CDM policy framework treats CDM as a priority resource in energy policy and energy planning.

1. Is CDM recognized and treated as a resource in energy policy?

If energy policy treats CDM as a **resource**, one would expect that it would receive the same or similar treatment in policy documents as other recognized electricity resources like electricity generation (e.g. from wind, hydro, nuclear, natural gas, etc.).

2. Is CDM integrated into energy planning and given priority over other energy resources?

If CDM is given **priority** over other electricity resources, one would expect that the policy framework should specify that CDM is to be pursued to the greatest extent possible before the procurement of other electricity resources. Whether Ontario's CDM policy framework treats CDM as an electricity resource on at least equal footing with other electricity generation resources depends on the policy documents being examined. The language in some documents, like the Ministry of Energy's Long Term Energy Plan, refers to CDM as Ontario's first and best electricity resource, while others, like the Electricity Act, give CDM parallel treatment with generation and transmission in some places but not in others.

Legislation

The Electricity Act, 1998, is probably the most important electricity-related piece of legislation in Ontario. The Electricity Act charges the OPA with assessing the adequacy and reliability of electricity resources in the province, and stipulates that in its assessment of electricity resources, the OPA must "consider generation and transmission capacities and technologies **and conservation measures**" (EA, 1998, Part II.2, s.25.29 (1&2), my emphasis). This wording recognizes CDM as an electricity resource, but the phrasing doesn't give CDM equal footing with generation and transmission. An example of wording that would, grammatically, have put CDM on equal footing with generation and transmission is "consider generation**,** transmission **and conservation** capacities and technologies" because it would require the OPA to consider the *capacity* for conservation and not just unspecified amounts of "conservation measures".

On the other hand, in setting the objects and character of the OPA, the Electricity Act specifies that one key component of the OPA's mandate is to

"conduct independent planning for electricity generation, **demand management, conservation** and transmission and develop integrated power system plans for Ontario" (EA, 1998, Part II.1, s.25.2b, my emphasis). In this clause, generation, CDM, and transmission are given grammatically parallel treatment, with no explicit priority given to any one over the others.

In another section of the Electricity Act, however, the clause granting the OPA power to enter into *generation* contracts is worded as "the OPA has the power, … to enter into contracts relating to the procurement of electricity supply and capacity in or outside Ontario" (EA, 1998, s. 25.2 (5)b), whereas the clause that grants the OPA the power to enter into contracts to procure electricity *demand reduction* is worded as "the OPA has the power, … to enter into contracts relating to the procurement of reductions in electricity demand and the management of electricity demand ***to assist the Government of Ontario in achieving goals in electricity conservation*** " (EA, 1998, s. 25.2(5)bcd, my emphasis). By providing the additional context of assisting the Government of Ontario with its electricity conservation goals, the wording of the clause implies that demand reduction procurement contracts are something to be done only to assist the Government with its electricity conservation goals, rather than being something that should be done simply as a matter of good electricity system planning. From a rhetorical perspective, the result is that the degree to which conservation should be pursued is explicitly tied to government policy direction, whereas the procurement of other electricity resources (generation and transmission) is a necessary matter of course, and not dependent to the same extent on government direction. Therefore, while legislation in Ontario treats CDM as an electricity resource, it does not require that energy planners give CDM equal footing with, or priority over, other electricity resources.

While Ontario's policy documents do recognize CDM as an electricity resource, they do not prioritize CDM over other electricity resources

Long term energy plan (LTEP)

However, by tying investment in conservation to government policy goals, the Electricity Act does provide for the *possibility* that government policy goals may specify that CDM is to be given priority over other electricity resources. Government policy goals under the current CDM policy framework are laid out in the government's November 2010 Long Term Energy Plan (LTEP) and February 2011 Supply Mix Directive. With respect to treating CDM as a priority resource, the LTEP's section on supply starts promisingly by referring to conservation as Ontario's "best and first resource" (Ministry of Energy, 2010, p.16). The LTEP also presents its future demand forecast as the net of conservation (i.e. the demand that is left over after first subtracting the projected effects of conservation from the overall projected increase in demand), which implies that the government's preferred approach to energy planning is to first estimate the extent to which demand can be reduced through conservation, and then to decide how best to meet the remaining demand with generation resources (Ministry of Energy, 2010, p. 13). However, nowhere does the LTEP *explicitly* state that CDM shall be prioritized over other electricity resources in energy planning.

Supply mix directive

The supply-mix directive to the Ontario Power Authority continues this treatment of CDM by discussing conservation first, of all the methods of addressing electricity demand, and even instructing the OPA to exceed and accelerate achievement of CDM targets where feasible and cost-effective. This implicitly suggests that conservation should be treated as the first priority in meeting demand (DuGuid, 2011, p. 1). However, like the LTEP, the Supply Mix Directive fails to *explicitly* state that conservation should be given priority over electricity generation resources.

Thus, while Ontario's policy documents do recognize CDM as an electricity resource, they do not prioritize CDM over other electricity resources. Specifically, Ontario's CDM policy framework does not contain a California-style loading order specifying that all cost-effective conservation must be pursued before employing supply-side electricity resources[26].

3. Does the framework set aggressive, binding targets for both energy (GWh) and demand (MW) savings?

The LTEP and the supply mix directive set province-wide targets for both demand (MW) and energy (TWh) savings up to the year 2030: 7100MW and 28TWh, respectively, relative to a 2005 baseline year (Ministry of Energy, 2010, p. 40). The LTEP also sets interim milestone targets for the ends of 2015, 2020, and 2025. The targets can also be broken down into portions to be achieved through different CDM activities, such as the implementation of codes and standards, the implementation of time-of-use pricing, and the implementation of CDM programming. In addition, Ontario's LDCs have been given their own targets for the 2011-2014 period — a period ending one year before the 2015 milestone (DuGuid, 2010d). For convenience, the targets are summarized in Table 4.1, below.

Table 4.1: Long-Term Provincial CDM Targets and Milestones

Date	2015	2020	2025	2030
Capacity	4,550 MW	5,840 MW	6,700 MW	7,100 MW
Generation	13 TWh	21 TWh	25 TWh	28 TWh

26 This in itself does not necessarily mean that conservation can't be prioritized under the existing policy framework, but it means that the existing policy framework doesn't explicitly require energy planners to prioritize CDM. Insofar as the framework allows the government to set CDM targets that must be integrated into electricity system planning, it allows for the possibility that CDM may be prioritized over other resources in the case where the government sets CDM targets that are sufficiently binding and ambitious so as to make the government's Supply Mix Directive a de facto prioritization of CDM for energy planners. Nevertheless, the fact remains that the prioritization of CDM over other energy resources is not built into Ontario's energy policy and planning framework.

If these targets are expressed as amounts to be achieved during each milestone period, they appear as presented in Table 4.2, below:

Table 4.2: Target Amounts Corresponding with Milestone Periods

Period	2005-2010	2011-2015	2016-2020	2021-2025	2026-2030
Capacity	1752 MW*	2698 MW*	1290 MW	860 MW	400 MW
Generation	13 TWh		8 TWh	4 TWh	3 TWh

LDC targets	2005-2010	2011-2014
Capacity	N/A	1330 MW
Generation	N/A	6 TWh

*Achieved vs. Remaining Target (ECO, 2010a, p. 13)

As can be seen above, the government has set targets for both energy savings (in TWh) and demand savings (in MW), both of which are desirable for reasons discussed in the introduction to this paper.

Assessing Ontario's CDM targets: Are they binding?

Who is responsible and accountable for meeting targets?

When asking whether Ontario's CDM targets are binding, the first question that comes to mind is 'binding upon whom?' Who is responsible and accountable for meeting the targets? The Ministry of Energy set the targets through the Supply Mix Directive, so it is ultimately accountable to the people of Ontario for ensuring that its policies are implemented. However, since the government outsources energy planning and the management of the electricity supply mix to the OPA, the responsibility really falls to the OPA to incorporate the government's CDM targets into the province's energy plan, and to manage the province's electricity resources such that the CDM targets are met.

In terms of the OPA's accountability, the OEB's power to reject an integrated power systems plan (IPSP) that does not comply with the Minister of Energy's Supply Mix Directive makes the OPA accountable for including the government's CDM targets in its IPSP. However, beyond the approval of the IPSP, there is really no enforcement mechanism for ensuring that the OPA follows through on actually achieving the government's CDM goals. For example, in his 2010 review of CDM progress in Ontario, Environmental Commissioner Gord Miller took stock of the OPA's progress on the 15 CDM-related directives that were issued between 2005 and 2009. Miller observed that while there were several instances where action on directives had languished and energy savings stipulated in directives had not been achieved, the OPA could not effectively be held to account for its lack of timely progress because the Minister of Energy lacked a mechanism for enforcing compliance with directives (ECO, 2010a, pp. 23-25). In this sense, the provincial CDM targets do not appear to be binding because there is no mechanism to hold the OPA to account for ensuring that provincial targets are met.

However, the overall provincial CDM targets have been divided into smaller pieces by adopting 5-year milestones and then by dividing the first milestone target (for 2015) among different types of CDM initiatives: codes and standards,

time-of-use pricing, and CDM programming. Accountability for achieving this last portion of the first milestone target — savings from CDM programming — has largely been given to the LDCs[27]. As allowed under the GEAGEA, the Minister of Energy issued a directive to the OEB in the spring of 2010, instructing the OEB to require the province's LDCs to collectively meet a peak demand reduction target of 1300MW and an energy savings target of 6TWh by Dec. 31, 2014 as a condition of their operating licences (DuGuid, 2010d, p. 1). This effectively means that if an LDC fails to meet its CDM targets, the OEB could revoke its licence to distribute electricity in Ontario. That is about as binding as you can get[28].

If an LDC fails to meet its CDM targets, the OEB could revoke its licence to distribute electricity

Therefore, the LDC portions of Ontario's CDM targets up to the year 2014 are officially binding; however, accountability for meeting the rest of the targets is unclear. As the energy planner and steward of Ontario's electricity supply mix, one would expect the OPA to be accountable by some mechanism for the meeting of the CDM targets, but apart from the Minister putting pressure on the OPA's government-appointed Board of Directors, no such mechanism exists (ECO, 2010a, p. 25)[29].

Are Ontario's CDM targets ambitious?

In order to answer this question, one first needs to clarify how one assesses the ambitiousness of Ontario's targets. One method is to compare Ontario's targets to those adopted by leading jurisdictions. Another is to compare Ontario's current targets to what has been achieved by Ontario in the past, and a third method is to compare the targets to estimates of how much potential for conservation exists in the province. Each one of these methods will be explored in turn.

Comparison with other jurisdictions: Are Ontario's CDM targets ambitious?

In 2011, the American Council for an Energy-Efficient Economy (ACEEE) evaluated and ranked US states on their energy efficiency policies. Several criteria were used, including the adoption of binding, long-term energy efficiency targets (Sciortino et al, 2011, p. 19). Since states did not have identical electricity loads or target timelines, for the purposes of comparison, the ACEEE converted each state's energy savings target into an average annual percentage of the load forecast (Sciortino et al, 2011, p. 20). For example, by their methodology, Ontario's current target to achieve 28TWh of cumulative energy

27 Conservation programs for transmission-connected customers are being delivered by the OPA, and CDM programs for First Nations and Metis peoples are being delivered by a third party under contract to the OPA.

28 However, whether it is actually possible or desirable to revoke a distributor's licence should it fail to meet its CDM target is a question that has yet to be answered - e.g. who would supply Toronto with electricity if Toronto Hydro's licence were revoked? The OEB's response to this issue when raised at an FAQ session in 2010 was essentially 'we will cross that bridge when we come to it' (OEB, 2010d, p. 6).

29 It is also worth noting that the parties bound to meet the CDM program savings targets (the LDCs) do not have control over the design of the bulk of the CDM programs that will be employed to achieve those savings. Therefore, there is a disconnect between who designs the programs (the OPA) and who bears all the risk if the programs fail to produce the anticipated savings (the LDCs). This is problematic.

savings by 2030 relative to a 2005 baseline on a load forecast of 165.6TWh[30] would be expressed as an average annual reduction of 0.68%[31]. Once energy targets were converted to annual averages, they were scored by ACEEE according to the following scheme:

Figure 4.1: ACEEE Scoring Scheme

Percent Savings Target or Current Level of Savings Met	Score
1.5% or greater	4
1% – 1.49%	3
0.5% – 0.99%	2
0.1% – 0.49%	1
Less than 0.1%	0

(Sciortino et al, 2011, p. 20)

Ontario would finish behind at least 17 of the 50 states evaluated.

Under this scoring scheme, Ontario would be awarded a maximum of 2 points for its energy reduction target of 0.68%/yr. By contrast, the leading jurisdictions in the energy savings target category all scored between 3.5 and 4 points, which means that they aimed to reduce energy consumption by at an average of least 1% per year over the terms of their targets (Sciortino et al, 2011, p. 20). To put Ontario's would-be score of 2 into context, in the ranking of states, Ontario would finish behind at least 17 of the 50 states evaluated, with all but three of the states who finished below Ontario having scored a zero in the category (Sciortino et al, 2011, pp. 6-7). Seen in this light, Ontario's energy savings target doesn't appear very ambitious.

However, under the ACEEE's scoring system, states can earn an extra half point for the inclusion of natural gas targets or lose up to a point and a half if targets aren't binding and cost caps impede states from meeting targets. This makes the scoring system a bit problematic, despite the attraction of being able to compare Ontario's overall provincial targets with state-wide targets. Fortunately, the ACEEE scorecard also ranks states in terms of actual savings achieved through ratepayer-funded CDM programs.

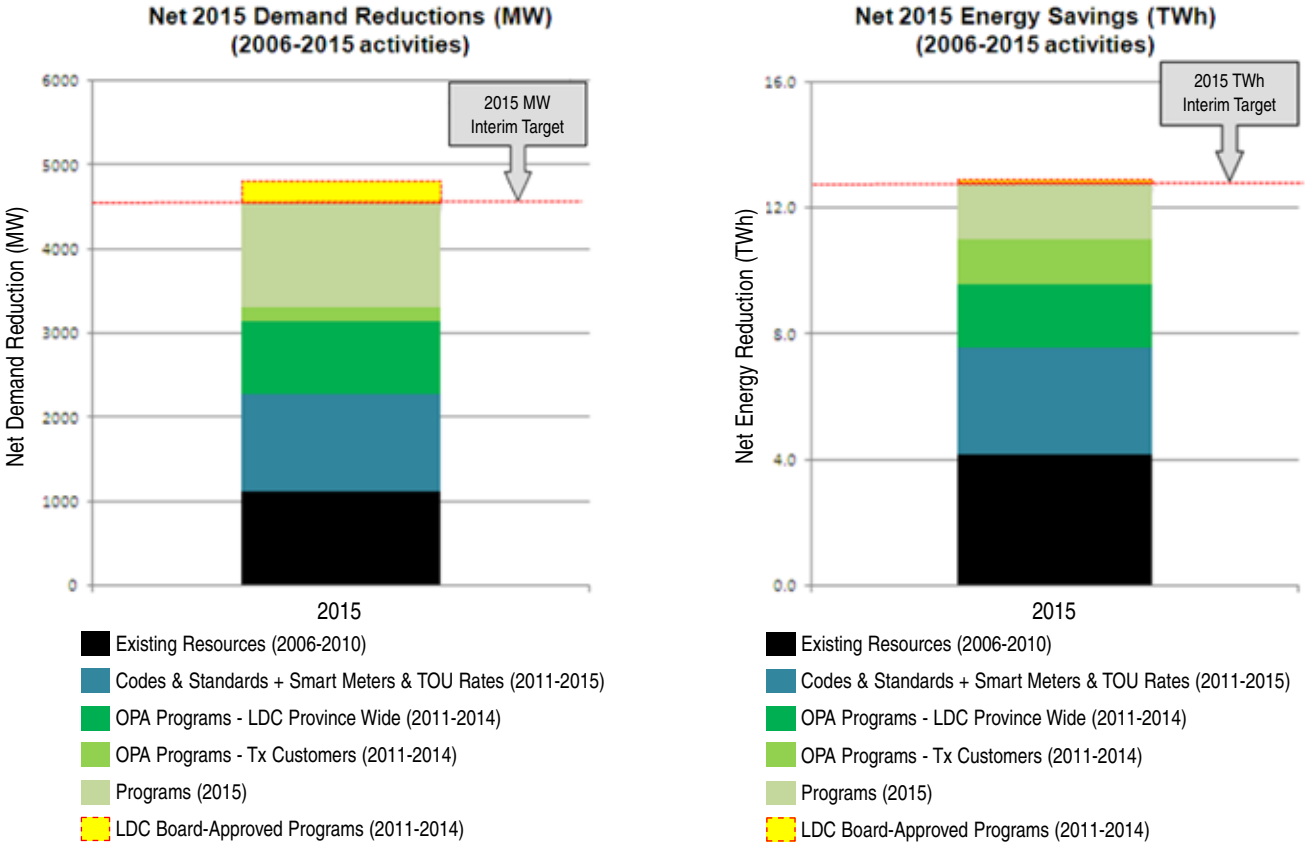
In order to make a fair comparison between savings from state CDM programs and Ontario's projected CDM program savings, the portion of Ontario's 2030 target expected to come from CDM programs needs to be separated from the overall savings target. However, a breakdown of the 2030 target by activity is not available, so a comparison will have to be made with the CDM programming portion of Ontario's 2015 milestone target, which is broken down

30 The OPA's electricity load forecast for 2030 is approximately 165TWh/year under a medium growth scenario (OPA, 2011g, p. 33). This forecast is the net of conservation - i.e. it includes a cumulative conservation target of 28TWh (OPA, 2011i, p. 7). This means that in the absence of conservation, demand for electricity would be expected to be more than 165TWh/year by 2030. Since I have been unable to obtain precise pre-conservation load forecast data from the OPA, I have assumed that the 3TWh of energy use savings to be achieved between the end of 2025 and the end of 2030 will be achieved evenly over that 5-year period at a rate of 600GWh/year. This would make Ontario's pre-conservation annual demand forecast 165.6TWh in 2030.

31 The figure 0.68%/yr is arrived at by the following calculation: [(Target/Load Forecast)x100%]/(# of years over which target will be achieved) = [(28TWh/165.6TWh)x100%]/(2030-2005).

by forecasted source of savings in the OPA's IPSP Planning and Consultation Overview document. A visual representation of this breakdown is shown in **Figure 4.2** below (OPA, 2011h, p. 4-6).

Figure 4.2: OPA Forecast for Meeting the 2015 Interim Milestone

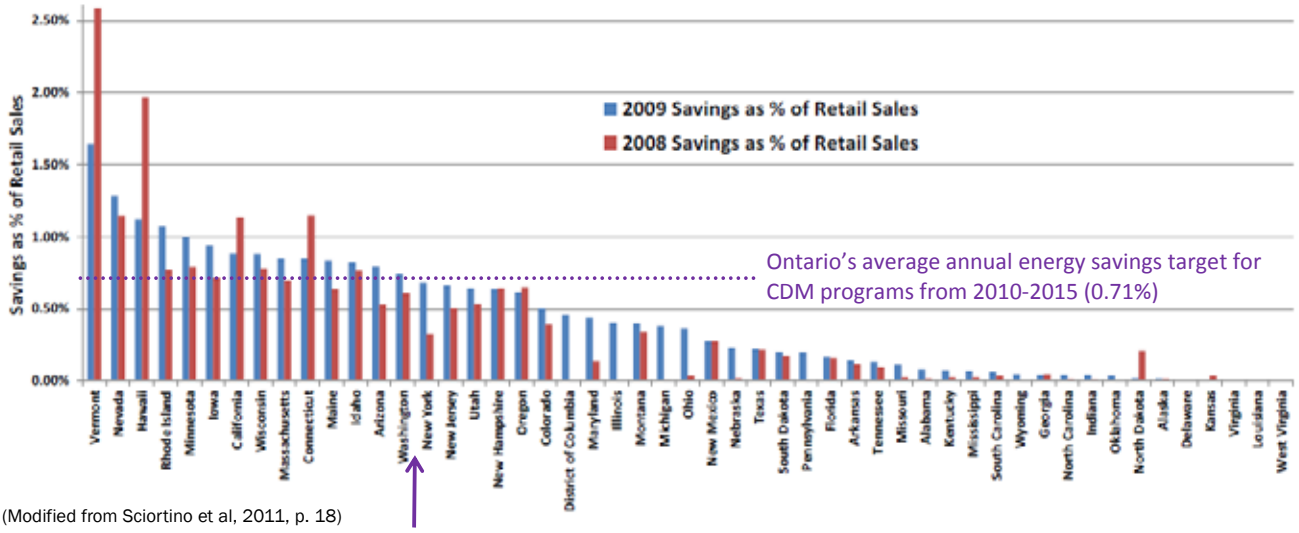


(OPA, 2011h, p. 4-6)

Pulling numbers from the Energy Savings figure on the right yields a rough estimate that approximately 5.2TWh of the 2015 milestone target (13TWh) are projected to come from CDM programming. Combining this figure with Ontario's post-conservation energy use forecast of 146TWh in 2015 yields an average annual reduction in forecasted electricity sales of 0.71%[32] (OPA, 2011h, p. 2-4). This average annual savings percentage of 0.71% is represented by the dotted purple horizontal line in the graph below, and Ontario's would-be ranking among the US states is represented by the purple arrow.

32 Ontario's post-conservation demand forecast for 2015 is approximately 146TWh in energy use (OPA, 2011h, p. 2-4). If the forecast is correct, this quantity of energy should be approximately equal to the quantity of electricity sold in 2015. This would make for a valid comparison with the state data on annual energy savings as a percentage of state energy sales. Ontario's target for energy savings from CDM programming as a percentage of the province's 2015 demand forecast is approximately 3.56%, which translates into an average reduction of 0.71% per year from 2011 and 2015, inclusive. The figure of 0.71% was arrived at by the following calculation: [(5.2±0.17 TWh)/146TWh*100%]/[2015-2011+1] = 0.7123% ±0.023%. This percentage is higher than it would be if it were calculated for the entire 2005-2030 period due to the front-loading of Ontario's Energy targets, meaning that a greater proportion of the savings are slated to be achieved in the earlier years of the target term than in the later years (ECO, 2011b, p. 13).

Figure 4.3: Electricity Savings from U.S. Ratepayer-Funded CDM Programs in 2008 and 2009



(Modified from Sciortino et al, 2011, p. 18)

At an average of 0.71% saving per year, Ontario's energy savings target would put the province among the top 15 states in the U.S. with respect to 2009 energy efficiency savings. This makes Ontario's energy savings target look moderately ambitious[33].

Comparison with Ontario's past CDM performance: Are Ontario's CDM targets ambitious?

Ontario Hydro undertook conservation activities in the late 1980's and early 1990's. Between 1989 and 1993, the utility's efficiency and conservation programs had achieved 1200MW in savings on a load of approximately 22,000MW in 1993 (Mallinson, 2011a, 2011b; OPA, 2011g, p. 18), which represents a reduction in demand of about 5.2% from what load would have been in the absence of such programs, and an average annual reduction in peak demand of about 1.03% over the five-year 1989-1993 period.

Ontario's next foray into conservation activities didn't occur until a decade later, when the Ontario government set the province a target of reducing electricity demand by 10% between 2005 and 2010. Although the province exceeded its 2007 milestone target of 1350MW, the final savings achieved over the 2005-2010 period were only 65% of the target for 2010 (OPA, 2009a, p. 4; ECO, 2011b, p. 14). This amounted to 1752MW in savings on a 2010 peak load of 25,075MW (IESO, 2012f) — making the savings achieved over the 2005-2010 period equivalent to approximately 6.5% of what the province's 2010 load would have been in the absence of the province's conservation activities. Dividing this percentage reduction by the six years during which the savings were achieved yields an average annual reduction of 1.09%.

For the purpose of comparison, if one converts Ontario's target for peak demand reduction over the 2011-2015 period into an average annual percentage relative to the 2015 pre-conservation demand forecast, one gets 3.22%/yr[34].

33 Data on peak demand savings targets was not available in the ACEEE scorecard report, so a comparison of Ontario's peak demand savings targets with savings achieved or targeted in US states is not provided.

For convenience, the above information is summarized in **Table 4.3**, below.

Table 4.3: Comparison of Current CDM Targets with Past Ontario CDM Performance

Period	Savings Achieved / (Savings Target)	Peak demand (or forecast) at the end of the period	Savings as a % of the pre-CDM system load at the end of the period	Average annual % reduction over savings period
1989-1993	1200MW	22,000MW	5.2%	1.03%/yr
2005-2010	1752MW	25,075MW[35]	6.5%	1.09%/yr
2011-2015	(2698MW)	(29,381MW)[36]	16.1%[36]	3.22%/yr

As can be seen from the comparison of average annual reductions in peak demand, Ontario's 2015 peak demand reduction target is approximately three times the average annual peak demand reduction achieved over the2005-2010 and 1989-1993 periods. Therefore, from this point of reference, the 2015 peak demand reduction target looks quite ambitious.[37]

The final savings achieved over the 2005-2010 period were only 65% of the target for 2010.

Nevertheless, in interviews, nearly all of the LDC representatives expressed a belief that the LDCs' 2011-2014 CDM targets were ambitious but achievable. There was also much agreement that the peak demand reduction target was going to be much more challenging to achieve than the energy savings target.

Nevertheless, several interviewees acknowledged that a huge potential for CDM savings exists — much greater potential than has been captured in the past or is aimed for with the current targets. From this observation, I infer that while the savings targets are viewed as ambitious and challenging, it is not because the potential for vast savings does not exist, but rather because vast savings may not be possible to capture under the current policy framework. This leads

34 Ontario's 2015 milestone peak demand reduction target is 4450MW relative to a 2005 baseline, which means achieving 2698MW over the 2011-2015 period (ECO, 2011b, p. 14). Ontario's peak load in 2011 was 25450MW (IESO, 2012f), and the OPA forecasts that peak demand will decrease by approximately 519MW (±24MW) between 2011 and 2015 (OPA, 2011g, p. 26). This gives a post-conservation forecast of about 24,931MW (±24MW) in 2015. Adding the province's 4450MW peak demand reduction target into this post-conservation forecast gives a pre-conservation forecast of 29,381MW. This makes the 2015 provincial target equivalent to reducing peak demand by approximately 16.1% (±0.01%) of the pre-conservation load forecast for 2015. This yields an average annual reduction of 3.22% per year over the 5 year period.

35 (IESO, 2012f)

36 The margin of error from reading the 2011-2015 change in peak demand off the OPA's graph does not significantly change the results of the calculations (see previous to last footnote).

37 This is a perception shared by many of the local distribution companies when comparing their 2011-2014 CDM program savings targets to what they achieved during the 2005-2010 period – particularly with respect to the peak demand savings target. As has been mentioned earlier, the Minister of Energy set the LDCs a collective demand reduction target of 1330MW and a collective energy reduction target of 6000GWh for the 2011-2014 period (DuGuid, 2010d). These targets were then divided up to provide each LDC with its own demand and energy reduction targets. To use just one utility as an example, Hydro Ottawa's targets for the 2011-2014 period were set at 85.26MW and 374.73GWh (OEB, 2010e, p.1). However, Hydro Ottawa's cumulative demand and energy savings for the Third Tranche period (from 2005-2008) were only 7.17MW and 77.9GWh (HONI, 2010a, p.11). This makes Hydro Ottawa's current targets look they have increased more than ten-fold and four-fold from what the utility was able to achieve during the Third Tranche period. Of course, not all of the LDCs targets seem to have jumped quite as dramatically, but this example illustrates why many utilities definitely view the targets as ambitious.

to the third means of assessing the ambitiousness of the current CDM targets: comparing them with estimates of conservation potential in Ontario.

Comparison with CDM potential estimates: are Ontario's CDM targets ambitious?

As mentioned in the introduction to this paper, numerous studies have investigated the extent of Ontario's energy conservation potential, taking into consideration different types of conservation and using different base consumption forecasts.

A huge potential for CDM savings exists — much greater potential than has been captured in the past or is aimed for with the current targets.

For example, the Pembina Institute's 2004 report entitled *Power for the Future: Towards a Sustainable Electricity System for Ontario* modelled the achievable potential for energy savings from a set of policies aimed at removing barriers to cogeneration in the industrial and commercial sectors, and at accelerating the uptake of energy efficient technologies and industrial processes through financial incentives and financing programs. The study found the policy interventions that were modelled could reduce electricity consumption by 73.5TWh and peak demand by 12.3GW by 2020 (Winfield et al., 2004, pp. 16, 22).

Another study, which was commissioned from ICF Consulting by the Ontario Power Authority in 2005, assessed the potential for electricity savings by 2025 from new efficiency improvement programming alone (i.e. it did not include savings from codes and standards, existing energy efficiency programs, fuel-switching, distributed generation, or other types of conservation). The study modelled energy efficiency savings under different CDM program scenarios and found the achievable potential[38] for electricity reduction under the most aggressive scenario to be 28.5TWh and 4.7GW in the year 2025 (ICF, 2005, p.34).

In contrast, Ontario's conservation targets for 2030 are 28TWh and 7.1GW, on a forecasted load of approximately 165.6TWh and 33.9GW in 2030[39] (Ministry of Energy, 2010, p. 41; OPA, 2011g, p. 33). In order to properly compare Ontario's conservation targets with these estimates of conservation potential, however, all figures need to be converted into equivalent units. This means correcting for differences in the number of years covered by the targets and potential estimates, and the size of the load forecasts on which the targets and potential estimates are based. Table 4.4 below lists Ontario's conservation targets and the Pembina and ICF reports in converted units, along with the load forecasts and timeframes on which those estimates and targets are based.

38 For a discussion of the difference between technical potential, economic potential and achievable potential, see section 4 in Appendix D.

39 The OPA forecasts that Ontario's electricity load will grow to approximately 165TWh/year and 26,800MW by 2030 under a medium growth scenario (OPA, 2011g, p. 33). This forecast is the net of the conservation that is expected to be achieved in Ontario over the forecast's timeframe – i.e. it includes a cumulative conservation target of 28TWh and a peak demand reduction target of 7,100MW (OPA, 2011i, p. 7). This means that in the absence of conservation, demand for electricity would be expected to reach 33,900MW and an unpublicized amount more than 165TWh/year by 2030. For the sake of simplicity, let us assume that the 3TWh of energy use savings to be achieved between the end of 2025 and the end of 2030 will be achieved evenly over that 5-year period at a rate of 600GWh/year. This would make Ontario's pre-conservation annual demand forecast for 2030 165.6TWh.

Table 4.4: Summary of CDM Potential Estimates and Ontario Targets

Sources of potential estimates / targets	Type(s) of CDM included in estimates / targets	Savings Potential Estimates / Targets (TWh, GW)	Reference load forecast (TWh, GW)	Timeframe	Savings potential estimates / targets (%/yr)[40]
Winfield / Pembina, 2004	Energy Efficiency, Fuel Switching, Cogeneration, Demand Response, & On-site generation.	73.5TWh and 12.3GW	181TWh and 30GW in the year 2020	2005-2020	Energy use: 2.7%/yr Peak demand: 2.7%/yr
ICF, 2005	Energy Efficiency	28.5TWh and 4.7GW	171TWh and 30GW in 2025	2005-2025	Energy use: 1.1%/yr Peak demand: 1.0%/yr
Ontario target for 2030	Energy Efficiency, Fuel Switching, Cogeneration, Demand Response, & On-site generation.	28TWh and 7.1GW	165.6TWh and 33.9GW	2005-2030	Energy use: 0.8%/yr Peak demand: 1.0%/yr

As can be seen from the figures above, Ontario's targets compare favourably with the ICF report's estimate of conservation potential available from energy efficiency improvements. However, the ICF report's estimate calculates conservation potential from energy efficiency only. When compared with the far more comprehensive conservation potential estimate from the Pembina Institute's report, Ontario's targets appear to fall significantly short of the province's available conservation potential.

4. Does Ontario have a clearly defined CDM strategy and action plan with milestones?

The answer to this question is yes. The province's Long Term Energy Plan and supply mix directive form the basis for Ontario's CDM strategy and action plan by setting long-term targets and interim milestones for CDM savings, and while the OPA has yet to release its Integrated Power Systems Plan, which should describe the OPA's CDM strategy in detail, an overview of the OPA's CDM strategy is given in the OPA's 2011 IPSP Planning and Consultation Overview document. The OPA's strategy for reaching the province's CDM targets and milestones is to rely on three main tools for acquiring savings: CDM programs, time-of-use (TOU) electricity pricing, and codes and standards (OPA, 2011h, p. 4-4) — all of which are compatible with the OPA's pre-existing three-step strategy for transforming the CDM market in Ontario: 1) stimulating innovation through research and development, 2) using incentive-based programs to increase market penetration of energy efficient technologies and processes, and 3) upgrading codes and standards to lock-in program-assisted efficiency improvements (OPA, 2011h, pp. 4-3, 4-7).

40 Savings targets and estimates are expressed as percentages using the following conversion: [(units of savings)/(units of reference load forecast)/(years of conservation effort)]*100%

Table 4.5 Treating CDM as a Priority Resource Summary Table

No.	Assessment Question	Short Answer
1	Is CDM recognized and treated as a resource in energy policy?	Yes
2	Is CDM integrated into energy planning and given priority over other energy resources?	Integrated into energy planning? Yes Given priority over other energy resources? No
3	Does the framework set aggressive and binding targets for both energy (GWh) and demand (MW) savings?	Framework sets targets?, yes Are targets binding? A subset, yes, but mostly, no Are targets ambitious? Yes and no
4	Does Ontario have a clearly defined CDM strategy and action plan with milestones?	CDM strategy? Yes Action plan? Yes Milestones? Yes

Section 5: Long-term commitment to CDM

The second theme up for exploration is whether the framework makes a long-term commitment to CDM.

1. Is long-term, rate-based funding for CDM provided?

1.1 Is conservation funding in Ontario rate-based?

CDM activities funded through the OPA

In Ontario, most government-funded electricity conservation activities are funded through the Ontario Power Authority, which undertakes conservation activities through its own conservation department, funds CDM projects through its Conservation Fund, and enters into CDM procurement contracts and CDM program delivery agreements with other entities (e.g. large industrial users and LDCs). As an agency, the OPA gets its funding from fees and charges that are collected from electricity rate payers by the IESO and the LDC's — specifically, the OPA Administrative Fee, and the Global Adjustment (Electricity Act, 1998., s.25.20(1),(2); IESO, 2012b; IESO, n.d.a). Therefore, funding for OPA-sponsored CDM activities comes from the rate base rather than the tax base.

CDM activities funded through the OEB

Under the current framework, LDCs have two potential sources of funding for CDM programming. LDCs can apply to the OPA for funding to deliver the OPA's standard province-wide programs in their service areas, and/or they can apply for funding from the OEB in order to design and deliver CDM programs tailored specifically to their local distribution areas (DuGuid, 2010d). If LDCs are successful in securing funding for Board-Approved CDM Programs, the OEB instructs the IESO to provide the LDCs with the approved funding, out of monies collected from the electricity rate payer via the global adjustment mechanism (Mallinson, 2011j, p. 1; OEB, 2011d, p. 30). Thus, funding for Board-Approved Programs also comes from the rate-base.

Although funding has been pledged, the amounts that will be spent in each year have not necessarily been allocated and assured.

CDM activities funded through the Ministry of Energy

The GEAGEA also allows the Ministry of Energy to fund conservation activities through the rate base by assessing the IESO and LDCs for expenditures related to certain CDM activities (GEAGEA, 2009, Sched. D, s. 6; OEB Act, 1998, s. 26.1(1)). This allows the costs of the Ministry's CDM expenditures to be funded through the rate-base rather than the tax-base. However, due to the politically contentious nature of funding CDM activities through assessments on the IESO and LDCs it seems unlikely that this mechanism will be used by the Ministry of Energy to fund CDM in future [41] (OEB, 2011e, p. 4).

41 To date, this funding mechanism has only been used once. See section 10 in Appendix D for details.

1.2 Is conservation funding long-term?

Under the Long Term Energy Plan, the government has pledged to provide $12 billion in funding for conservation over the 20 year plan period, and $3 billion in funding for CDM programming between 2011 and 2015, the year of the government's first milestone CDM target (Ministry of Energy, 2010, p. 40). However, although funding has been pledged, the amounts that will be spent in each year have not necessarily been allocated and assured. For example, as mentioned earlier, most publically-funded conservation activities in Ontario are funded through the OPA. The amount of money the OPA spends each year must pass through two approval processes. First, the Minister of Energy must approve the OPA's annual Business Plan, and second, the OEB must approve the OPA's proposed expenditure and revenue requirements (EA, 1998, s.25.2, s. 25.22). Thus, the Minister of Energy and the OEB have the ability to send back the OPA's proposed budget with recommendations for further consideration - potentially with recommendations regarding conservation-related spending (EA, 1998, s.25.21, s. 25.22).

OPA funding for this four year period is not provided to LDCs upfront, but rather is delivered in either monthly or biannual installments.

With respect to funding for CDM programs run by the LDCs over the 2011-2014 period covered by the CDM Code, the OPA has budgeted $1.4 billion to fund the implementation of its standard province-wide programs, and the government has placed no cap on the amount of money that the OEB can approve for LDC CDM programs, other than to stipulate that programs funded through the OEB should be cost-effective and not duplicate OPA programs (OEB, 2011d, p. 12). However, the CDM Code is valid only from Jan. 1, 2011 to Dec. 31, 2014, and gives no indication of if or how CDM programs will be funded beyond 2014[42] (OEB, 2010c, p. 6).

Furthermore, even within the four-year period covered by the CDM Code, funding is not guaranteed. OPA funding for this four year period is not provided to LDCs upfront, but rather is delivered in either monthly or biannual installments, in response to invoices from the LDCs (OPA, 2011j, pp. 18-19). However, the Master Agreement that the LDCs must sign with the OPA regarding both parties' obligations with respect to delivering and funding province-wide CDM programs states that the OPA may terminate any CDM program with immediate effect by providing written notice to an LDC (OPA, 2011j, p. 42).

With respect to funding through the OEB, the OEB has the ability to deny LDCs funding for Board-Approved Programs tailored to their specific service areas, and has already done so. Only two LDCs have submitted applications for funding for Board Approved programs (Hydro One and Toronto Hydro), and both have had program funding requests denied[43] (OEB, 2011c).

42 Moreover, the period for implementing CDM programming within this four-year funding period is actually made considerably shorter than four years due to two factors: 1) the OPA's province-wide programs were not all ready to be operationalized starting Jan. 1, 2011 (OPA, 2011j, pp. 15-16), and 2) neither the OEB nor the OPA will pay for Participant Incentives for CDM programs completed after Dec. 31, 2014 (OEB, 2010c, p. 6; OPA, 2011j, p. 36). This means that LDCs must ramp down their activities earlier in the year to avoid the possibility of entering into participant agreements for projects that may not be completed by Dec. 31, as LDCs would be responsible for paying for the Participant Incentives for such late-finishing projects out of their own funds (OPA, 2011j, p. 36).

43 For details of Hydro One's and Toronto Hydro's applications to the Board for funding for Board-Approved Programs, see Section 3 in Appendix D.

For these reasons, the current CDM policy framework does not provide guaranteed long-term funding for CDM programming.

2. Are CDM players who design and deliver CDM programs provided with sufficient policy stability to plan and make investment decisions?

To assess the degree to which the current policy framework provides stability in CDM policy, one first needs to look at how electricity system planning is done in Ontario. The OPA is charged with developing an Integrated Power Systems Plan (IPSP) that covers a 20 year period, and is charged with updating this plan every three years (O. Reg. 242/04, s. 1). However, in developing its IPSP and IPSP updates, the OPA must follow the directives of the Minister of Energy (O. Reg. 242/04, s. 2; EA, 1998, s. 25.30(2)). This means that the OPA can potentially receive very different directions every three years regarding the role that conservation will play in the province's energy plans, depending on the priorities of whoever is in government at the time the plans are updated. This type of setup does not encourage stability and consistency in energy policy.

Furthermore, the current framework for CDM activities undertaken by local distribution companies (as outlined in the OEB's CDM Code) is only valid for the four year period between Jan. 1, 2011 and Dec. 31, 2014 and specifies that all savings resulting from CDM programs governed by the Code must take place during that four-year period (OEB, 2010c, p. 6). Neither the Code, nor the Minister's directive instructing the OEB to create the code make any mention or provide any insight into the policy framework that will apply to the LDCs' CDM activities after Dec. 31, 2014 (OEB, 2010c; DuGuid, 2010d). This obviously does not provide LDCs with the confidence to make long term investments in building CDM capability within their own organizations. The four-year expiry date on the current CDM code means that LDCs can't hire CDM staff with confidence that they will still be needed in four years' time[44].

The four-year expiry date on the current CDM code means that LDCs can't hire CDM staff with confidence that they will still be needed in four years' time.

The lack of clarity on what policy framework will govern CDM program delivery following the expiration of the CDM Code casts doubt on whether funding for CDM programs will be maintained at the same level after 2014, if at all. Investment in CDM is vulnerable to being abandoned when available generation resources are sufficient to meet demand[45], so with the IESO forecasting that demand will remain steady and even decline somewhat from 2012 to 2014 (IESO, 2012a), whether the government will continue investing in CDM to the same degree after 2014 is an open question[46].

44 Because LDCs cannot be sure that CDM staff will be needed following the expiry of the CDM Code, one might suggest hiring staff on a contract basis for the duration of the four year CDM Code period; however, union rules can prevent LDCs from hiring workers on contract for longer than 12 consecutive months (Mallinson, 2011g). As a result, LDCs are turning to energy service companies for consulting services rather than building capability within their own organizations to work on delivering CDM programs (Mallinson, 2011g).

45 For example, in the early 1990's Ontario Hydro cancelled all of its DSM programs in the face of a surplus of generation resources and lower-than-expected demand (Mallinson, 2011b)).

46 Conservation programs become vulnerable to cuts when demand plateaus or declines because conservation is often framed as a way of dealing with supply shortfalls (DuGuid, 2011). Therefore, when existing generation assets appear adequate to meet future demand, policy makers are unlikely to choose to use conservation to reduce demand further, as that can mean letting existing (paid for) generation assets sit idle or renegotiating/getting out of existing power purchase agreements.

However, even if the post-2014 CDM program framework does continue funding for conservation programs, the transition from the current policy framework to the next one will likely result in a period of CDM program inactivity because in order to ensure that all program savings occur before Dec. 31st, 2014, LDCs will have to ramp down their activities and essentially stop CDM business development several months prior to Dec. 31, 2014[47]. Thus, failing to provide advance notice and smooth transitions between policy frameworks results in programs having to be stopped and restarted, which kills program momentum and wastes time and energy.

However, even if transitions between policy frameworks are smooth, repeatedly doling out funding certainty and policy stability in three and four year chunks does not allow or encourage LDCs to make investments into long-term CDM job creation, long term CDM technology development and innovation, and long term market transformation (Mallinson, 2011l, p. 4).

3. Is funding provided for the research and development of new energy efficiency technologies?

The Minister of Energy's April 23, 2010 directive to the Ontario Power Authority focuses on three opportunities for advancing CDM in the province, one of which is the support and funding of CDM research and innovation (DuGuid, 2010a, p. 1). Specifically, the directive instructs the OPA to continue to provide support and funding for CDM research and innovation through the OPA's Conservation Fund (DuGuid, 2010a, p. 4). The Conservation Fund was established in 2005 to provide funding for CDM pilot projects for the purposes of building market capability, testing new or unique CDM program elements, and informing the development of future conservation programs[48] (DuGuid, 2010a, p.4; OPA, 2012c; OPA, 2011c, p. 4).

In addition to research into new CDM technologies through the Conservation Fund, the OPA's Conservation department also conducts market research to assess Ontarians' awareness, attitudes, behaviours, and motivations with respect to CDM, in order to identify barriers to electricity conservation and opportunities to fine tune messaging strategies and inform future planning for CDM initiatives (OPA, 2012e).

Therefore, under the current CDM policy framework, funding is being provided for the research and development of new CDM technologies and applications.

4. Do building codes and appliance standards have regular review cycles?

Ontario's Building Code

The GEAGEA specifies that energy conservation standards in Ontario's building code must be reviewed every five years (GEAGEA, 2009, Sched. J, s. 1.; BCA,

47 Similar periods of forced LDC inactivity on CDM occurred during the transitions between the Third Tranche period of LDC-designed programs, the post-Third Tranche period of OPA-designed programs, and the current hybridized CDM Code framework period (Mallinson 2011l, 2012).

48 For more information about the Conservation Fund, see section 11 in Appendix D.

1992, s. 34 (6)). This is in keeping with the approximate five year release cycle of the Ontario building code in general, which in turn follows the release cycle of the federal model National Building Code (MMAH, 2011i, p. 4).

Ontario's current edition of the Building Code was published in 2006 and specified that new buildings would have to meet an energy conservation target 25% higher than the 1997 Model National Energy Code for Buildings (MNECB) after Dec. 31, 2011 (MMAH, 2011a, p. iii; MMAH, Dec. 30, 2011f). A new version of the Ontario building code is currently being developed[49] and will take into consideration NRCan's new version of the model National Energy Code for Buildings (released in November 2011), and a list[50] of potential changes informed by the interim recommendations of the Building Code Energy Advisory Council, and research commissioned by the Ministry of Municipal Affairs and Housing (NRCan, 2011b; MMAH, 2011i, p. 24; MMAH, 2011g).

Energy conservation standards in Ontario's building code must be reviewed every five years.

Energy efficiency standards for products and appliances

In Canada, federal-level energy efficiency regulations set national minimum standards for energy efficiency and labelling for a range of products imported into Canada, or shipped between provinces and territories (NRCan, 2011a)[51]. However, several provinces also have their own regulations setting minimum energy efficiency standards for products and appliances sold within their particular provinces. Ontario is one of these provinces[52] (NRCan, 2011a).

Unlike the 5-year review cycles that the GEAGEA sets for energy conservation standards in Ontario's building code, there is no provision in the Green Energy Act specifying the frequency with which Ontario's energy efficiency standards for products and appliances must be updated, nor the process by which standards are to be updated, nor the degree to which energy efficiency standards must be improved over time (GEA, 2009, s. 15 (1)). Rather, appliance and product standards are updated as needed, or as attended to (Mallinson, 2011d). For example, prior to the recent addition of standards for general service lamps (O. Reg. 13/12), the regulation which documents the efficiency standards referenced in the GEA (O. Reg. 82/95) was last amended (i.e. updated for at least one appliance) in 2006 (O. Reg. 38/06). This does not inspire confidence that Ontario's standards are being updated with sufficient thoroughness or frequency to exclude the worst performing products and appliances from Ontario's marketplace.

49 Changes to Ontario's building code occur either by releasing a new edition of the building code, or by making interim amendments to an existing edition of the code. For example, the 2006 code was subject to six interim amendments, including the passing of a June 2011 regulation to update the Building Code's Energy Efficiency Supplementary Standard (SB-10) to include the 2010 ASHRAE 90.1 standard as an alternative path for complying with the Ontario building code's energy conservation standards (MMAH, 2011i, p. 4; O. Reg. 315/11).

50 This list of potential changes to the code has been subjected to public and stakeholder consultations, and includes such items as mandatory installation of programmable thermostats, mandatory installation of at least one conduit in residential units to facilitate the future installation of a photovoltaic or solar domestic hot water system (would be effective on January 1, 2017), and increasing the energy efficiency requirements of residential buildings to either 10%, 15% or 20% higher than the Dec. 31, 2011 requirements (would be effective after Dec. 31, 2016) (MMAH, 2011i, pp. 23-26).

51 According to NRCan, the principal developer of energy efficiency standards in Canada is the Canadian Standards Association (CSA), due to the energy expertise of its technical committees and its status as a not-for-profit membership-based association, which allows it to function as a neutral third party in bringing producers, users, and regulatory and public interests together to develop standards by consensus. (Canadian Standards Association [CSA], 2011; NRCan, 2009).

52 The others are Quebec, British Columbia, Manitoba, New Brunswick, and Nova Scotia.

How does Ontario's building code compare with other jurisdictions?

Ontario is one of only two provinces in Canada to include energy conservation requirements in its building code (the other is BC) (Bailie et al, 2006, p. 14). However, in the United States, all states are required to comply with the base building code energy efficiency standards set by the U.S. Department of Energy (Sciortino et al, 2011, p. 37). The current base code is the 2007 version of ASHRAE's 90.1 standard (Sciortino et al, 2011, p. 38), which means that Ontario's June 2011 amendment citing the 2010 version of ASHRAE's 90.1 standard makes Ontario's minimum energy efficiency building code standards more stringent than the base code in the U.S. Nevertheless, five U.S. states have adopted both residential and commercial building energy efficiency standards that exceed the base code set by the US Department of Energy (California, Massachusetts, Oregon, Washington, and Georgia) (Sciortino et al, 2011, pp. 40-41), and several states have mandatory three-year review cycles for their building codes (including California, Washington, Oregon, Utah, and Idaho) (Bailie et al, 2006, p. 15).

5. Are there processes in place to change and update CDM plans as information, technologies, and circumstances change over time?

Change processes in the OPA's master agreements with LDCs

The OPA did not anticipate that its standard province-wide programs would remain static from 2011 to 2014, but rather envisioned that the programs would evolve over the four-year period as experience in implementing the programs revealed opportunities for improvement (OPA, 2011h, p. 4-11). As a result, section 3 and schedule A-4 of the Master Agreement between the OPA and LDCs lays out a process for making changes to the Master Agreement and its CDM programs and initiatives (OPA, 2011j, pp. 15, Sched. A-4). These sections of the Master Agreement apply to both minor changes like modifying participant incentives and major changes like the introducing additional initiatives or new CDM programs (OPA, 2011j, Schedule A-4, p. 1). The change terms set out a collaborative process for the OPA and LDCs to manage necessary and desirable changes to CDM programs and initiatives. Moreover, in the aftermath of the OEB's decision on Toronto Hydro's application for Board Approved Programs, the OPA sent letters to the LDCs indicating that the OPA is open to working with any LDCs who are interested in developing additional programs to supplement the OPA's existing province-wide CDM programs (Pride, 2011). However, these change processes apply only to the four-year period covered by the CDM Code. The OPA's Master Agreement document does not indicate what types of CDM programs will be delivered after Dec. 31, 2014, nor what framework will govern the delivery of such programs, nor how such a framework will be developed.

Change processes in the CDM Code

Although the CDM Code does not outline a process for handling mid-stream changes to Board-Approved CDM programs, it does require LDCs to include in their annual reports to the Board details of any changes or planned modifications to their CDM Strategies, as well as any recommendations LDCs may have for improvements to their Board-Approved CDM Programs that would

enhance program design, performance, and uptake by customers. The CDM Code also allows and sets rules for the reallocation of funding between Board-Approved programs[53], such that LDCs may transfer up to 30% of an individual CDM program's approved budget to another Board-Approved program without needing to seek special approval from the Board[54] (OEB, 2010c, p. 10).

However, as with the OPA's Master Agreement, the CDM code applies only until the end of 2014, and the closest it comes to hinting at a process for determining what kind of CDM programs and what kind of CDM framework will exist after 2014 is the Code's requirement for LDCs' annual reports to include information about how the results of any pilot programs they are running might inform the implementation of future CDM initiatives or the planning of frameworks for future CDM initiatives (OEB, 2010c, p. 8).

There is no provision specifying the frequency with which Ontario's energy efficiency standards for products and appliances must be updated.

Processes for managing change in the IPSP planning and consultation overview document

The OPA's IPSP Planning and Consultation Overview document indicates that the OPA is planning for CDM programs to be implemented in 2015, and is anticipating that such programs will contribute well over 1000GWh and 1000MW in energy and peak demand savings to meeting the province's 2015 milestone savings target (OPA, 2011h, p. 4-6). However, the document fails to mention who will be delivering such programs or under what framework they will be delivered. The closest the IPSP Planning and Consultation Overview document comes to referencing a process for developing a framework to govern the delivery of CDM programs beyond 2014 is an appeal for stakeholder input regarding other potential programs or policies that are not currently included in the OPA's plan, and which the OPA might consider in order to exceed or accelerate achievement of provincial CDM targets (OPA, 2011h, p. 4-12).

Therefore, provisions exist in the current CDM framework to deal with changes to the OPA's province-wide programs, with changes to LDC participation in such programs, and with re-allocation of program budgets during the existing four-year CDM framework period. However, the current CDM policy framework does not have processes in place to change and update CDM plans as information, technologies, and circumstances change over the long term, beyond Dec. 31, 2014.

53 This provision would be used in such cases, for example, where an LDC might want to transfer funding from an underperforming program to a more successful one.

54 LDCs may apply to the Board for approval to transfer more than 30% of a program budget to another program, but two circumstances make it unlikely that any LDCs will do so. First, Toronto Hydro is currently the only LDC who has received OEB approval for Board Approved program funding, and has actually decided not to pursue the two pilot projects approved for funding because the "modifications imposed on the Test Programs [by the OEB] so constrain those programs that they cannot now be implemented in a meaningful and cost effective way" (Tyrrell, 2011, p. 1). Second, it took Toronto Hydro over six months to get an OEB decision on its application (OEB, 2011d, p. 2). These events do not inspire confidence that requests for transfer approval will be approved in a reasonable timeframe.

6. Does Ontario's CDM policy framework support market transformation as a long-term goal?

6.1 Is responsibility for furthering market transformation assigned to an appropriate agent?

Although the OPA is not specially designated as a market transformation entity, it has a broad and inclusive mandate under the Electricity Act to "engage in activities that promote electricity conservation and the efficient use of electricity" (EA, 1998, s. 25.2 (1)(g)). This mandate *allows* the OPA to engage in a broad range of activities, including market transformation-oriented activities. However, the OPA's mandate does not *require* it to take a market transformation approach to CDM, and the OPA did not receive specific direction in the Minister of Energy's CDM directive to foster market transformation or to engage in market-transformation-oriented activities (DuGuid, 2010a). Rather, the Minister's direction that the OPA's province-wide CDM programs should target *end uses* "that have the potential for significant electricity energy savings and/or demand reduction" (DuGuid, 2010a, p.3) seems to emphasize resource acquisition-type activities and de-emphasize capability building and market transformation-type activities like awareness campaigns, and education & training initiatives[55].

The Minister's stipulation that OPA programs should target *end uses* with potential for significant savings de-emphasizes important conservation activities like education and training initiatives.

6.2 Is the province's strategic approach to CDM explicitly market transformation-oriented?

The OPA's strategic approach to CDM

The OPA maintains the market transformation approach to CDM that the OPA's Conservation Bureau developed prior to the current policy framework. The OPA's market transformation strategy is laid out in its IPSP stakeholder consultation presentation on conservation, which identifies three key steps to achieving market transformation: 1) stimulating innovation, 2) accelerating market penetration, and 3) locking in conservation. In this presentation, the OPA identifies capability building as something that contributes to each of these three steps, and identifies resource acquisition as contributing only to the second of the three steps (accelerating the penetration of CDM products and services into the market) (OPA, 2011f, p. 22).

The OPA's capability building activities

The OPA's CDM strategy calls for it to engage in capability building activities at each of the three steps to market transformation identified above. As discussed earlier, the OPA stimulates innovation by funding research and development

55 By contrast, the previous CDM policy framework provided the OPA with explicit direction to engage in market transformational activities. For example, the Minister of Energy's Dec. 22, 2008 directive called on the OPA to assume responsibility for a broadcast and print media advertising campaign to increase public awareness of energy conservation and to build a culture of conservation in the province (Smitherman, 2008). In fact, the phrase "culture of conservation", which was so prominent during the 2008 CDM framework period, is conspicuously absent in the Minister's April 23, 2010 CDM directive to the OPA under the current framework (DuGuid, 2010a)

using the Conservation Fund[56]. It also contributes to locking in conservation savings by collaborating with government Ministries on activities that support the development of new codes and standards (OPA, 2011a, p.10). With respect to capability building activities that accelerate market penetration of conservation measures, the OPA engages in general CDM awareness campaigns such as the saveONenergy PLEDGE campaign[57], promotes CDM to the general public through its saveONenergy web site, and has included supply chain and workforce-focused capability building initiatives in its suite of OPA-contracted province-wide CDM programs.

6.3 Do targets and performance metrics encourage market transformation-oriented activities?

In Ontario, despite the province's commitment to creating a 'culture of conservation' under the previous CDM policy framework (Phillips, 2008, p. 1), the current policy framework defines CDM targets purely in terms of quantifiable energy and demand savings — which is the case both with the provincial targets in the Ministry of Energy's Long Term Energy Plan and with the LDCs CDM targets for the 2010-2014 period. As a result, utilities face the risk of losing their operating licences (and have the potential to be rewarded with incentives) purely on the basis of whether they meet quantifiable savings targets. This creates a disincentive for utilities to invest time and energy in capability-building and market transformation-oriented activities that yield savings which are difficult to quantify or which accrue over the long term and possibly outside of the window during which progress towards CDM targets will be measured[58]. In a situation where LDCs have limited budgets, such programs are unlikely to be pursued because they don't significantly contribute to hitting savings targets (Mallinson, 20llf, p. 5).

6.4 Do program screening tools encourage market transformation activities?

When it comes to utility-run CDM programs in Ontario, two types of screening tests are used to determine programs' eligibility for funding: 1) the OPA's cost-effectiveness tests (the TRC and PAC tests), and 2) the requirement that Board-Approved Programs designed by the LDCs must not duplicate the OPA's province-wide programs. Only the first of these screening criteria will be discussed in this

56 One of the criteria that the OPA continues to use to assess applications to the Conservation Fund is the degree to which projects have the potential to build market capability – or the "skills and knowledge required by the market to accelerate the design, delivery, marketing and implementation of electricity conservation initiatives" (OPA, 2012b). Conservation Fund Guidelines also stipulate that training is considered an eligible expense for projects receiving funding (OPA, 2011c, p. 6).

57 Consumer awareness initiatives run by the OPA in 2010 include print, radio, and television advertising campaigns promoting general conservation awareness and particular CDM programs (e.g. the Cool Savings Rebate program), and sponsorship of a Toronto FC soccer game (OPA, 2010k; OPA, 2011a, p. 9).

58 The CDM Code specifies that all savings that will be counted towards the LDCs CDM targets must fall within the 4-year period covered by the CDM Code (OEB, 2010c, p. 6). While the OPA's EM&V Protocols document does provide guidelines on evaluating the market effects of market transformation-focused programs and activities, and then claiming savings based on those market effects (OPA, 2011d, pp. 107-109), the reality that such activities are likely to yield savings over a timeframe that extends outside the LDCs' four-year target period makes them less attractive types of CDM programs to invest in from the utility's perspective.

section on long term commitment, as the screening criteria of Board-Approved Programs not being duplicative of the OPA's province-wide programs will be discussed in the section of this paper assessing the comprehensiveness of Ontario's CDM programs.

As a general rule, both the OPA's standard province-wide CDM programs and the LDCs' Board-Approved CDM programs must pass cost-effectiveness screening tests in order to qualify for funding. OPA programs must be deemed cost-effective on a portfolio basis (rather than on a stand-alone program basis) (DuGuid, 2010a, p. 3), and Board Approved Programs must pass the OPA's cost-effectiveness tests on a stand-alone program basis, with the exception of low income programs, educational programs, and pilot projects, which are exempt from this requirement (OEB, 2010c, p. 11).

Capability building and market transformation programs produce energy savings more indirectly than resource acquisition programs, so the energy savings from such programs are more difficult to quantify.

To calculate cost-effectiveness, the OPA uses two tests: the Total Resource Cost (TRC) test, and the Program Administrator's Cost (PAC) test (OPA, 2010i, p. 6). Both of these calculate the value of a CDM measure by subtracting the costs of the measure from the benefits of the measure. Future costs and benefits are adjusted for inflation and then discounted to arrive at a net present value that represents, in present dollars, the value of the measure over its lifetime.

The two tests differ in what they consider costs and benefits[59], but they both deem programs worthwhile purely on the basis of whether the costs of the program are less than the costs that would have been incurred in the absence of the program[60]. Both tests calculate avoided supply cost using quantifiable energy savings.

As mentioned earlier, capability building and market transformation programs produce energy savings more indirectly than resource acquisition programs, so the energy savings from such programs are more difficult to quantify, and thus the cost-effectiveness of such programs is more difficult to demonstrate. This is particularly true of educational programs (Winfield & Koveshnikova, 2009, p. 41). Therefore, requiring capability building and market transformation programs to pass cost-effectiveness tests in order to be included in program portfolios is likely to result in portfolios that are heavy on resource acquisition programs that yield easily quantifiable immediate savings, and light on capability building and market transformation programs that yield difficult-to-quantify savings over the long term.

One might argue that the rules around CDM programs passing cost-effectiveness tests do include exemptions for Board-Approved educational and low-income programs, as well as the stipulation that OPA programs need only be cost-effective on a portfolio rather than standalone basis. However, these concessions are inadequate to encourage the pursuit of capability building and market transformation activities because the requirement that OPA programs

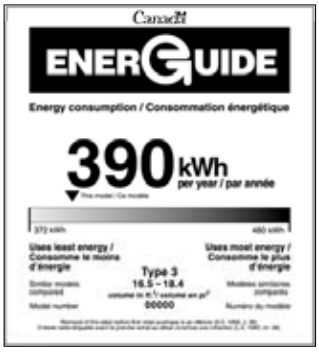
59 The equations for calculating net benefit using the TRC and PAC tests are listed below:
TRC Test Net Benefit = Avoided Supply Cost – (Incremental Equipment Cost + Program Cost)
PAC Test Net Benefit = Avoided Supply Cost – (Incentive Cost + Program Cost) (OPA, 2010i, pp. 6-7). For a description of the costs and benefits considered by each test, see section 13 in Appendix D.

60 (i.e. avoided costs of electricity generation in the case of the PAC test, and avoided costs of electricity generation, water use, and use of other non-electric fuels for the TRC test)

must pass the TRC and PAC cost-effectiveness tests on a portfolio basis means that the TRC and PAC tests still need to be performed on all programs, and that the majority of programs in a portfolio must pass the cost-effectiveness tests in order for the portfolio as a whole to be cost-effective. This encourages utilities to include a majority of resource acquisition programs and a minority of capability building and market transformation programs in their province-wide program portfolios.

6.5 Does the mix of CDM programs produced by the framework emphasize market transformation-oriented Activities?

The majority of the OPA's standard province-wide programs can be categorized as taking a resource acquisition approach[61]; however, the OPA's suite of CDM programs does include some capability building initiatives. Among the over twenty initiatives that make up the OPA's province-wide program portfolio, there are a few initiatives that promote greater consumer awareness of energy use and opportunities for savings[62], a few initiatives that include education and training components[63], and a few initiatives that provide incentives to decision-makers up-stream in the supply chain[64]. In addition, all of the OPA's standard province-wide programs involve promoting conservation awareness to some extent by virtue of promoting the particular conservation measures featured in each program. However, there are some types of market-transformation activities that are entirely lacking in the OPA's suite of province-wide program portfolio. These include initiatives that specifically target educating the next generation about conservation, and marketing initiatives that try to change energy use behaviour through influencing social norms.



Educating children and young people in CDM is an important long term market-transformation activity because it fosters the development of a culture of conservation among the next generation of energy users, and has the desirable side effect of placing pressure on the parents of children and youth to conserve energy in the present. Under past CDM policy frameworks, local distribution companies formed partnerships with school boards, providing

61 Since no proposed Board-Approved Programs have been approved and funded, the province's publically funded CDM program offerings are limited to CDM programs funded through the OPA.

62 (i.e. the residential and small commercial demand response program provides consumers with home energy interfaces so they can access real-time electricity usage information (OPA, 2011l); the commercial & institutional Energy Audit Initiative provides consumers with customized information about opportunities to save energy (OPA, 2011o), and the Industrial Accelerator initiative funds preliminary and engineering studies, as well as monitoring and targeting initiatives (OPA, 2010h)).

63 (i.e. the Energy Manager and Key Account Manager initiatives under the Industrial Accelerator program provide training and certification to building operators and other energy service professionals, and the residential HVAC Incentive initiative includes some training for HVAC contractors (OPA, 2011w; OPA, 2011x; OPA, 2011l).

64 (i.e. The Midtream Electronics initiative, Midstream Pool Equipment Initiative, and the New Construction initiatives all provide incentives to manufacturers, installers, and builders rather than to the consumer (OPA, 2011l; OPA, 2011m)). The Midstream Electronics Initiatives encourages retailers and distributors to promote, sell, and distribute high efficiency televisions and set-top boxes, and the Midstream Pool Equipment Initiative encourages pool installers to sell and install efficient pool pump equipment that is optimized for the size, function and capacity of residential in-ground pools (OPA, 2011l, pp. 25-27). Similarly, the Residential New Construction and Major Renovation Initiatives offer builders and renovators incentives to choose energy efficient installation options (OPA, 2011m).

students with CDM tools and resources, and sponsoring class field trips[65]. This type of collaboration is supported by Ontario's environmental education policy framework, which promotes learning about environmental issues and solutions and endorses a strategy of fostering environmental stewardship by developing students' knowledge, skills, and perspectives with respect to environmental issues like energy conservation (Ontario Ministry of Education, 2009, pp. 8, 12).

Educating children and young people in CDM is an important long term market-transformation activity.

The assertion that the OPA's suite of province-wide programs is light on market transformation-oriented programs, particularly with respect to consumer education and awareness initiatives, is supported by the observations of LDC representatives during interviews. A number of LDCs noted that the OPA's province-wide programs are very oriented towards capital replacement of technology, and advocated a more holistic approach to CDM — calling for more education and social marketing initiatives, as well as more benchmarking, monitoring, and energy management-oriented programs (Mallinson, 2011f, 2011i, 2011l).

The need for more market-transformation-oriented programs is also highlighted by the types of programs that LDCs proposed in their applications for Board-Approved Program funding. For example, in its withdrawn application for Board-Approved Program funding, Hydro One proposed a Community Education Program specifically targeted at changing social norms through face-to-face interaction with consumers at community events, as well as a Neighbourhood Benchmarking Program that would have used social benchmarking (i.e. peer comparison and influence) to drive energy-use behavioural changes (HONI, 2010b, pp. 14-15). Furthermore, Toronto Hydro included proposals for multiple marketing, outreach and education programs in its application for Board-Approved Programs, but none were granted funding by the OEB (OEB, 2011d, p. 20)[66].

65 For example, during the Third Tranche period in 2006, the Toronto Hydro partnered with the Toronto District School Board (TDSB) to produce a new classroom resource called the Toronto Wind Turbine Vitual Tour, which included two teacher's guides focused on the topics of energy conservation and energy efficiency (TDSB, 2006, p. 3; TDSB & Toronto Hydro, 2006, p. 3). Similarly, in 2007, Powerstream partnered with the York Region District School Board and the York Catholic School Board to launch a pilot project called the PowerStream Energy Education Program, which involved sending forty-one grade 5 classes to Kortright Centre for Conservation, allowing teachers and students in to complete energy reviews and develop energy reduction action plans, and providing all 1200 students with "energy toolkits" to facilitate lessons and exercises to be completed at home with their parents (PowerStream 2007a, p. 5; PowerStream, 2007b).

66 This is unfortunate because research shows that one of the factors that influences the success of information campaigns is the degree to which information is personalized (McKenzie-Mohr & Smith, 1999, p.82-100; Stern, 1992, p. 1227-1228). Since LDCs are in a better position to personalize information to energy consumers, it seems likely that LDC-run consumer education and awareness campaigns would have a greater impact on consumer behaviour than province-wide mass media information campaigns run by the OPA.

Table 5.1: Long Term Commitment Criteria Summary Table

Question	Short Answer
1. Is long-term, rate-based funding for CDM provided?	Rate-based? Yes Long-term? No
2. Are stakeholders provided with sufficient policy stability to plan and make investment decisions?	No
3. Is funding provided for the research and development of new energy efficiency technologies?	Yes
4. Do building codes and appliance standards have regular review cycles?	Building codes? Yes Appliance and product standards? No
5. Are there processes in place to change and update CDM plans as information, technologies, and circumstances change over time?	Within the existing 4-year policy framework period: Yes Beyond Dec. 31, 2014: No
6. Does the framework support market transformation as a long term policy goal?	No
6.1 Is responsibility for market transformation assigned to an appropriate entity?	No
6.2 Is the OPA's strategic approach to CDM explicitly market transformation-oriented?	Yes
6.3 Do the metrics used to set targets and measure success encourage market-transformation-oriented activities?	No
6.4 Do tests used to screen programs for inclusion in CDM program portfolios encourage market transformation-oriented activities?	No
6.5 Has the framework produced a portfolio of CDM programs that emphasizes market transformation-oriented activities?	No

Section 6: Roles and responsibilities

1. Are the roles and responsibilities of the different CDM players clearly defined?

Who are the different CDM players?

For the purposes of this paper, a CDM player is defined as an entity assigned duties, powers, or responsibilities with respect to CDM activities in Ontario by any of the various policy documents that make up the current CDM policy framework[67]. Thus, the main players under the current CDM framework are:

- The Government of Ontario (Lt. Governor in Council)
- The Ministry of Energy
- The Ontario Power Authority (OPA)
- The Ontario Energy Board (OEB)
- The Local Distribution Companies (LDCs)
- The Environmental Commissioner of Ontario (ECO)

Other important, though less major players under the current framework include gas utilities and public agencies like municipalities, municipal boards, hospitals, school boards, and post-secondary institutions (O. Reg. 397/11). However, the discussion of roles and responsibilities in this section will focus only on the major CDM players, as defined above.

The Environmental Commissioner of Ontario is charged with reporting on the government's progress on conservation activities.

For what key activities should roles be clarified?

Whether these key roles are clearly defined under Ontario's CDM policy framework differs according to the type of CDM activity being examined. Since there are any number of conservation activities that can take place under the current CDM policy framework, for the purposes of this analysis, activities will be grouped into the following general categories:

1. CDM planning,
2. CDM programming,

67 I make a distinction here between entities that are assigned roles by policy framework documents and entities that engage in CDM activities in Ontario as a result of the nature of the current CDM policy framework. While energy service companies (ESCO's) under contract to LDCs are playing a major role in delivering CDM programs, they are not assigned such a role in the policy documents that make up Ontario's CDM policy framework, and thus ESCO's will not be discussed in this paper as a CDM player despite their obvious and significant contribution to CDM in Ontario. The same is true of non-governmental organizations (like the Pembina Institute, the David Suzuki Foundation, and the Clean Air Alliance), which perform the valuable service of providing external oversight and critiques of Ontario's overall CDM policy framework and energy planning decisions, but which are nonetheless not assigned such a role under the government's CDM policy framework.

3. CDM Research & development,
4. Smart metering and TOU pricing,
5. Updating codes and standards, and
6. Miscellaneous compliance with government or Ministry direction.

Evaluation of the overall CDM policy framework

Under the current policy framework, the role of evaluation agency is filled by the Environmental Commissioner of Ontario (ECO), who has the ability to require reports from all of the major CDM players and is charged with reporting on the government's progress on conservation activities and identifying aspects of the province's CDM policy framework that present barriers to achieving the government's conservation goals (Environmental Bill of Rights [EBR], 1993, s. 58.1). Another player that fills an evaluating agency role is the Auditor General of Ontario, who is has the power to financially audit the provincial government, its ministries, and its agencies, and is mandated to report on any reservations he or she may have about the manner in which public monies are collected and disbursed (Auditor General Act, 1990). The policy framework also provides some opportunities for stakeholders to critique and evaluate the effectiveness of Ontario's CDM policies by submitting feedback at various stages of CDM policy development. However, the ability of stakeholders to occupy this role will be discussed under the fourth question in this section, which deals with incorporating stakeholder feedback.

The OPA is mandated in legislation to design the province's energy system plan.

CDM planning

CDM Planning is one area where attempting to identify the oversight agency, responsible agency, and implementing agency is quite useful in clarifying and differentiating the roles of the different players.

Below is a flow chart for the CDM and electricity system planning process as outlined in legislation:

The **Ministry of Energy**'s role with respect to CDM and energy system planning is a hybrid one. On the one hand, the Ministry acts like an oversight agency by providing high level guidance on the shape of the energy plan by communicating government policy objectives through the supply mix directive (EA, 1998, s. 25.30). However, in practice, the long term CDM targets that appear in the Ministry's supply-mix directive (and Long Term Energy Plan) are developed in consultation with, and through making use of data and expertise from, the OPA (Mallinson, 2011d). This close degree of involvement in the energy planning process results in Ministry guidance being quite prescriptive and specific rather than merely high-level, and makes the Ministry's role in energy planning more characteristic of a responsible agency than an oversight agency.

By contrast, the **OPA**'s role in the energy planning process is clearly the role of responsible agency: the OPA is mandated in legislation to design the province's energy system plan, and is responsible for ensuring the plan's execution once it has been approved (EA, 1998, ss. 25.30-25.32). One could also argue that the OPA also acts as an implementing agency because it implements the province's energy plan through its procurement of energy and CDM resources and its coordination and execution of CDM programming (EA, 1998, s. 25.32; DuGuid, 2010a; DuGuid, 2010c).

As the body responsible for approving the OPA's IPSP, the **OEB** occupies the role of oversight agency. However, the OEB's mandate with respect to reviewing the IPSP for approval is limited to assessing whether the plan is cost-effective, and whether it complies with the Minister of Energy's directives (EA, 1998, s. 25.30(4)). The limited scope of the OEB's review of the IPSP means that no entity provides oversight for the IPSP process with respect to assessing whether the planning choices made in the IPSP address Ontario's needs in a manner that is prudent, responsible, and appropriate. This is problematic.

The OPA is not accountable to any entity for demonstrating due diligence in minimizing the environmental impact of its IPSP.

Also problematic with respect to lack of oversight is the IPSP's exemption from undergoing environmental assessments (O. Reg. 276/06), which would require the OPA to report on the likely environmental impacts of its IPSP versus the likely environmental impacts of alternative planning choices (Environmental Assessment Act, 1990, s. 6.1(2)). Instead, the OPA is required, itself, to "ensure that safety, environmental protection and environmental sustainability are considered in developing the plan" (O. Reg. 424/04, s. 2.(1) 7.). This means that the OPA is not accountable to any entity for demonstrating due diligence in minimizing the environmental impact of its IPSP.

Although it involves minor rather than major CDM players, it is worth noting that several MUSH sector entities have been assigned an energy planning and reporting role under the current CDM policy framework (O. Reg. 397/11). Municipalities, municipal service boards, post-secondary educational institutions, school boards, and public hospitals have been required to create their own CDM plans and to report on their energy use and CDM activities (O. Reg., 397/11).

CDM programming

CDM programming is another area where classifying players as oversight, responsible, and implementing agencies is useful in trying to elucidate roles and responsibilities. However, this task is made more difficult because different types of CDM programming are treated differently under the existing policy framework.

Board approved programs

The Minister's directives and the OEB's CDM Code specify that LDCs must meet their CDM targets using any combination of OPA-Contracted province-wide CDM programs and LDC-designed Board-Approved CDM programs (DuGuid, 2010d; OEB, 2010c). With respect to Board-Approved programs, the framework places the OEB in the role of oversight agency, as it is responsible for approving LDCs' CDM plans, approving funding for Board-Approved programs, and

receiving reports from LDCs on their progress towards their CDM targets (OEB, 2010c). LDCs on the other hand, are placed in both the responsible agency and implementing agency roles, as they are charged with both designing and delivering Board-Approved programs, and for reporting to the OEB on their progress towards their CDM targets.

OPA-contracted province-wide programs

With respect to OPA-Contracted Province-Wide programs, as the party charged with designing, funding and performing EM&V on OPA-Contracted Province-Wide CDM programs, the OPA occupies the role of responsible agency, while the LDCs, who are charged with delivering such programs, occupy the role of implementing agency (DuGuid, 2010a, pp. 2-4). However, LDCs are responsible for creating their own CDM program plans and choosing which programs to implement, and are also accountable for hitting the CDM savings targets associated with the OPA-Contracted province-wide programs (DuGuid, 2010a, pp. 2-4), which results in a splitting of the responsible agency role between the OPA and the LDCs.

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The role of oversight agency is similarly split between different players. The OEB is the primary oversight agency for CDM programs being delivered by the LDCs because it set the rules for LDCs in selecting, implementing and evaluating OPA-Contracted CDM programs, and is the body to which LDCs must submit their CDM plans and program results (OEB, 2010c). However, the OPA also occupies somewhat of an oversight role with respect to the OPA-Contracted programs because it approves and provides LDCs with funding for such programs, and it also requires LDCs to report back to it on the savings achieved by OPA-contracted programs (in order that the OPA can perform EM&V on such programs) (DuGuid, 2010a). The Ministry of Energy also acts like an oversight agency by setting the criteria for the OPA's design and delivery of OPA-Contracted programs, and by setting the criteria for the creation of the OEB's CDM Code (DuGuid, 2010a; DuGuid, 2010d).

CDM programs for First Nations and transmission-connected customers

The OPA was directed by the Minister of Energy to design and deliver energy efficiency programs for First Nations and large transmission-connected industrial customers, which makes the OPA the responsible agency and implementing agency for such programs (DuGuid, 2010c, p.1; DuGuid, 2010a, p. 4). In the case of the transmission-connected program, the Minister of Energy acts like an oversight agency by setting the guidelines for designing and implementing the program, including how long the program will be offered, the energy savings to be achieved by it, and the program's maximum budget (DuGuid, 2010c).

Ministry of Energy programs

Under the current framework, CDM programs run by the Ministry of Energy can be funded through assessments on the IESO and LDCs (GEAGE Act, 2009, Sched. D, s. 6; OEB Act, 1998, s. 26.1(1)). Although legislation sets limits and parameters on the types of programs that can be funded through assessments on the IESO and LDCs (OEB Act, 1998, s. 26.2(2)), apart from the Ministry being required to report program savings to the Environmental Commissioner's

Office, there is no external oversight of Ministry CDM program activities. Thus, the Ministry of Energy is effectively placed in all three roles of oversight agency, responsible agency, and implementing agency with respect to Ministry CDM programs.

For convenience, Table 6.1, below, arranges the CDM players according to the roles they play with respect to CDM programming.

Table 6.1: Roles and Responsibilities of Ontario's CDM Players for CDM Programming

Roles & Responsibilities	Type of CDM Program			
	OPA-Contracted Province-Wide	Board-Approved	For First Nations & Transmission-Connected Customers	Ministry of Energy
Oversight Agency				
Approves CDM program plans	OEB	OEB	OPA	Ministry of Energy
Approves budget or provides funding	OPA	OEB	Ministry of Energy	Ministry of Energy
Requires and receives reports on CDM program activities and results	OPA/OEB	OEB	Not specified	Not specified
Sets requirements for screening tests and EM&V protocols.	OPA	OEB	OPA	Not specified
Provides high-level guidance on the shape of the policy framework	OEB Ministry of Energy	OEB Ministry of Energy	Ministry of Energy	Legislation/ government
Responsible Agency				
Designs the CDM plan	LDCs	LDCs	OPA	Ministry of Energy
Decides which programs and measures will be implemented	OPA/LDCs	LDCs	OPA	Ministry of Energy
Undertakes or supervises program EM&V activities	OPA	LDCs via 3rd parties	OPA	Not specified
Reports to the oversight agency	LDCs	LDCs	OPA	Ministry of Energy
Implementing Agency				
Executes CDM programs/plan	LDCs	LDCs	OPA	Ministry of Energy
Evaluation Agency				
Has the power to require reports from all players	ECO	ECO	ECO	ECO
Publically reports on the results of CDM policies	ECO	ECO	ECO	ECO

CDM research and development

The OPA, the Ministry of Energy, and the government generally, all have the ability to support research and development of CDM under the existing framework. The OPA's mandate and responsibility to support and fund CDM research and innovation through its Conservation Fund was renewed by the Minister of Energy's Apr. 23, 2010 directive (DuGuid, 2010a, p. 4), and the OPA is also responsible for providing its expertise in CDM matters as requested by the Minister of Energy (EA, 1998, s. 25.26). This places the OPA in both the responsible agency and implementing agency role with respect to R&D. In terms of oversight, the Ministry of Energy is mandated to make recommendations on priorities for CDM research and development (Ministry of Energy Act, 2011, s. 7.(1)(d)), and also has a role (along with the OEB) in approving the OPA's budget, of which the Conservation Fund forms a part.

As with conservation programming, the Ministry of Energy also has the ability to conduct its own research into CDM, funded through assessments made one the IESO or LDCs (OEB Act, 1998, ss. 26.1(1), 26.2(2)4.).

Smart metering and time-of-use (TOU) pricing

With respect to smart metering and TOU pricing, the OEB acts as the oversight agency by setting and regulating TOU pricing (OEB Act, 1998, s. 78.(3.1)), and the LDCs act as both the responsible agency and implementing agency by installing the smart meters and billing customers using the TOU prices established by the OEB.

Building code updates

In the case of updating the energy provisions in the building code, the GEAGEA specifies that every five years, the Minister of Municipal Affairs and Housing shall initiate a review of the energy-related provisions in the building code, and that the Minister shall establish a Building Code Conservation Advisory Council to advise him on standards for energy conservation in the building code (GEAGEA, 2009, Schedule J; BCA, 1992, ss. 34(6), 34.1). Although it is the government that ultimately updates the building code legislation, it is the Ministry of Municipal Affairs and Housing that manages and oversees the process of developing and submitting recommendations for changes, and the Ministry is advised on needed energy-related changes by the Building Code Conservation Advisory Council (BCA, 1992, s. 34.1). The Advisory Council is in turn is supported by research and recommendations developed by the OPA (Raffaele, 2010, p. 5). So although the roles of the various players do not fit neatly into the classifications of oversight agency, responsible agency and implementing agency[68], they are clearly defined.

68 In this case, the Ministry of Municipal Affairs and Housing could be considered the responsible agency because it is responsible for ensuring that a review happens and for reporting to the government on needed changes. The Building Code Conservation Advisory Council could be considered the implementing agency because it actually looks into what changes need to be made (MMAH, 2010b). However, the MMAH also does its own research into needed changes, or commissions such research from third parties like the OPA (MMAH, 2011i, p. 8; Raffaele, 2010, p. 5). As the entity that sets the framework for how codes are revised, and as the entity that actually implements code updates through changes to legislation, the government could be considered to occupy aspects of both the oversight and implementation roles.

Updates to energy efficiency standards

In the case of updating energy performance standards, not only are the classifications of oversight agency, responsible agency, and implementing agency not easy to identify, but it is not easy to see where roles have been assigned at all. Energy standards for appliances and other products are set in Ontario regulation 82/95, and the power to update regulation 82/95 lies with the government (the Lt. Governor in Council), as described in Part III and Part IV of the Green Energy Act (O. Reg. 82/95; GEA 2009, PART III, IV). However, unlike updates to the building code, no party is named in the legislation as being responsible for undertaking a review of energy performance standards, nor is any party named as an expert body to consult during such a review (GEA, 2009, PART III; O. Reg. 82/95). Perhaps this lack of explicit specification of who is responsible for updating the provincial energy performance standards is one of the reasons that updates to Ontario's product and appliance energy efficiency standards have been so infrequent[69].

No party is named in the legislation as being responsible for undertaking a review of energy performance standards.

Furthermore, whether by intention or accident, when the Energy Efficiency Act, 1990 and the Energy Conservation Leadership Act, 2006 were amalgamated into the Green Energy Act, their compliance and enforcement-related provisions were neither retained nor replaced with new compliance and performance provisions. This effectively removes the ability of the government or Ministry of Energy to perform oversight on the implementation of energy efficiency standards and on the disclosure of energy efficiency performance for appliances, products, and properties sold in Ontario (ECLA, 2006, ss. 2.(2-4), 8, 9; EEA, 1990, ss.4-5).

Miscellaneous government and ministry powers & responsibilities

Both the government and the Ministry of Energy have the power to set standards and targets and to require other entities to engage in CDM activities. These powers do not put the government or Ministry cleanly into one or more roles of oversight agency, responsible agency, or implementing agency, but what they do have in common is that they put the government and the Ministry of Energy into director's chairs. For example, the GEAGEA gives the government the power to require public agencies to prepare CDM plans and meet CDM targets (GEA, 2009, s. 6). The current policy framework also allows the Minister of Energy to promote CDM by directing the OPA to undertake any type of CDM activity or initiative, allows the Minister to direct the OEB to require LDCs to meet CDM targets, and allows the Minister to require (with the approval of the government) other government ministries to report on the energy consumption of their facilities (GEAGEA Sched. B, s. 5.(2); EA, 1998, s. 25.32(4.1); GEAGEA, 2009, Sched. D, s. 7; OEB Act, 1998, s. 27.2; GEA, 2009, s. 10.(2)). The current policy framework also allows the government to pass legislation updating energy efficiency standards for appliances and other products (GEA, 2009, s. 16), and allows the Ministry of Energy to establish (with the approval of

69 The regulation which sets efficiency standards (O. Reg. 82/95) was most recently amended (in March of 2012) in order to add standards for general service lamps (O. Reg. 13/12). However, prior to this change, the efficiency standards regulations was last amended (updated for at least one appliance) in 2006 (O. Reg. 38/06).

the government) minimum energy standards for the construction and major renovation of government facilities (GEA, 2009, s. 10.(2)). One last example is the government's power to promote CDM by designating goods, services, and technologies for the promotion of energy conservation (such that they cannot be restricted or prevented by municipal or condominium by-laws) (GEA, 2009, s.4).

With respect to exercising these miscellaneous powers, the CDM policy framework makes the government and the Ministry both responsible and implementing agencies, but it doesn't make them accountable to any oversight agency for actually exercising these powers in order to drive CDM. As a result, the only pressure the government and Ministry face with respect to putting the above powers to use is the motivation to avoid public shaming in the ECO's annual report evaluating how well the actors within the policy framework are fulfilling their roles and meeting conservation goals[70].

2. Are the roles defined in the framework appropriate for the players involved?

Having described the roles and responsibilities assigned to the different players under the current CDM policy framework, the question then becomes 'is this assignment of roles and responsibilities appropriate?' If yes, the assignment of roles should be administratively efficient, and should exploit the strengths of various players and support players in their areas of weakness.

The only pressure the government and Ministry face with respect to putting their powers to use is the motivation to avoid public shaming in the ECO's annual report.

Overall CDM policy framework

It is appropriate that the ECO occupies the role of evaluation agency with respect to the efficacy of Ontario's CDM policy framework because the ECO's office is impartial, and the evaluation agency role fits well within the ECO's mandate of reviewing and reporting on the government's compliance with its stated environmental values (EBR, 1993, s. 57).

Energy planning

The roles of the Ministry of Energy, the OPA and the OEB as they are currently being played out under the existing CDM policy framework are not appropriate because they fail to fully exploit the strengths of the various players and result in a lack of stability and certainty in CDM policy. There are two problems with the Minister of Energy's directives steering the development of the province's power system plan.

First, the OPA is the more appropriate party to be driving the energy planning process, given its responsibility under the Electricity Act to forecast electricity demand and to assess the adequacy and reliability of Ontario's electricity resources, and "to conduct *independent* planning for electricity generation, demand management, conservation and transmission and develop

70 One place where legislation does assign government responsibility for engaging in CDM rather than just the power to require others to do so is the Green Energy Act's stipulation that the government must consider energy efficiency and conservation when making capital investments and obtaining goods and services (ECLA, 2006, s. 6). One way the government has operationalized this mandate through its GreenFIT Procurement Strategy, a policy whereby the government can leverage its own purchasing power to pilot innovative new energy saving technologies in a government setting (Ontario Ministry of Government Services, 2010).

integrated power system plans for Ontario" (EA, 1998, s. 25.2(1)(b), my emphasis; EA, 1998, s. 25.2(1); EA s. 25.29(1)).

Second, it gives the planning process no long term stability because the planning instructions coming from the Minister can change drastically depending on who the Minister happens to be, and what government happens to be in power at the time the IPSP is being updated. The Ministry of Energy and by extension, the government, does appropriately have a role in providing policy direction with respect to the development of the province's IPSP. However, that direction should come in the form of broad policy objectives rather than specific planning instructions[71].

The current framework also fails to fully exploit the OEB's potential to provide oversight with respect to provincial energy planning. The OEB is severely restricted in its role as oversight agency by the scope of its IPSP review being limited to an assessment of cost-effectiveness and obedience to Ministerial directives.

There is no long term stability because the planning instructions coming from the Minister can change drastically.

One assignment of roles in energy planning that is appropriate, however, is the requirement that public agencies like hospitals and municipalities create their own CDM plans and report on their energy consumption and CDM activities (O. Reg. 397/11). This role assignment is appropriate because it not only has the potential to result in widespread savings, but it also conforms to the government's aspiration of leading by example.

CDM programming

OPA-contracted province-wide programs & board approved programs

There are three main problems with the current framework's assignment of roles with respect to CDM programming: 1) the framework assigns all LDCs the same role, whether they employ 3 people or 3000 people, 2) it effectively prevents LDCs from designing programs, and 3) there is a mismatch between who bears responsibility for meeting CDM program targets and who designs the CDM programs.

First, there is a lot of diversity in the size and capabilities of the various LDCs, so whether the roles that have been assigned to them are appropriate is

71 To illustrate, the Minister's Feb. 17, 2011 supply mix directive specifically instructs the OPA to "plan for nuclear generation to account for approximately 50 per cent of total Ontario electricity generation", and even more specifically instructs the OPA to plan for the refurbishment of 10,000MW of existing nuclear capacity at the Bruce and Darlington Nuclear Generating Stations and the procurement of two new 2000MW nuclear generating units at Darlington (DuGuid, 2011, p. 2). This instruction is characteristic of the planning instructions contained in the supply mix directive; they are prescriptively focused on process, as if the Ministry has picked a particular course of action aimed at achieving an unnamed set of policy objectives.

By contrast, an example of the type of broad policy objective that might appropriately inform the development of an IPSP is the objective to reduce Ontario's greenhouse gas emissions by six percent from 1990 levels by 2014, and 15 per cent by 2020, as articulated in the Ontario government's 2007 Climate Change Action Plan (Ontario Ministry of the Environment, 2007, p. 6). As a broad policy objective, the example from the Climate Change Action Plan is outcome-oriented instead of process specific; it would provide the OPA with policy direction while still leaving the OPA to work out the 'how' of achieving the desired outcome. (NB: Although in practice, the Ministry consults with the OPA in developing its Long Term Energy plan and the supply mix directive [Mallinson, 2011d], the policy framework does not require that the Ministry seek the expert advice of the OPA in developing its CDM targets and supply mix directives [EA, 1998, s. 25.30(2)]). These two examples of policy direction may very well be getting at the same thing: a desire to lower Ontario's GHG emissions, but if so, they go about it very differently.

mixed. On the one hand, assigning LDCs the role of implementing agency by having them deliver CDM programs is appropriate because it takes advantage of LDCs existing relationships with consumers[72]. It is also appropriate that smaller LDCs who have very little capacity for designing or delivering CDM programs are supported with standard programs, marketing, tracking tools, and EM&V services from the OPA. However, some LDCs have a wealth of CDM experience and expertise from having designed and delivered their own CDM programs under previous frameworks, and have little need for direction from the OPA with respect to how to deliver CDM programs. By failing to differentiate between LDCs that do and do not have experience and capacity to design or deliver CDM programs, and treating all LDCs the same way, the current framework strains the resources of smaller LDCs and hamstrings the larger and more experienced LDCs. For example, the OPA's Master Agreement and program schedules define how the OPA's standard programs are to be delivered so prescriptively that they read like instructions manuals geared towards readers who have never delivered CDM programs before[73]. This excessive level of detail leaves the more capable LDCs feeling restricted and presents the smallest and least experienced LDCs with an 813-page program delivery agreement to wade through (OPA, 2011j; OPA, 2011l-2011aa). As a result, the one-size-fits-all approach of the CDM policy framework has created an assignment of roles and responsibilities that is ill-fitting for many.

The current framework strains the resources of smaller LDCs and hamstrings the larger and more experienced LDCs.

Second, the CDM Code specifies that Board-Approved Programs must not duplicate the OPA's standard programs (OEB, 2010c). While this stipulation may seem prudent, the OPA's standard program offerings are extensive, the CDM Code's non-duplication rules are broad and encompassing, and the OEB's interpretation of those non-duplication rules has been very restrictive[74]. Together, these factors have so far resulted in no Board-Approved programs being approved[75]. Therefore, although on paper, the Minister's directive and CDM Code specify that LDCs may design and deliver Board-Approved CDM programs (DuGuid, 2010d), LDCs' de facto inability to receive funding for Board-

72 Experimental studies show that marketing and communications about energy conservation are more likely to prompt consumers to engage in energy savings measures when they originate from sources that consumers perceive as credible and trustworthy (Craig & McCann, 1978, p. 86). Therefore, where LDCs have a history of offering and delivering CDM programming to electricity consumers, the most appropriate players for delivering CDM programs to electricity customers are likely to be the LDCs.

73 This is particularly true of the industrial program schedules (e.g. OPA, 2011u, p. 9). One LDC representative interviewed also stated that the program schedule for the Low Income program goes as far as to specify that energy audits are to be performed in 2 hours, which the LDC representative found overly prescriptive and not necessarily conducive to delivering quality customer service. I was not able to confirm this account because although the Low Income Program Schedule specifies that LDCs must follow the OPA's Audit and Retrofit Protocols when conducting audits, the version of the schedule posted on the OPA's public web site leaves Exhibit C (Audit and Retrofit Protocols) blank (OPA, 2011aa, p. 26). For a discussion of the prescriptive nature of the program schedules, see section 1 of Appendix D.

74 The OEB's reticence to approve funding for Board-Approved CDM Programs likely stems from a combination of the CDM Code's non-duplication rules and the change provisions present in the OPA's master agreements with the LDCs. If Board-Approved Programs must not duplicate OPA programs, but OPA programs can change over time, then the Board could view any application for LDC programs as potentially duplicative of OPA programs if OPA programs should change over the 2011-2014 period.

75 For a list of the CDM Code's non-duplication rules and a brief history of LDCs applications for Board-Approved Programs under the current CDM policy framework, see sections 2 and 3 of Appendix D

Approved programs under the current framework prevents them from doing so. These two problems combine to squander one of the LDCs key strengths: their ability to tailor programs to local market conditions so that programs meet local needs and achieve maximum uptake.

A third problematic aspect of the current framework's assignment of roles is the misalignment between who is assigned responsibility to design the CDM programs and who bears ultimate responsibility for meeting the CDM targets associated with those programs. The framework makes LDCs responsible for hitting their CDM targets using programs that they did not design[76] and are quite constrained in implementing. On the other side of the coin, the framework makes the OPA responsible for designing the standard province-wide programs, but does not make it in any way accountable for the success or failure of those programs. This misalignment of powers and responsibilities seems distinctly unfair.

Transmission-connected customers

Because the large industrial customers who are connected through the transmission system are not connected to the distribution system, it seems appropriate that the design and delivery of such programs would be managed by the OPA rather than the LDCs.

The current policy framework makes LDCs responsible for hitting CDM targets using programs that they did not design and are constrained in implementing.

First Nations programs

It is appropriate that the OPA would design and coordinate the delivery of CDM programs to First Nations and Metis communities because such a role builds on their previous work successfully piloting a multi-element program to promote CDM among Aboriginal communities across Ontario (DuGuid, 2010a, p. 4). However, one important aspect of delivery that should be considered and attended to is that such programs will be delivered in the service territories of LDCs, who will already be offering a suite of CDM programs to all their customers. Thus, there should be cooperation between whoever is the delivery agent for the First Nations programs and the local distribution companies to avoid duplication of efforts, and to provide one point of contact with customers for all programs.

Ministry of Energy programs

Although the current framework has created a lot of speculation about what type of CDM programs might actually be run by the Ministry using funding from the rate base, I don't feel that the Ministry should be precluded from running rate-based CDM programs because there are circumstances in which the Ministry would be the most appropriate party to administer certain CDM programs. One such case would be when programs involve partnerships between different levels of government, such as the Ontario Home Energy Savings program formerly offered by the Ministry in conjunction with Natural Resources Canada's federal ecoENERGY Retrofit program. In this sense, the restrictions imposed on what types of programs the Ministry can run through assessments on the IESO and LDCs seem adequate (OEB Act, 1998, s. 26.2(2)).

76 The LDCs had only a consultation role in the design of the province-wide CDM programs (OPA, 2011a, pp. 7-8).

Research and development

The OPA's role in funding CDM research and development is appropriate given the OPA's historical success with stimulating CDM innovation and commercialization through the Conservation Fund and Technology Development Fund. The Ministry of Energy's ability to conduct its own CDM research is also appropriate because the Ministry has legislated responsibilities that require it to do research (e.g. advising and assisting the government in its dealings with other governments on energy matters).

Smart metering and TOU pricing, building code updates, and energy efficiency standards

The assignment of roles with respect to Smart Metering, TOU pricing and building code updates are straight-forward and appropriate. However, the lack of assignment of roles and responsibilities in legislation with respect to updating energy efficiency standards is inappropriate and problematic because it leaves the updating of such standards entirely to the discretion of the government. The reality that prior to the most recent update to Ontario's energy efficiency standards (which added standards for general service lamps in February of 2012) there was a six year gap when no energy efficiency standards were updated speaks to the ineffectiveness of the current arrangement (O. Reg. 13/12; O. Reg. 38/06).

Another inappropriate and problematic aspect of the framework is its lack of compliance and enforcement-related provisions in the Green Energy Act. This means that there is currently no entity in the oversight and enforcement role, ensuring that manufacturers and retailers abide by the province's energy performance standards and energy performance disclosure rules.

It is not sufficient for legislation to grant government the power to promote conservation — legislation needs to require action on conservation.

Miscellaneous government and ministry powers & responsibilities

As mentioned above, the Ministry and Government are put in director's roles — they are given powers and the discretion to use them or not use them as they see fit. The problem with the government and Ministry occupying this type of role is that if the government and Ministry elect not to exercise their powers to direct other entities to engage in CDM, things in the province could continue in a business-as-usual manner, with no gain for CDM as a result of the CDM-related provisions in the GEAGEA.

For example, since the passing of the Energy Conservation Leadership Act in 2006, the government has had the power to require public agencies (e.g. hospitals, school boards, municipalities, etc.) to report annually on their energy use and CDM activities, but it only elected to exercise this power five years later in August of 2011 (O. Reg. 397/11, s. 4)). The Energy Conservation Leadership Act , 2006 also gave the government the power to designate goods and services for the promotion of conservation, but the only thing that has been prescribed under this clause are clotheslines and clothes trees in 2008 (O.Reg. 97/08). These examples illustrate that it is not sufficient for legislation to grant entities the power to promote conservation — legislation needs to require action on conservation.

An example of a more appropriate assignment of roles and responsibilities through legislation is the GEA's specification that CDM-related principles shall guide the government in constructing, acquiring, operating and managing its facilities (i.e. clear and transparent reporting of energy use, and planning and designing government facilities to ensure efficient use of energy) (GEA, 2009, s. 10 (1)).

3. Does the framework facilitate cooperation between the various CDM players?

Cooperation in planning the IPSP between the Ministry of Energy and the OPA

There is a lot of cooperation between the Ministry of Energy and the OPA with respect to the Minister of Energy's supply mix directive. However, legislation does not require the Ministry of Energy to consult the OPA in developing its supply mix directive for the IPSP, so this cooperation happens in spite of the current policy framework rather than because of it (EA, 1998, s. 25.30(2)).

Cooperation between OPA and LDCs

In contrast, the Minister of Energy's April 23, 2010 CDM directive instructed the OPA to "tak[e] all reasonable steps to collaborate with LDCs" when designing province-wide CDM programs (DuGuid, 2010a, p. 2). This resulted in the OPA forming CDM program working groups with representatives from the various LDCs and the EDA to develop the current suite of province-wide programs (OPA, 2010c, p. 5; OPA, 2010e, p. 3; OPA, 2010d, p. 3; OPA, 2011f, p. 30)[77].

Cooperation between the OEB and the OPA and LDCs

The Electricity Act requires the OPA to share information with the OEB (EA, 1998, s. 25.27), and the Minister of Energy's CDM directive instructs the OPA to advise the OEB on the allocation of CDM targets among LDCs and on the administration of LDC CDM activities (DuGuid, 2010a, p. 2). However, neither the Electricity Act nor the Minister's directives make similar demands of the OEB with respect to sharing information with the OPA or the LDCs, and observers raised concerns during interviews that the OEB's behaviour with respect to cooperating and sharing information during the Board Approved Program application process impeded rather than facilitated the process[78].

77 The OPA also reached out to LDCs after the OEB's rejection of Toronto Hydro's application for Board Approved programs, assuring LDCs that the OPA would be "happy to work with any LDC who is interested in developing additional programs to supplement the Province-wide Programs", and was looking forward to continuing to collaborate with LDCs to "achieve CDM goals and create a culture of conservation in Ontario" (Pride, 2011).

78 For example, Hydro One submitted its application for Board Approved Programs on November 1, 2010, but the Board took until March 7th, 2011 to come to the decision that Hydro One's application was incomplete due to the lack of full evaluation plans for programs and that it did not consider the OPA's CDM programs to have been established at the time of Hydro One's application (HONI, 2010b; HONI, 2011, p. 1). Furthermore, during the OEB's assessment of both Hydro One's and Toronto Hydro's applications for Board Approved Programs, the OEB elected not to use its ability to request and require information from the OPA with respect to obtaining the OPA's advice on whether proposed Board-Approved Programs were duplicative of OPA's province-wide programs, and instead required LDCs to themselves obtain letters of assessment from the OPA, and then add those letters in their application packages. This led some observers to assert that the OEB seemed to be impeding rather than facilitating the process of applying for funding for Board-Approved CDM programs (Mallinson, 2011a).

Cooperation among LDCs, and between LDCs, gas utilities, and municipalities

The Minister of Energy's Mar. 31, 2010 directive to the OEB instructs the OEB to "encourage opportunities for coordinating CDM programs between the distributor and other relevant entities such as other electricity distributors, natural gas distributors, and the OPA" (DuGuid, 2010d, p. 4). However, one of the OEB's criteria for counting savings and calculating incentives for Board-Approved programs may hinder cooperation between such players. Under the CDM Code, LDCs may apply for performance incentives once they have reached 80% of each of their energy and demand targets, and may continue to receive incentives for savings until they reach 150% of their targets (OEB, 2010c, p. 15). However, the Code specifies that in cases where an LDC collaborates on Board-Approved programs with another LDC or with other entities (e.g. gas utilities, municipalities, or the federal government), the distributor must demonstrate that its role was central[79] to the program in order to claim 100% of the incentive for savings from that particular program (OEB, 2010c, p. 14). This means that distributors risk losing incentives when they develop and deliver Board-Approved programs in partnership with other distributors or gas utilities or municipalities. In this way, the Code's centrality requirement discourages coordination and synergies among LDCs and between LDCs and other CDM players like gas distributors, municipalities, and the federal government (Coalition of Large Distributors [CLD], 2010, p. 9).

The Code's centrality requirement discourages coordination and synergies among LDCs and between LDCs and other CDM players.

One observation that emerged from my interviews with the LDCs is that Ontario's electricity distribution industry in Ontario is unique in that the province's approximately eighty different electrical utilities operate in discrete service areas and as a result, are not in competition with each other. This means that competition is not a barrier to them sharing information, experiences, ideas, marketing, and people. This capacity for, and culture of, collaboration and cooperation is a strength that should be exploited (Mallinson, 2011i, p. 6).

4. Does the framework include processes for incorporating the input of key stakeholders?

Stakeholders in Ontario's CDM policy framework include all the major CDM players, as well as non-governmental organizations, energy service companies, representatives of various industries and businesses, and members of the energy-consuming public. Effective processes for incorporating stakeholder input into the development of CDM policy can allow stakeholders to take on an evaluation agency-like role.

CDM and energy system planning

Under the Environmental Bill of Rights, Ministers are required to post notice on the Environmental Registry of any proposed policies or Acts that the Minister considers could significantly affect the environment, and which the minister

79 The Code defines centrality as contributing greater than 50% of program funding, or contributed less than 50% but initiated the partnership, the program, or the program implementation (OEB, 2010c, p. 14).

considers the public should be able to comment on before the proposal or policy is implemented (EBR, 1993, s. 15(1)). In accordance with this clause, the Ministry of Energy posted the Draft Supply Mix Directive to the Environmental Registry on November 23, 2010 for a 45 day public review and comment period[80]. This is the only opportunity for stakeholders to provide input on the planning decisions made in the supply mix directive, which is unfortunate because a 45-day comment period is not a very robust form of public consultation for a policy document that makes the major planning decisions and acts as the foundation for the province's next integrated power system plan.

A far more meaningful and appropriate process for soliciting and incorporating stakeholder input into the development of the IPSP would be the type of stakeholder consultation process outlined in the Environmental Assessment Act. Unfortunately, both the IPSP and the supply mix directive upon which it is based are exempt from undergoing environmental assessments (O. Reg. 276/06).

However, the Electricity Act does require the OPA to "establish one or more processes by which consumers, distributors, generators, transmitters and other persons who have an interest in the electricity industry may provide advice and recommendations for consideration by the OPA" (EA, 1998, s.25.12), and the regulation specifying the principals which should guide the development of the IPSP also specifies that the OPA shall "Consult with consumers, distributors, generators, transmitters and other persons who have an interest in the electricity industry in order to ensure that their priorities and views are considered in the development of the plan" (O. Reg. 424/04, s. 2(1)1.). This means that OPA's fleshing-out of the supply mix directive into a fully-formed IPSP is the subject of a stakeholder consultation processes open to participation by anyone in Ontario[81]. However, the OPA's ability to incorporate stakeholder input into its planning decisions is limited by its need to conform to the Minister's supply mix directive[82].

Once the IPSP has been submitted to the OEB, the IPSP is also subject to the OEB's review and approval process, which includes processes for receiving input from stakeholders (OPA, 2012d). However, the OEB's ability to incorporate stakeholder feedback into its decision on the IPSP is also limited by the stipulation that the only criteria the OEB can consider when deciding whether or not to approve the IPSP are 1) whether the IPSP complies with the Minister's directives, and 2) whether the IPSP is cost-effective (EA, 1998, s. 25.30(4)).

80 The posting stated that all comments received before Jan. 7, 2011 would be considered as part of the Ministry of Energy's decision-making process (Government of Ontario, 2010).

81 The 2011 IPSP stakeholder consultation process involved publishing an IPSP Planning and Consultation Document and holding in-person and web-casted consultation sessions on various topics, including one on conservation. Submissions were accepted until up to two weeks following the last stakeholder consultation session on May 31st, 2011 (OPA, 2012d). Feedback will inform the evidence that will be submitted to the OEB along with the finalized IPSP.

82 (i.e. the OPA does not have the power to deviate from the Minister's supply mix instructions on the basis of its own expert judgement, let alone on the basis of input from stakeholders.)

Policy framework for CDM programming

The framework for the delivery of CDM programming by LDCs comes from the Ministry of Energy's March 31st, 2010 directive to the OEB and the OEB's subsequent CDM Code for Electricity Distributors, released in September of 2010. Stakeholder consultation on the CDM Code consisted in the OEB issuing a notice of proposal to issue a new code and a draft of the CDM Code for comment, with a June 21, 2010 deadline for submitting written feedback (OEB, 2010g, p. 7). The Board received written stakeholder comments from 26 stakeholders, including utilities, municipalities, and advocacy groups. Although stakeholders raised concerns with several aspects of the code, following its review of the comments, the Board concluded that apart from minor adjustments to improve clarity and understanding, "no material changes" were required to the proposed Code (HONI, 2010c; CLD, 2010; EDA, 2010b; OEB, 2010f, p. 1). The same type of stakeholdering process was held for the CDM Guidelines for Electricity Distributors that the OEB released in January of 2012, and resulted in feedback from 16 stakeholders, but, again, a verdict by the OEB that "no material changes" were required (OEB, 2012d, p. 1).

In these two cases, although the structures for receiving and incorporating feedback from stakeholders were in place (i.e. LDCs and other stakeholders submitted comments on the proposed CDM Code), the OEB did not make any material changes to the CDM Code or the CDM Code guidelines as a result of this process. This emphasizes that even when enabling policies and structures are in place, the players involved need to be committed to both the spirit and the letter of the policies in order for them to really be effective.

Even when enabling policies and structures are in place, the players involved need to be committed to both the spirit and the letter of the policies.

Province-wide CDM programs

With respect to stakeholder consultation during the OPA's development of the province-wide programs, the Minister of Energy's April 23, 2010 directive to the OPA specified that in its design of OPA-Contracted Province-Wide Programs, the OPA should take all reasonable steps to collaborate with the LDCs (DuGuid, 2010a, p. 2). In December 2009, the OPA and the Electricity Distributor's Association (EDA) established three working groups composed of representatives from small, medium and large LDCs, the EDA, the Ministry of Energy, and the OPA (OPA, 2010c, p. 5; OPA, 2010e, p. 3; OPA, 2010d, p. 3; OPA, 2011f, p. 30). These working groups were tasked with developing new industrial, business, and consumer province-wide programs by the end of May, 2010. Following the development of the draft program designs by the OPA and the working groups, the OPA also hosted a two day stakeholder consultation session (on April 20th and 21st, 2010) so that stakeholders could provide input prior to the finalization of the program designs (OPA, 2010j).

Another place where the CDM policy framework calls for stakeholder consultations with respect to the CDM programs delivered by the LDCs under the CDM Code is the stakeholder consultation process associated with the LDCs applications for funding for Board-Approved CDM programs. After an application for Board-Approved Program funding is filed, a notice of the application is published so that stakeholders who wish to participate in the hearing process have a chance to respond to the application with their feedback

within a specified time frame. The applicant (i.e. the LDC) then has to respond to the written questions (called 'interrogatories') from the stakeholders (called 'intervenors'). The Board panel then decides whether the application will go to an oral hearing (which takes approximately 300 days) or a written hearing (which takes approximately 240 days). In an oral hearing, the intervenors question the witnesses provided by the applicant, and after the hearing concludes, the Board decides on the application (Mallinson, 2011j, p. 2; OEB, n. d.).

One issue that has arisen is the cost in time and effort associated with applying to the OEB for program funding.

One issue that has arisen regarding these proceedings is costs in time and effort associated with applying to the OEB for program funding due to the method of stakeholder consultation associated with the OEB's application process. Some LDCs have observed that the intervenor process places undue administrative burden on the applicants (i.e. LDCs) due to their need to respond to submissions and requests for information from both Board staff and intervenors. In response to this issue, a recent report on regulatory reform from the Electricity Distributors Association (EDA) recommended changes to the OEB's intervenor process that included screening interrogatories for duplication, relevance and materiality, and changing the eligibility requirements for intervenor status, as well as the eligibility rules for cost awards (EDA, 2011, p. 9).[83]

Codes and standards

Potential changes to the building code are subjected to public and stakeholder consultations run by the Ministry of Municipal Affairs and Housing (MMAH), for both new editions of the Building Code and for significant interim amendments (MMAH, 2010d, p. 4). During the review process, a public consultation is followed by evaluation of the potential changes by the building industry experts who make up the Building Code Conservation Advisory Council (formerly the Building Code Energy Advisory Council), who then submit recommendations to the Ministry of Municipal Affairs and housing, which develops the list of proposed Code changes to be reviewed by the provincial Cabinet (MMAH, 2010d, p. 4; BCA, 1992, s. 34.1(1)).

83 In its report, the EDA asserted that "requests for information from intervenors and OEB staff are essentially duplicative in nature, however are worded such that they appear subtly different, necessitating a tailored response. This results in additional administrative burden with limited added value" (EDA, 2011, p. 8). Furthermore, the EDA noted that many intervenors are eligible to recover the costs of their participation in hearings from the applicant (i.e. the LDC) (EDA, 2011, p. 4). This means that the LDC (and ultimately the ratepayer) is burdened not only with the costs incurred in responding to all of the interrogatories submitted in an application process, but also with the costs of posing those questions (EDA, 2011, p. 9).

84 Another avenue for stakeholder input that has the potential to influences public policy is for stakeholders to contact their local MPP's and put pressure on the government to intervene/ interfere in the rate-setting process. The Ontario government did intervene in this manner in December of 2010 by passing a regulation decreeing that Ontario's off-peak TOU period would start two hours earlier (at 7pm as opposed to 9pm) starting May 1, 2011 (O. Reg. 494/10; O. Reg. 95/05, s. 6(1)). However, because rates must reflect costs, this just meant that rates would be adjusted so that costs were covered in a different ratio of on-peak to off-peak pricing – i.e. higher peak or mid-peak prices to compensate for the shorter mid-peak period (OEB, 2011l, p. 3).

TOU pricing

Time-of-use electricity prices for customers with smart meters are set by the OEB and adjusted twice a year in May and November, as has been the case since 2005 (OEB, 2011i, p. 19; OEB, 2011a). There is no stakeholder input during the setting of TOU rates because legislation dictates that electricity prices must reflect costs[84] (EA, s. 25.33 & OEB Act. s. 78. (3.3)). However, the methodology that the OEB uses to calculate and set TOU rates (e.g. how they decide on the price differential between on-peak and off-peak rates), is adjusted periodically in a process that solicits input from stakeholders (OEB, 2011a).

Table 6.2: Roles and Responsibilities Summary Table

Question	Short Answer
1. Are the roles of the different CDM players clearly defined?	Yes and no
2. Are the roles defined in the framework appropriate for the players involved?	No and yes
3. Does the framework facilitate cooperation between the various CDM players?	Yes and no
4. Does the framework include processes for incorporating the input of key stakeholders?	Yes and no

Section 7: Funding and incentive structures

1. Is adequate funding provided to achieve the targets that have been set?

In order to answer this question, we first need to know how much it typically costs to procure energy savings on a per kW or kWh basis, so that we can calculate the minimum budget that would be required to procure the level of energy savings called for by the province's targets. Then we need to know how much funding actually has been allocated to conservation activities, so that we can compare those numbers to the theoretical minimums generated by our calculations. This should give us a general idea of whether the funding that has been committed is likely to be enough to achieve the targets that have been set.

As mentioned in previous sections, Ontario's conservation targets are 7,100MW and 28TWh by 2030, with LDCs given collective targets of 1330MW and 6TWh by the end of 2014. With respect to CDM funding, the Ontario government anticipates spending $12 billion by 2030 (Ministry of Energy, 2010, p. 40), and the OPA has a budget of $1.4 billion to spend on OPA-Contracted Province-Wide conservation programs over the four year period covered by the CDM Code (OEB, 2011d, p. 12).

Arriving at a number for the per kW or per kWh cost of conservation is less straightforward, however. There are different ways of calculating the cost of conservation, and different entities have arrived at different figures. In 2009, for example, the American Council for an Energy Efficient Economy (ACEEE) calculated the average cost of electricity savings at $0.025/kWh, based on a survey of 14 leading American states (Friedrich et al., 2009, p. ii). By contrast, the OPA forecasts the cost of conservation in 2030 to be somewhere between $0.05 and $0.067/kWh (in 2010 dollars) (OPA, 2011h, p. 3-23). Still other figures for the cost of conservation can be derived from calculations using past CDM spending and results, or using LDC proposals for CDM program budgets. For convenience, a number of different estimates of the cost of conservation are listed in the table below, along with their sources, as well as the minimum budgets these figures suggest would be required to meet Ontario's targets.

Table 7.1: The Cost of Conservation for 2030 Target

Source	Energy Savings (targeted or achieved)	Budget (actual or proposed)	Cost of Conservation per kWh (or MW)	Minimum budget calculations
ACEEE survey (Friedrich et al., 2009, p. ii)	---	---	$0.025/kWh (in 2007 US dollars)	$700 million for 28TWh
OPA 2030 projection (OPA, 2011h, p. 3-22)	---	---	$0.05/kWh to $0.067/kWh (in 2010 dollars)	$1.4-1.876 billion for 28TWh
OPA Conservation Procurement Cost Transparency document (OPA, 2008b, p. 4)[85]	---	---	Energy efficiency programs: $0.008-0.150/kWh (in 2008 dollars)	$224 million – $4.2 billion for 28TWh
			Demand Response/ consumer behaviour: $19-105/MW/yr (in 2008 dollars)	$134,900 - $745,500/yr for 7,100MW
Ontario Experience 2006-2010.	1751.9MW achieved (ECO, 2011b, p. 14)	$1.7 billion (Ontario Ministry of Energy, 2010, p. 38)	$970,375/MW	$6.89 billion for 7,100MW
Hydro One's CDM Strategy and Application for Board-Approved Programs	210MW and 1073GWh (HONI, 2010b, p. 2)	$213 million (HONI, 2010b, p. 3)	$0.20/kWh	$5.56billion for 28TWh ($1.19 billion for 6TWh)
Toronto Hydro Application for Board-Approved-Programs	286MW and 1317GWh (THESL, 2010, p. 3)	$327 million (THESL, 2010, p.3)	$0.248/kWh	$6.95 billion for 28TWh ($1.49 billion for 6TWh)

As can be seen from the far right column in the table, all of the minimum budgets calculated using the various CDM cost estimates are less than the $12 billion the government anticipates spending on CDM by the year 2030. Therefore, the funding that has been allocated for conservation should be adequate to achieve the targets that have been set.

85 The OPA calculated these numbers from 20 completed conservation procurements in 2006 and 2007, during which time most CDM programs were residential, with some commercial. Industrial programs (which are typically cheaper) were launched later, so these cost-of-conservation figures might be higher than a later mix of programs would yield (OPA, 2008b, pp. 4-5).

2. Does the framework remove disincentives to utilities investing in CDM, provide utilities with incentives for meeting and exceeding CDM targets, and provide disincentives for failing to meet targets?

Recovery of program costs

Under Ontario's existing CDM policy framework, the costs of utility CDM programs are funded through the OPA or the OEB and recovered from Ontario ratepayers through the Global Adjustment, meaning that the cost of such programs is recovered by utilities.

Compensation for lost revenues

The Ministry of Energy's Mar. 31, 2010 directive to the OEB specifies that the Board "shall have regard to the objective that lost revenues that result from CDM Programs should not act as a disincentive to a distributor" (DuGuid, 2010d, p. 5). Ontario's current policy framework allows LDCs to make use of a Lost Revenue Adjustment Mechanism (LRAM) to ensure that decreases in revenue which result from CDM activities do not act as a disincentive for LDCs in meeting their targets (OEB, 2012b, s. 13, pp. 8-10)[86].

Delays in incentive payments weaken the link between incentives and performance.

Providing incentives and penalties

The current framework also provides LDCs with per kWh and per kW performance incentives that begin to accrue once an LDC achieves 80% of both its kW and kWh targets. These incentives start at 30¢/kWh and $13.50/kW, and increase to a maximum of $1.80/kWh and $81/kW when an LDC achieves 150% of its targets (OEB, 2010c, pp. 15, 23).

In terms of providing a penalty to LDCs for failing to meet targets, the framework makes meeting CDM targets a condition of the LDCs' operating licences, so LDCs risk losing their licences if they fail to meet their targets (OEB, 2010e, p. 2). This is a very serious disincentive. Therefore, the answer to the question of whether the current framework provides utilities with incentives for meeting their CDM targets and disincentives for failing to meet targets is yes.

However, some LDCs and other energy sector observers have raised issues with respect to the effectiveness of both the performance incentives as a means of encouraging CDM program success and the licence condition as a disincentive for failing to meet CDM targets. Several features have been

86 Some observers have suggested that utilities would be better served by a true-up plan or straight fixed variable pricing (SFV) revenue decoupling mechanism rather than an LRAM. For example, a revenue decoupling report commissioned by the OEB in 2010 suggested that the LRAM mechanism currently available to Ontario LDCs was overly burdensome both in terms of required evidence and in terms of administrative cost (Lowry & Makos, 2010, p 111). The report suggested that these factors discourage utilities (especially small utilities) from submitting claims for lost margins due to CDM activities, and supported this claim by pointing to the reality that most LDCs had not filed LRAM claims at the time of the report's release (Lowry & Makos, 2010, p. 111).

identified as contributing to the performance incentive structure's lack of effectiveness in encouraging CDM program success: 1) the joint 80% target threshold, 2) the timing of the incentive payments, and 3) the size of the incentives.

First, incentives only begin to accrue once LDCs have met 80% of both their energy (kWh) and peak demand (kW) targets, so an LDC that manages to hit 80% of its peak demand target in year 1 and 80% of its energy use target in year four wouldn't have incentives accrue on its peak demand savings until year four. Second, incentives will be paid to distributors after all program results for the four year period covered by the CDM Code have been verified. OPA EM&V on CDM program results typically takes about a year (OPA, 2011e; OPA, 2010a), so the earliest LDCs could apply to the Board for performance incentives would be late 2015. This is problematic because delays in incentive payments weaken the link between incentives and performance (Blumstein, 2010, p. 6235).

In addition, some LDCs have noted that regardless of when the incentives would be paid out, the size of the incentives relative to LDCs overall revenue makes them ineffective as a means of motivating LDCs to accelerate or exceed their targets (Mallinson, 2011l). Finally, other LDCs have noted that they view engaging in CDM activities as good customer service, and therefore performance incentives are simply not a motivating factor in meeting CDM targets.

With respect to making the meeting of CDM targets a condition of LDCs' licences, several observers have noted that while LDCs take the conditions of their licences very seriously, the impracticality of pulling an LDCs operating licence will make this penalty difficult or at least troublesome to enforce. As some LDCs expressed during my interviews, given LDCs' lack of control over the design and effectiveness of the OPA's standard province-wide CDM programs, coupled with the OEB's reluctance to grant LDCs funding to design and run their own programs, the OEB would be hard-pressed to justify pulling an LDCs licence if that LDC could demonstrate that it had exercised due diligence in trying to meet its CDM targets using the OPA's programs.

3. Do electricity price-setting policies send price signals to customers to conserve energy and invest in CDM measures?

For a description of how electricity is priced in Ontario, see section 7 in Appendix D. Electricity pricing policies in Ontario send consumers price signals both in terms of reducing overall electricity use and in terms of shifting electricity use away from periods of peak demand.

First, Ontario legislation dictates that electricity prices must reflect costs (EA, s. 25.33 & OEB Act. s. 78. (3.3)). From a conservation point of view, this is positive because it prevents artificially low electricity pricing, thus automatically encouraging reduced electricity use as the costs of producing and providing electricity rise.

Second, electricity consumers on the tiered pricing structure of the Regulated Price Plan (RPP) are charged one price up to a certain threshold, beyond which they are charged a higher price (see chart below) (IESO, n.d.d). This encourages consumers to curtail their overall electricity use so that they are not charged higher price for electricity consumed in excess of the monthly threshold.

Table 7.2: RPP Tiered Pricing Structure

Low-Volume Consumer	Pre-threshold price	Monthly threshold	Post-threshold price
Residential consumers	7.5 ¢/kWh	600 kWh	8.8¢/kWh
Business consumers	7.5 ¢/kWh	750 kWh	8.8¢/kWh

(IESO, n.d.d)

The difference between Ontario's on-peak and off-peak electricity prices may not be large enough to induce substantial time-shifting behaviour among consumers.

The tiered pricing structure outlined above and the stipulation that electricity prices must reflect costs are both examples of policies that encourage consumers to moderate or reduce their use of electricity. However, Ontario also has electricity pricing policies that encourage consumers to *shift* their use of electricity to times when there is less demand on the electricity system. These include the TOU pricing structure for RPP customers with smart meters, the allocation of Global Adjustment charges to large volume consumers, and the calculation of transmission and distribution charges for medium-volume consumers.

RPP customers on the TOU pricing structure are charged higher rates during periods of high and medium demand and lower rates during periods of low demand (see chart below) (IESO, n.d.e).

Table 7.3: TOU Pricing Structure

Period	Peak	Mid-peak	Off-peak
Price	11.8 ¢/kWh	9.9 ¢/kWh	6.3 ¢/kWh

(IESO, n.d.e)

Similarly, medium-volume consumers are charged transmission and distribution rates based on their peak demand rather than their overall electricity use, and large volume consumers pay Global Adjustment charges that are tied to their contribution to the five highest demand hours in the year. All of these three pricing structures encourage consumers to shift their electricity use away from peak periods. The way the Global Adjustment is charged to large volume consumers also has the additional benefit that because the five highest-peak hours of the year are not known in advance, such an arrangement is likely to elicit a significant consumer response as companies try to avoid the peak periods by shifting use during all hours that could potentially be yearly peaks in provincial demand.

However, despite the overall conservation-positive orientation of Ontario's electricity pricing policies, some problems and issues do exist. Chief among them are the price differential of Ontario's TOU pricing structure, the Ontario government's Clean Energy Benefit, and the recently announced Industrial Electricity Incentive Program for companies that create jobs in Ontario.

While many aspects of Ontario's current TOU rate structure for residential consumers are positive[87], the difference between Ontario's on-peak and off-peak electricity prices may not be large enough to induce substantial time-shifting behaviour among consumers. The prices associated with Ontario's TOU periods are currently 11.8¢/kWh for peak, 9.9¢/kWh for mid-peak, and 6.3¢/kWh for off-peak, which gives a peak-to- mid-peak-to-off-peak ratio of 1.9:1.6:1 (IESO, n.d.e). In 2010, a review of existing TOU rates in other jurisdictions revealed that the average peak:off-peak TOU price ratio was 4-to-1, and that even higher peak: off-peak price ratios characterized the rates that were most effective at encouraging permanent load shifting (Faruqui et al, 2010, p. 3). In contrast, Ontario's peak: off-peak price ratio at the time of the review was 1.9:1. As a result, the review's authors concluded that the difference between Ontario's on-peak and off-peak pricing was unlikely to produce more than modest customer response or bill savings (Faruqui, A., et. al, 2010, pp. 3, 5).

Next, the Ontario government's Clean Energy Benefit refunds 10% of monthly electricity bills to low volume consumers (Ontario Clean Energy Benefit Act, 2010, s. 4. (1)). This policy has the effect of making electricity less expensive to consume, and is thus counter-productive from a conservation perspective. In addition to undermining conservation efforts, the cost of the taxpayer-funded Clean Energy Benefit also dwarfs investment in conservation programs targeted at the same electricity consumers who receive the benefit. To illustrate, the Clean Energy Benefit is expected to cost in excess of $2.5 billion over the three year 2010/2011 - 2012/2013 budget period (Ministry of Finance, 2012), whereas the budget for investment in OPA-Contracted Province-Wide conservation programs over the four year period covered by the CDM Code is only $1.4 billion (OEB, 2011d, p. 12). Moreover, because the benefit is calculated as a percentage of consumers' electricity bills, the refund has the undesirable consequence of increasing in size as consumers use more electricity. This means that for two electricity consumers who pay the same amount of tax, the consumer who reduces his or her electricity use through conservation ends up subsidising the greater electricity use of his or her non-conserving peer.

The cost of the taxpayer-funded Clean Energy Benefit dwarfs investment in conservation programs targeted at the same electricity consumers who receive the benefit.

Finally, and very similarly to the last point, the government's recently introduced Industrial Electricity Incentive Program offers a discounted electricity price to companies expanding or establishing new operations in Ontario (Ministry of Energy, 2012). This program offers customized long-term contracts to companies that bring jobs and economic benefits to Ontario by investing $250 million or more in new technology, products or processes in the province (Ministry of Energy, 2012). It also proposes to allow established companies who expand their Ontario operations to pay only the market price for their additional electricity consumption until 2020 — providing them with very little incentive to conserve (Ministry of Energy, 2012). Like the Clean Energy Benefit, this

[87] In 2010, the Brattle Group was commissioned by the OEB to review Ontario's Time-of-Use pricing structure and found that it aligned strongly with best practices in other jurisdictions in terms of the number of TOU periods (three), the timing and duration of peak periods, and the seasonality of pricing (Faruqui, A., et. al, 2010, p. 3).

policy artificially lowers the price of electricity, encouraging increased energy consumption and discouraging conservation.

4. Does the framework facilitate customer investment in CDM by addressing barriers like high first costs and inability to obtain attractive financing?

Many of the OPA's province-wide CDM programs targeted at electricity consumers focus on providing consumers with incentives that reduce or eliminate the incremental higher cost of choosing energy efficient products and services (OPA, 2011m, 2011n, 2011o, 2011p, 2011q, 2011r, 2011s). This is positive in terms of addressing high up-front cost as a barrier to investment in CDM projects. However, the policy framework hasn't generally produced programs aimed at providing low-interest loans to consumers wanting to engage in CDM measures, nor has it facilitated the use of alternative methods of financing energy-saving projects[88].

Government loan programs specifically for energy saving retrofits have not emerged at the provincial level.

Grants and subsidies

With respect to **grants and subsidies** for lowering the cost of borrowing, both the Ministry of Energy and the Ministry of Infrastructure have the ability to make grants, and this seems to create legislative space for Ministry programs to provide grants or subsidies that either lower the initial cost of energy savings projects or lower the interest rates associated with financing such projects[89].

Government loans

Both the Ministry of Energy and the Ministry of Infrastructure also have the ability to issue government-approved loans, which would allow for government loan programs similar to the City of Toronto's Sustainable Energy Fund, which provides building owners with access to zero interest loans between $50,000 and $1,000,000 per energy project, up to a maximum of 49% of the project costs (City of Toronto, 2008, p. 1). However, government loan programs specifically for energy saving retrofits have not emerged at the provincial level (Persram, 2011b, p. 21). Nevertheless, some government loan programs do exist under the existing policy framework (even if they were not conceived specifically with energy conservation in mind). For example, public sector electricity consumers (e.g. universities, hospitals and municipalities) can apply to Infrastructure Ontario's Loan Program to finance energy conservation projects using low interest loans with repayment terms of up to 40 years (Infrastructure Ontario, 2012). However, these loans are only available to public sector consumers, and no equivalent program for private sector electricity consumers has emerged.

88 For example, none of the OPA's standard province-wide programs are aimed at providing electricity consumers with attractive financing for CDM projects.

89 The GEAGEA added to this ability by specifying that the Ministry of Energy and Infrastructure could make grants subject to conditions to encourage energy conservation (GEAGEA, 2009, Schedule C, s. 6(2)). However, that specification has since disappeared from both the Ministry of Energy Act and the Ministry of Infrastructure Act (the two Ministries were separated in 2011) (Ministry of Energy Act, 2011, s. 7(3)(g); Ontario Infrastructure and Lands Corporation Act, 2011, s. 7(4)(h)).

Property-assessed financing

The main impediment to the implementation of **property-assessed financing** by municipalities in Ontario is the uncertainty as to whether energy-saving projects qualify as 'work' that can be funded through local improvement charges (LIC's) (Peters, Whitmore, & Horne, 2005, p. 8). What qualifies as 'work' that can be funded through special charges for the purposes of local improvement is governed by a particular regulation under the Municipalities Act (O. Reg. 586/06). Whereas this regulation used to define such 'work' very prescriptively as limited to 16 items (O. Reg. 199/03), the new regulation defines 'work' more flexibly, saying that it may include but is not limited to the 16 items in the old regulation (O. Reg., 586/06 s. 1.). Such a change would seem to remove this particular impediment to using local improvement charges to fund energy efficiency projects on private property. However, because the regulation does not explicitly define energy improvements as a type of work appropriately fundable through LIC's (and neither does legislation explicitly state that municipalities may use LIC's to fund improvements on private property (O. Reg., 586/06 s. 1.)), municipalities are reluctant to develop programs based on such an interpretation of the legislation governing the use of LIC's, lest the province disagree with such an interpretation (Persram, 2011b, p. 25).

Furthermore, municipalities have noted that the process for setting up LIC's is complex and costly for municipalities because it requires setting up by-laws for each area and obtaining multiple approvals, etc., which can result in LIC's taking years to implement (Persram, 2011b, p. 26).

Utility bill financing

Ontario's current policy framework does not disallow financing through electric utility bills, but as of yet, no utilities have been granted funding to develop such programs. Toronto Hydro did include a "metering loan service" provision (i.e. financing tied to the utility meter rather than the utility customer) in its proposal for a modified and enhanced industrial accelerator program for distribution-connected customers, which it submitted as part of its application for Board-Approved CDM programs (THESL, 2011c, p. 30). However, the OEB did not grant Toronto Hydro funding to develop and implement this program. As a result, on-bill financing is currently not available in Ontario (Persram, 2011a, p. 27).

Figure 7.4: Funding and Incentive Structures

Question	Short Answer
1. Is adequate funding provided to achieve the targets that have been set?	Yes
2. Does the framework provide utilities with incentives for meeting and exceeding CDM targets, and remove disincentives for engaging in CDM?	Yes
3. Do electricity pricing policies send price signals to customers to engage in CDM?	Yes and no
4. Does the framework attempt to address financial barriers to customers investing in CDM (e.g. high first costs and inability to access capital)?	High first cost: Yes Access to capital: no

Section 8: Comprehensive CDM program portfolio

1. Does the framework produce CDM programs that cover all sectors and geographic areas in the province?

The OPA has created province-wide programs for three major sectors: residential, commercial, and industrial (OPA, 2011l-2011z). These programs, by nature of being province-wide, are available to all LDCs across the province (though, LDCs are not obliged to offer every program in their service areas) (OEB, 2010c; OPA, 2011j). In addition, each sector-specific suite of programs has multiple initiatives, which target various energy end-users and end uses. That said, however, due to the province's focus on summer peak demand reduction, the OPA's suite of province-wide programs does not include winter-peak-oriented CDM programs (e.g. street lighting or car engine block heater programs), which would be particularly useful for LDCs and their consumers in the more northern areas of the province (Mallinson, 2011l, p. 3).

Nevertheless, on the whole, under the current CDM policy framework, the OPA has produced a fairly comprehensive suite of CDM programs, which cover most sectors and geographic areas in the province.

2. Has the framework produced programs targeted at hard-to-reach customer segments like low-income consumers, First Nations communities, and very small businesses?

First Nations and Metis communities

The Minister of Energy's directive to the OPA regarding CDM initiatives under the GEA conservation framework specifically calls on the OPA to design and coordinate the delivery of energy efficiency and demand response programs involving first Nations and Métis communities (DuGuid, 2010a, p. 4). For First Nations communities, the OPA's Aboriginal CDM Program consists of four programs modelled on the OPA's province-wide CDM programs, but which have been adapted to meet the needs of First Nations communities. For Metis and urban Aboriginal communities, the Aboriginal CDM Program consists of specific outreach, promotion, and application support for participation in the OPA's standard province-wide programs (OPA, 2011f, p. 37).

However, there is a difference between what is mandated under the CDM policy framework and what is actually being implemented. LDCs 2011 annual reports reveal that the OPA's First Nations CDM program was not in the market in 2011 (North Bay Hydro Distribution Ltd., 2012; Orillia Power Distribution Corporation, 2012, p. 10).

Low income consumers

In July of 2010, the Minister of Energy issued a directive calling on the OPA to design, implement and fund an electricity CDM program for low-income residential consumers as part of its suite of province-wide CDM programs (DuGuid, 2010b, p. 1). This resulted in the OPA's Low Income province-wide program, which offers free home energy audits and free installation of energy efficient measures to low income consumers (OPA, 2011aa, p. 3; OPA, 2011f, p. 32). The OPA's Equipment Replacement Incentive Initiative (ERII) for commercial consumers also includes additional incentives offered to providers of assisted and social housing (OPA, 2011p, p. 18)[90]. However, although a standard province-wide low-income program is available for use by the LDCs, the CDM Code does not specify that LDCs must offer low-income programs in their service areas. Rather, the Code requires LDCs to state in their CDM strategies whether they will offer CDM programs to low income customers, and to state their rationale for their decision (OEB, 2010c, p. 7). This provision does not ensure that low income consumers are actually reached with targeted conservation programming. Furthermore, due to the late finalization of the low-income initiative schedule, delays in centralized payment processes being put in place, and the scope, complexity and customer privacy requirements associated with the low-income program, only two LDCs were able to bring the low-income program to market in 2011 (Orillia Power Distribution Corporation, 2012, p. 32).

Only two LDCs were able to bring the low-income program to market in 2011.

Very small business consumers

Although no specific directive from the Minister of Energy calls for programs targeted to very small business consumers, some of the OPA's suite of programs for the commercial sector do target small businesses (e.g. the direct install lighting and water heating initiative, and the direct service space cooling initiatives (OPA, 2011q; OPA, 2011s). In addition, some of the OPA's province-wide programs for residential consumers define eligibility in such a way as to include small businesses (e.g. the residential appliance retirement and exchange initiatives (OPA, 2011l, pp. 18-23)), or they explicitly target small businesses in addition to residential consumers (i.e. the residential and small commercial demand response program (OPA, 2011n)). Nevertheless, some

90 The Low income program schedule available on the OPA's web site is incomplete because the program was still under development at the time the schedule was posted. From this preliminary Program Schedule, it appears that the eligibility requirements in the OPA's low income program restrict participants to those that live in social housing (OPA, 2011aa, p. 17). This would be problematic because not all low-income consumers live in assisted or social housing. Fortunately, a webinar slide presentation put together by the Low Income Energy Network (LIEN) includes an OPA slide deck from November 2011, which clarifies that potential low income program participants are screened for eligibility based on their income or based on having received benefits from one of several government-run low income support programs in the past 12 months. If participants reside in social housing or assisted housing, they are eligible for participation in the low income program without having to be screened for income (Low Income Energy Network, 2011, slide 24).

LDCs identified very small businesses as a customer segment that was not offered much in the way of standard province-wide programming[91] (Mallinson, 2012).

3. Does the framework encourage the development of innovative programs?

4. Does the framework produce programs tailored to local markets using information about local users, energy end-uses and market conditions?

The answers to these two questions are similar with respect to Ontario's CDM policy framework, so they will be dealt with together.

Encouraging Innovative Programming under the Current Framework

LDCs are effectively prevented from engaging in program design under the current framework.

Encouraging innovation, by its very nature, means attempting approaches that are not yet proven (Quantum Consulting, 2003, p. S-26). Two aspects of the current framework explicitly aimed at testing new approaches to CDM programming are 1) the availability of funding for pilot programs through the OPA's Conservation Fund[92], and 2) the pilot program provisions in the CDM Code[93]. However, the size of the opportunity for creative and innovative program design that these aspects of the policy framework offer to LDCs is small compared with the opportunity that would be available to LDCs if they were able to design their own programs. However, for reasons discussed in section 6 of this paper, LDCs are effectively prevented from engaging in program design under the current framework, so the only CDM programs currently on offer to electricity consumers under the existing framework are the OPA's standard province-wide programs.

A situation where all LDCs are offering the same standard programs to consumers is not a situation that fosters innovation. And while it is indeed possible that the OPA's standard province-wide programs might themselves be innovative, in reality, the majority of the OPA-contracted province-wide programs are carry-overs or enhancements of programs that were offered under the previous CDM policy framework (OPA, 2010d; OPA, 2010c; OPA, 2010e). In fact, many of the carried-over programs are actually based on programs originally developed by the LDCs during the previous-to-last CDM policy framework (i.e. the Third Tranche period from 2005-2007).

91 For example, one LDC noted that local stores would benefit from an electric heating or external thermal storage program, but there is nothing of that nature available to them in the OPA's program portfolio. (And since LDCs haven't been able to obtain program funding through the OEB, they can't design custom programs to cater to local businesses) (Mallinson, 2012).

92 To be eligible for funding from the Conservation Fund, CDM pilot projects must test new or unique conservation program elements (OPA, 2011c, pp. 4-5).

93 To be eligible for funding through the OEB, pilot programs must not only test or evaluate methodologies and/or technologies not generally in use in Ontario, but must also avoid duplicating pilot programs being run by the OPA or other LDCs, and must have previously been declined pilot project funding through the OPA.

Encouraging programs tailored to local conditions

Similarly, a situation where LDCs may only offer standard programs to their consumers does not allow programs to be tailored to local market conditions. The CDM Code's provisions about non-duplication of OPA programs are of particular relevance to the inability of LDCs to tailor programs to local conditions. To illustrate, one of the CDM Code's non-duplication rules is that Board-Approved CDM programs must not have "different customer incentive levels on products or services already offered through the OPA-Contracted Province-Wide CDM Programs" (OEB, 2010c, p. 8). This may seem sensible and equitable, but it ignores the reality that different market conditions exist in different LDC service areas due to differences in LDCs' past levels investment in CDM. In some service areas, much of the 'low-hanging fruit' in energy saving measures have already been picked; in others 'low hanging fruit' is being targeted for the first time (THESL, 2011a, p. 3). If standard programs target market conditions somewhere in between these two extremes, the same levels of effort in promoting the standard programs might yield very high levels of savings in some areas and very low levels of savings in others, with LDCs unable to make adjustments that would make the programs more appropriate to their particular service areas' market conditions[94].

The reality is that different market conditions exist in different LDC service areas due to differences in LDCs' past levels investment in CDM.

5. Does the framework clearly define which activities and programs qualify to meet the targets?

Both the CDM directive and the CDM Code specify criteria for the types of CDM activities that LDCs may not undertake in order to meet their CDM program savings targets. The CDM Code specifies that the following types of activities will not be approved under the CDM code as contributing to LDCs CDM program targets:

- investments in new LDC infrastructure,
- replacing existing infrastructure,

94 For example, the OPA's current Residential and Small Commercial Demand Response Initiative offers customers an incentive for allowing their LDC to install an electronic thermostat in the consumer's residence or business, which enables the LDC to interrupt power to the customer's hot water heater or air conditioner in order to temporarily reduce electricity demand from those appliances (OPA, 2011n, p. 5). The program is based on a previous version of the same OPA program offered under the 2007-2010 policy framework (OPA, 2007b), which in turn was based on a previous Peaksaver program that originated with the Coalition of Large Distributors and was offered by select LDCs during the Third Tranche period (CLD, 2006, p. 5). The peaksaver incentive offered by LDCs during the Third Trance period was $75 for the installation of a switch (Mallinson, 2011c); the incentive offered under the 2007-2010 policy framework was $25 for the installation of a switch or electronic thermostat (OPA, 2007b, p. 11); and the incentive offered under the current program is simply a free programmable thermostat with an in-home display (OPA, 2011n, p. 1). If market saturation has already occurred at the $75 incentive level in areas where the peaksaver program has been offered since the 2005, and offering a free programmable thermostat with an in-home display turns out not to be enticing enough to generate much program uptake, the CDM Code's non-duplication rules prevent LDCs from offering consumers different incentives for products or services already offered through the OPA-Contracted Province-Wide CDM Programs (OEB, 2010c, p. 8). This means that where market conditions don't match the incentive level offered by the OPA's standard province-wide programs, LDCs may essentially be out of luck with respect to deriving savings from implementing the OPA programs. In cases where LDCs were relying on using the incented CDM measure to contribute savings towards their targets, this would be akin to having a tool taken out of their CDM toolboxes.

- maximizing the efficiency of new or existing infrastructure, and
- activities associated with the OPA's Feed-in Tariff (FIT) or microFIT programs (OEB, 2010c, p. 10).

In addition, the Code specifies that CDM programs must be cost effective according to the OPA's cost-effectiveness tests, and specifies several rules for non-duplication of OPA-Contracted province-wide programs[95]. These include specifications that Board-Approved CDM programs may not offer different incentives for products or services already incented by OPA-Contracted Province-Wide CDM Programs, and may not feature different participation criteria, different technology specifications, different marketing approaches, or different delivery budgets for programs involving products or services already incented by OPA-Contracted Province-Wide CDM Programs (OEB, 2010c, pp. 8-9). Given the breadth of the OPA's program offerings, these rules are very restrictive, but they still seem to leave some room for LDCs to design local Board-Approved programs to complement the OPA's standard province-wide programs.

Given the breadth of the OPA's program offerings, the CDM Code's non-duplication rules are very restrictive, but they still seem to leave some room for LDCs to design local Board-Approved programs.

However, the Board's ruling on Toronto Hydro's application for Board-Approved programs suggests that the Board is using criteria or principles to evaluate program applications which are not explicitly spelled out in the CDM Code. For example, in its decision on Toronto Hydro's BAP application, the OEB stated that the only restriction the Minister's directive and the Board's subsequent CDM Code impose on spending for Board Approved programs is that such programs should be cost-efficient and not duplicate the OPA's province-wide programs (OEB, 2011d, p. 12). However, THESL's application showed that its proposed programs either passed the OPA's cost-effectiveness tests or were exempt under the CDM Code from needing to demonstrate cost-effectiveness (i.e. educational programs), and a submission from the OPA classified five of Toronto Hydro's proposed programs as non- duplicative of the OPA's province-Wide programs (OEB, 2011d, p. 6). Nevertheless, the Board still deemed four of these same programs to be duplicative (and one to be simply unnecessary), and declined to fund them[96] (p. 20-28). As explanation, the Board offered the rationale that it expects the OPA's programs to change and evolve over time (p. 10), and that the purpose of the non-duplication rules is to avoid unnecessary expenditure (p. 12). Furthermore, the Board's decision quoted an OPA representative saying that it is "perfectly conceivable for an LDC to achieve their targets using only province-wide programs"[97], which, in the context of the statements preceding and following it, implied that the Board viewed funding Board Approved Programs in general as an unnecessary expenditure (OEB, 2011d, p. 17).

95 See section 2 of Appendix D for a list of the CDM Code's non-duplication rules.

96 As noted in a footnote in section 3 of Appendix D, the OEB did offer to fund 18-month 'test' versions of two of Toronto Hydro's proposed programs, but the utility declined the funding on the basis that proceeding with the programs in the test form proposed by the Board would be uneconomic and would not materially contribute to Toronto Hydro meeting its CDM targets.

97 However, according to the scenario and risk analysis that the OPA completed for the province-wide programs, only under the most optimistic scenarios would LDCs achieve their entire mandatory aggregate CDM target using only OPA-contracted province-wide programs (OPA, 2011f, p. 42).

Therefore, while the CDM Code does get quite specific about the types of CDM programs for which LDCs are not allowed to apply to the Board for funding, it does not make explicit the Board's apparent interpretation of the Minister's directive to mean that LDCs should not apply to the Board for funding for Board-Approved CDM programs, but rather should plan to achieve their entire targets using the OPA's standard province-wide programs. This lack of clarity has resulted in much wasted time and effort, not to mention frustration, on the part of the LDCs who submitted applications for Board-Approved programs in good faith.

6. Does the policy framework allow participation in CDM programs to be simple?

The OPA has attempted to create a one-stop-shop portal in its saveONenergy web site, which is positive from a consumer's perspective, as it creates a single point of access for resources and program information, and directs Ontario consumers to information about which CDM programs are being offered in their service areas by their LDCs (OPA, 2011f, p. 31; OPA, 2012g).

The participation contract for the Process and Systems Upgrades Initiative is 48 pages long.

However, as mentioned in the previous section on roles and responsibilities, some stakeholders have raised concerns about the complexity of participant agreements and application procedures with respect to the OPA's standard province-wide programs (THESL, 2012, p. 23). Programs are more complex than under the previous policy framework, and participant agreements are longer and more prescriptive, particularly with respect to the industrial programs (e.g. the participation contract for the Process and Systems Upgrades Initiative is 48 pages long (OPA, 2011u, pp. 70-117)).

Some LDCs have also expressed concern that the online application process under the existing framework is not as user-friendly as the paper-based application process that was in place under the previous CDM program framework, and thus acts as an impediment to consumer participation[98]. The LDC cited a lack of adequate training on the online application tools as one source of frustration that contributed to this situation, noting that the OPA's online system was launched for customers on the same day that it was given to LDCs. This suggests a need to examine and simplify the processes experienced by both consumers and LDCs with respect to participating in and implementing CDM programs so that participation for both parties can be made as easy as possible.

98 In at least one instance, an LDC noted that they had reverted back to paper application processes for 11 of the 12 programs they were offering because the online application process was acting as an impediment to participation (Mallinson, 2011g).

Table 8.1: Comprehensive Programs Criteria Summary Table

Question	Short Answer
1. Has the framework produced CDM programs that cover all sectors and geographic areas in the province?	Yes
2. Has the framework produced programs targeted at hard-to-reach customer segments like low-income consumers, First Nation communities, and very small business customers?	Yes and no
3. Does the framework encourage the development of innovative programs?	No
4. Does the framework produce programs tailored to local markets using information about local users, energy end-uses and market conditions?	No
5. Does the framework clearly define which activities and programs qualify to meet the targets?	Yes and no
6. Does the policy framework allow participation in CDM programs to be simple?	Yes and no

Section 9: Evaluation, measurement, & verification (EM&V) processes

1. Does Ontario have well-defined protocols for tracking, evaluating, verifying, and reporting on program results?

The OPA has very well defined EM&V procedures and protocols, which are laid out in detail in the OPA's 150-page *EM&V Protocols and Requirements: 2011-2014* document. These EM&V protocols are based upon the U.S. Department of Energy's 2006 "EERE Guide for Managing General Program Evaluation Studies" (OPA, 2011d, p. 1), and walk users through a step-by-step process for designing and executing program evaluations. The OPA's EM&V protocols document stresses that purpose of the entire EM&V effort is to develop reliable estimates of the net savings attributable to or resulting from CDM program activities, and to give instructions for how to estimate net savings by calculating net-to-gross "adjustment factors" like free ridership, spill-over, rebound effects and transmission and distribution losses (OPA, 2011d, pp. 4, 111). The protocols also stress the importance of using utility billing data and other methods like participant and non-participant surveys to calculate ex post savings[99] (OPA, 2011d, pp. 39, 111).

In addition to step-by-step instructions for designing and executing program evaluations, the EM&V Protocols and Requirements document also includes several supportive and technical guidelines. Attachments to the EM&V Protocols and Requirements document include a draft evaluation plan template, the OPA's CDM Cost Effectiveness Test Guide, Demand Response Load Impact Protocols, and prescriptive and quasi-prescriptive measures and assumptions lists.

2. Are these protocols applied consistently across the province and updated regularly?

The OPA's Master Agreement with the LDCs regarding delivery of the OPA's standard-wide CDM programs specifies that each CDM program and initiative will be subject to the OPA's EM&V protocols, and that the OPA will conduct EM&V

99 Ex post savings are measured after the implementation of a CDM program, as opposed to ex anti savings, which are estimated before program implementation.

on programs and initiatives using program participation and implementation data provided to them by the LDCs (OPA, 2011j, pp. 34-36). Similarly, the OEB's CDM Code requires LDCs to file EM&V reports with the Board with they file their annual reports. The Code also specifies that the results of Board-Approved CDM Programs must be reviewed and evaluated by an independent third party using the OPA's EM&V Protocols (OEB, 2010f, p. 14). Thus, all CDM programs delivered by LDCs will be evaluated using the same EM&V protocols.

In terms of updating protocols, the OPA's lists of measures and assumptions, which form an important component of the OPA's EM&V protocols, are published on an annual basis (OPA, 2011d, p. 69). The OPA develops new measures for the measures and assumptions list internally, but also has a process in place whereby any stakeholder can submit new or revised measures, or other measure considerations (OPA, 2011d, p. 66). After being verified by the OPA, such submissions may be included in the OPA's annual publication of its measures and assumptions lists, or may be appended to the existing list between annual publications (OPA, 2011d, p. 69).

3. Does an audit office review and report on energy savings?

The Maser Agreement with the LDCs specifies that the OPA will perform EM&V on all standard province-wide programs (OPA, 2011j, pp. 34-36). By contrast, the results of any Board-Approved CDM programs must be evaluated by an independent third party selected from the OPA's third party vendor of record list (OEB, 2010c, p. 14).

Furthermore, an overall audit or assessment of the province's progress towards its CDM goals is undertaken every year by the Environmental Commissioner's office (EBR, 1993, s. 58.1). The Environmental Commissioner's report is published annually in two installments; volume one, published in May, covers Ontario's broader conservation policy framework and operational issues that affect energy conservation in Ontario (ECO, 2010a). Volume two, published in November, describes Ontario's conservation initiatives, assesses the energy savings resulting from those initiatives, and measures the province's progress on meeting its conservation targets (ECO, 2010b).

Although the OPA's EM&V protocols do not yet include provincial reporting standards for the savings reports that CDM program administrators must submit to the Environmental Commissioner's Office, such standards are referenced on the OPA's list of standards to develop and add to the EM&V Protocols and Requirements document (OPA, 2011d, p. 119).

4. Do cost-effectiveness tests and performance metrics assign value to program results in a manner that is consistent with social and environmental policy objectives?

Cost-effectiveness tests and programs for low-income consumers

As a general rule, both the OPA's standard province-wide CDM programs and the LDCs' Board-Approved CDM programs must pass cost-effectiveness screening tests in order to qualify for funding. However, the OPA's programs must only be deemed cost-effective on a portfolio basis (DuGuid, 2010a, p. 3), meaning that low-income, pilot and educational CDM programs need not be cost effective on a stand-alone basis (OPA, 2010i, p. 16). The CDM Code also specifies that while Board Approved Programs must be cost-effective on a stand-alone program basis, it specifically exempts low income programs, educational programs, and pilot projects from this rule (OEB, 2010c, p. 11).

Cost-effectiveness tests and environmental sustainability

In Ontario, CDM programs are required to pass both the TRC and the PAC tests in order to be considered cost-effective[100], and cost-effectiveness is the dominant screening tool used to determine whether a CDM program is funded and implemented (OPA, 2010i, pp. 15-16). Both the TRC test and the PAC test assess the cost-effectiveness of programs based on the avoided costs of generation, and neither takes environmental sustainability or environmental costs into account (OPA, 2010i, p. 7). This means that environmental sustainability is not measured or assessed when screening or evaluating the effectiveness of CDM programs in Ontario, which is unfortunate because incorporating environmental externalities into cost-effectiveness calculations would make investment in CDM programs look even more attractive when compared with investing in generation resources.

Cost-effectiveness is the dominant screening tool used to determine whether a CDM program is funded and implemented.

Performance metrics

The purpose of EM&V processes is to document the effects of CDM programs to see if programs are achieving the goals that the programs have been created to achieve. The metrics used to measure achievement determine what has value. In the case of Ontario's CDM programs, success is being measured by the degree to which CDM programs contribute to the province's energy and demand savings targets (in kWh and kW). The current framework's focus on energy and demand savings targets doesn't leave room for programs to be deemed successful based on non-energy benefits like decreased incidence of arrears, or decreased air pollution. Although the OPA's EM&V Protocols do acknowledge that non-energy benefits associated with CDM activities do exist, they do not yet include guidelines for estimating non-energy benefits (OPA, 2011d, p. 117).

100 As mentioned above, exceptions do exist for low income programs, pilot programs, and educational programs or awareness campaigns, which are exempt from passing cost-effectiveness tests on a stand-alone program basis.

In sum, under Ontario's existing CDM policy framework, the rules surrounding the use of cost-effectiveness tests as screening tools for CDM programs support government policy objectives with respect to offering CDM programming to low-income consumers, even when the economic cost-effectiveness of such programs cannot be demonstrated using the tests used to screen other programs. However, despite the Ontario government's assertion that the chief role and responsibility of the Ministry of Energy is to promote "the development of a safe, reliable, secure and environmentally sustainable energy supply" (Government of Ontario, 2012), the tests that the minister's directive specified must be used to screen CDM programs for inclusion in CDM program portfolios take a purely least-cost approach without including the environmental costs in the calculation (OPA, 2011d). Thus, the current cost-effectiveness tests used to screen CDM programs do not adequately support the policy objective of promoting an environmentally sustainable energy supply in Ontario.

5. Is the budget and time devoted to EM&V activities appropriate?

On the issue of proper allocation of EM&V costs, the OPA's EM&V protocols align with California's general guideline; they specify that EM&V budgets should generally be between four and six percent of total program expenditures, and acknowledge that EM&V budgets could potentially be larger or smaller for project-based evaluations or for evaluations of larger, ongoing programs (OPA 2011d, p. 3; TechMarket Works, 2004, pp. 75-76).

On the issue of timelines for completion of EM&V activities, the OPA's protocols note that evaluations of CDM programs implemented in the 2011-2014 period will not be completed until July of 2016 because a full year of post-measure energy use data will be required, and then six months will be needed to analyze and report on that data (OPA, 2011d, p. 27). The protocols assert that a full year will be required to verify savings for most CDM measures, but notes that for some measures, a full operating cycle could pass immediately after or shortly after a CDM measure's installation (e.g. constant lighting loads, or decommissioning projects, or new construction projects) (OPA, 2011d, p. 27). This is in keeping with the guidelines offered by the Efficiency Valuation Organization's (EVO's) International Performance Measurement and Verification Protocol (IPMVP) document. However, during my interviews, some LDCs indicated that they viewed this likely delay in verified results as problematic because it would mean that the EM&V results for CDM-programs during the 2011-2014 program cycle will not be available in time to inform the design of the next generation of CDM programs for the post-2014 period (Mallinson, 2011e).

Table 9.1: EM&V Criteria Summary Table

Question	Short Answer
1. Does Ontario have well-defined protocols for tracking, evaluating, verifying, and reporting on program results?	Yes
2. Are these protocols applied consistently across the province and updated regularly?	Yes
3. Does an audit office review and report on energy savings?	Yes
4. Do cost-effectiveness tests and performance metrics assign value to program results in a manner that is consistent with social and environmental policy objectives?	Social: Yes Environmental: No
5. Is the budget and time devoted to EM&V activities appropriate?	Budget: Yes Time: typical, so yes, but some complaints

Section 10: Conclusions

Having examined Ontario's CDM policy framework through the lens of each of the paper's six assessment themes, it is now possible to fill in the score card from Appendix C.

Treating CDM as a priority resource in energy planning		
1.	Is CDM recognized and treated as a resource in energy policy?	Yes
2.	Is CDM integrated into energy planning and given priority over other energy resources?	Yes and No
3.	Does the framework set aggressive and binding targets for both energy (GWh) and demand (MW) savings?	Targets?, Yes Binding? Mostly, No Ambitious? Yes and No
4.	Does Ontario have a clearly defined CDM strategy and action plan with milestones?	Yes
Making a long-term commitment to CDM?		
1.	Is long-term, rate-based funding for CDM provided?	Rate-based? Yes Long-term? No
2.	Are CDM players who design and deliver CDM programs provided with sufficient policy stability to make long term plans and investment decisions?	No
3.	Is funding provided for the research and development of new energy-saving processes and technologies?	Yes
4.	Do building codes and appliance standards have regular review cycles?	Building codes? Yes Appliance standards? No
5.	Are there processes in place to change and update CDM plans as information, technologies, and circumstances change over time?	Until end of 2014: Yes Beyond Dec. 31, 2014: No
6.	Does the framework support market transformation as a long term policy goal?	No
6.1	Is responsibility for market transformation assigned to an appropriate entity?	No
6.2	Is the OPA's strategic approach to CDM explicitly market transformation-oriented?	Yes
6.3	Do the metrics used to set targets and measure success encourage market-transformation-oriented activities?	No
6.4	Do tests used to screen programs for inclusion in CDM program portfolios encourage market transformation-oriented activities?	No
6.5	Has the framework produced a portfolio of CDM programs that emphasizes market transformation-oriented activities?	No

Clearly defining roles and responsibilities		
1.	Are the roles of the different CDM players clearly defined?	Yes and no
2.	Are the roles defined in the framework appropriate for the players involved?	No and yes
3.	Does the framework facilitate cooperation between the various CDM players?	Yes and no
4.	Does the framework include processes for incorporating the input of key stakeholders?	Yes and no
Aligning funding and incentive structures with policy objectives		
1.	Is adequate funding provided to achieve the targets that have been set?	Yes
2.	Does the framework provide utilities with incentives for meeting and exceeding CDM targets, and remove disincentives for engaging in CDM?	Yes
3.	Do electricity pricing policies send price signals to customers to engage in CDM?	Yes and no
4.	Does the framework attempt to address financial barriers to customers investing in CDM (e.g. high first costs and inability to access capital)?	High first cost: Yes Access to capital: No
Offering a comprehensive portfolio of CDM programs		
1.	Has the framework produced CDM programs that cover all sectors and geographic areas in the province?	Yes
2.	Has the framework produced programs targeted at hard-to-reach customer segments like low-income consumers, First Nation communities, and very small business customers?	Yes and no.
3.	Does the framework encourage the development of innovative programs?	No
4.	Does the framework produce programs tailored to local markets using information about local users, energy end-uses and market conditions?	No
5.	Does the framework clearly define which activities and programs qualify to meet the targets?	Yes and no
6.	Does the policy framework allow participation in CDM programs to be simple?	Yes and No
Performing Evaluation, Measurement, & Verification (EM&V) on CDM activities		
1.	Does Ontario have well-defined protocols for tracking, evaluating, verifying, and reporting on program results?	Yes
2.	Are these protocols applied consistently across the province and updated regularly?	Yes
3.	Does an audit office review and report on energy savings?	Yes
4.	Do cost-effectiveness tests and performance metrics assign value to program results in a manner that is consistent with social and environmental policy objectives?	Social: Yes Environmental: No
5.	Is the budget and time devoted to EM&V activities appropriate?	Yes

Each panel of the scorecard is broken apart in the following pages to highlight the most important issues to emerge from each assessment theme. This discussion of findings is then followed by a section offering recommendations on how to address some of the issues identified.

Prioritization of CDM

No.	Assessment Question	Short Answer
1	Is CDM recognized and treated as a resource in energy policy?	Yes
2	Is CDM integrated into energy planning and given priority over other energy resources?	Integrated into energy planning? Yes Given priority over other energy resources? No
3	Does the framework set aggressive and binding targets for both energy (GWh) and demand (MW) savings?	Framework sets targets?, yes Are targets binding? A subset, yes, but mostly, no Are targets ambitious? Yes and no
4	Does Ontario have a clearly defined CDM strategy and action plan with milestones?	CDM strategy? Yes Action plan? Yes Milestones? Yes

Although Ontario's policy documents do recognize CDM as an electricity resource, and CDM is integrated into energy planning, Ontario's energy policy and energy planning framework do not require that CDM be prioritized over other energy resources in the manner of a California-style loading order. Furthermore, although Ontario has a CDM strategy with milestones and targets for both energy savings (TWh) and peak demand reduction (MW), only a subset those targets are binding, and the targets are not so aggressive that they constitute a de facto prioritization of CDM over other energy resources. When compared to what has been achieved and attempted in other North American jurisdictions, Ontario's targets appear moderately ambitious. When compared to the CDM savings that have been achieved in the past in Ontario, the current provincial targets appear quite ambitious. However, it also appears that what has been achieved in other jurisdictions and what has been achieved in the past in Ontario still fall far short of the savings that are possible to achieve. When compared with the most comprehensive estimate of conservation potential in Ontario, it appears that the current provincial targets aim to capture less than half of the identified achievable potential in the province, and thus cannot be characterized as ambitious.

One particularly troubling observation that comes out of this analysis is that even though the language in the government's Long Term Energy Plan refers to CDM as Ontario's best and first resource (Ministry of Energy, 2010, p. 16), the treatment of CDM in Ontario energy policy still reflects the attitude that CDM is a resource to be called upon only when generation resources can't meet projected demand. This treatment is reflected in the wording of the Ministry of Energy's April 23, 2010 directive to the OPA regarding undertaking and coordinating CDM activities. In it the Minister writes, "Conservation is one of the most cost-

effective means of dealing with electricity supply issues" (DuGuid, 2010a, p. 1). For emphasis, this quote refers to the use of CDM as a resource as *a means of dealing with supply issues*. As long as conservation is viewed merely as a useful way of dealing with electricity supply shortfalls rather than as a resource to be employed first regardless of the state of electricity generation assets, then investment in CDM will always be at the mercy of the electricity supply situation.

Furthermore, as long as Ontario's energy planning process is dependent upon supply mix directives from the Minister of Energy, then the degree to which conservation will be prioritized in energy planning will be at the mercy of the priorities of the Minister and government of the day.

Long-term commitment

Question	Short Answer
1. Is long-term, rate-based funding for CDM provided?	Rate-based? Yes Long-term? No
2. Are stakeholders provided with sufficient policy stability to plan and make investment decisions?	No
3. Is funding provided for the research and development of new energy efficiency technologies?	Yes
4. Do building codes and appliance standards have regular review cycles?	Building codes? Yes Appliance and product standards? No
5. Are there processes in place to change and update CDM plans as information, technologies, and circumstances change over time?	Within the existing 4-year policy framework period: Yes Beyond Dec. 31, 2014: No
6. Does the framework support market transformation as a long term policy goal?	No
6.1 Is responsibility for market transformation assigned to an appropriate entity?	No
6.2 Is the OPA's strategic approach to CDM explicitly market transformation-oriented?	Yes
6.3 Do the metrics used to set targets and measure success encourage market-transformation-oriented activities?	No
6.4 Do tests used to screen programs for inclusion in CDM program portfolios encourage market transformation-oriented activities?	No
6.5 Has the framework produced a portfolio of CDM programs that emphasizes market transformation-oriented activities?	No

As long as conservation is viewed merely as a useful way of dealing with electricity supply shortfalls rather than as a resource to be employed first, then investment in CDM will always be at the mercy of the electricity supply situation.

Some aspects of Ontario's CDM policy framework do positively contribute to making a long term commitment to conservation. For instance, funding is provided for research and development of CDM technologies and processes, and the energy provisions in the building code reviewed and updated are on a five-year cycle. However, taken on the whole, Ontario's policy framework does not allow the province to make a long term commitment to conservation. Although the government has pledged long term funding for CDM activities ($12 billion by 2030 [Ministry of Energy, 2010, p. 40]) and CDM funding is rate-based rather than tax-based, the way that funding for CDM is approved and allocated under the current framework does not allow CDM funding to be guaranteed over the long term. The framework also sets no review cycle for energy efficiency standards for products and appliances sold in the province.

Furthermore, despite the OPA's explicitly market-transformation-oriented CDM strategy, most of the OPA's standard province-wide programs are focused on resource acquisition rather than capability building or market transformation — a state of affairs that is likely influenced by the cost-effectiveness tests used to screen programs for inclusion in program portfolios, as well as the quantitative metrics used to set targets and measure conservation success.

Finally, the 4-year expiry date on the CDM Code and the dependence of energy planning on supply mix directives from the Minister of Energy do not provide sufficient policy stability to allow CDM players to make long term investments in building their CDM capability.

In sum, while several aspects of the policy framework contribute to Ontario's lack of long term commitment to conservation, the most important problem themes that emerge are the following:

1. Lack of stability in Ontario energy policy and energy planning, and
2. The lack of attention being paid to market transformation and to building a culture of conservation in the province.

Roles and responsibilities

Question	Short Answer
1. Are the roles of the different CDM players clearly defined?	Yes and no
2. Are the roles defined in the framework appropriate for the players involved?	No and yes
3. Does the framework facilitate cooperation between the various CDM players?	Yes and no
4. Does the framework include processes for incorporating the input of key stakeholders?	Yes and no

Whether the roles and responsibilities are clearly and appropriately defined under the current CDM policy framework depends on the type of CDM activity being considered. Roles seem very clearly and appropriately defined with regard to updating building code provisions and setting Time-of-Use electricity pricing. However, while the framework encourages cooperation between the OPA and LDCs, cooperation among LDCs may be hindered by the CDM Code's rules about counting savings towards targets in programs where collaboration between LDCs occurs. In addition, although the framework does a decent job of soliciting input from stakeholders in some areas, problems exist in the lack of adequate stakeholder consultation involved in the major energy planning decisions that form the basis of the IPSP, and in the overly burdensome nature of the OEB's intervenor process for assessing Board-Approved CDM program applications. However, the major problems that emerged from this paper's assessment have to do with the assignment of roles and responsibilities with respect to energy planning and CDM programming.

First, with energy planning, the ability of the Minister of Energy to issue energy planning directives to the OPA undermines the OPA's mandated responsibility to undertake independent power systems planning. Second, the current policy framework provides insufficient oversight for the IPSP with respect to whether the planning decisions made within it are appropriate to Ontario's needs and address Ontario's energy policy objectives. This is due to both the exemption of the IPSP from environmental assessments, and the stipulation that the OEB, in its oversight role, may only consider cost-effectiveness and compliance with Ministerial directives when reviewing the IPSP for approval.

LDCs should be able to design CDM programs that respond to local needs.

Third, with respect to CDM programming, the policy framework gives all LDCs the same roles to play whether they employ three people or three thousand people, which ignores the reality that different sized LDCs have different capacities for designing and delivering CDM programming. Fourth, despite the intention that LDCs should be able to design CDM programs that respond to local needs, the framework effectively prevents LDCs from doing so.

Funding and incentive structures

Question	Short Answer
1. Is adequate funding provided to achieve the targets that have been set?	Yes
2. Does the framework provide utilities with incentives for meeting and exceeding CDM targets, and remove disincentives for engaging in CDM?	Yes
3. Do electricity pricing policies send price signals to customers to engage in CDM?	Yes and no
4. Does the framework attempt to address financial barriers to customers investing in CDM (e.g. high first costs and inability to access capital)?	High first cost: Yes Access to capital: no

With respect to the funding of CDM activities under the current policy framework, a review of several estimates of the per kWh cost of electricity conservation savings indicate that the funding currently pledged towards conservation in Ontario will likely be adequate to achieve the provincial savings targets that have been set.

The design of electricity pricing schemes is often guided by a number of different objectives, which may sometimes compete with one another[101]. One such case is the competition between providing consumers with clear price signals to conserve, and removing disincentives for utilities to engage in CDM. Decoupling utility revenue from commodity electricity sales removes a disincentive for utilities to engage in conservation activities. However, it also decreases consumers' ability to reduce their electricity bills by using less electricity, and thus removes an incentive for consumers to conserve energy. Ontario's existing CDM policy framework attempts to strike a balance between removing disincentives for utilities and maintaining price signals for consumers. Mechanisms for motivating LDCs to engage in CDM activities under the current framework include an LRAM, performance incentives, and the threat of distributors losing their operating licences for failing to meet targets. However, although Ontario's current policy framework does indeed include such features, issues have been raised about the manner in which performance incentives are calculated and awarded, and the impracticality of revoking a utility's operating licence as a penalty for failing to meet targets.

Electricity price structures under the existing policy framework that motivate consumers to reduce electricity include a stipulation that electricity prices must reflect costs, and time-of-use pricing that encourages consumers to shift their energy use to off-peak periods. However, some observers maintain that the price differential between on-peak and off-peak periods is too low to induce significant time-of-use shifting behaviour among consumers. Furthermore, the government's massive investment in the Clean Energy Benefit artificially lowers the price of electricity, undermining the work done by Ontario's electricity price structures in sending consumers price signals to conserve. This makes the government's approach to electricity pricing appear schizophrenic.

Finally, with respect to removing financial barriers for consumers wanting to engage in CDM activities, Ontario's current policy framework has produced numerous programs aimed at reducing the upfront costs of investing in energy saving measures, but it has not produced programs that provide affordable financing to electricity consumers wishing to invest in retrofit projects.

101 (E.g. covering costs, fairly distributing costs among consumers, encouraging the efficient use of resources, minimizing costs to consumers, and making electricity prices stable, understandable and publically acceptable (Ontario Hydro, 1987, p. D-2)).

Comprehensive programming

Question	Short Answer
1. Has the framework produced CDM programs that cover all sectors and geographic areas in the province?	Yes
2. Has the framework produced programs targeted at hard-to-reach customer segments like low-income consumers, First Nations communities, and very small businesses?	Yes and no
3. Does the framework encourage the development of innovative programs?	No
4. Does the framework produce programs tailored to local markets using information about local users, energy end-uses and market conditions?	No
5. Does the framework clearly define which activities and programs qualify to meet the targets?	Yes and no
6. Does the policy framework allow participation in CDM programs to be simple?	Yes and no

On the whole, the current CDM policy framework does call for and has produced a fairly comprehensive suite of CDM programs that includes offerings aimed at most sectors and geographic areas in the province, including some programs for hard-to-reach consumer segments like First Nations communities and very small businesses. However, while the framework requires the OPA to develop programs for low income consumers, it does not technically require LDCs to offer such programs in their service areas. Furthermore, the delays in getting low-income and First Nations programs to market mean that the extent to which such hard-to-reach consumers are being reached by targeted CDM programs is likely falling short of their needs.

The current framework has produced a provincial program portfolio dominated by standard programs based upon CDM programs offered under previous frameworks.

With respect to producing innovative CDM programs, the current framework has produced a provincial program portfolio dominated by standard programs based upon CDM programs offered under previous frameworks. While the OPA's Conservation Fund and the CDM Code's pilot project provisions do present LDCs with some opportunity to test out new and innovative CDM program ideas, a far greater opportunity to foster the development of innovative programming is squandered by LDCs' effective inability to develop their own Board-Approved Programs under the current framework. LDCs' inability to design their own programs has also resulted in a lack of programs that are tailored to local conditions.

In terms of clarifying which types of CDM program savings count towards targets, the CDM Code does get quite specific about the types of CDM programs for which LDCs are not allowed to apply to the Board for funding. However, the Code does not make explicit the Board's apparent position that LDCs should not apply to the Board for funding for Board-Approved CDM programs, but rather should plan to achieve their entire targets using the OPA's standard province-wide programs.

In terms of ease of participation in CDM programs, the OPA's saveONenergy web site attempts to simplify participation by providing consumers with a single point of access for conservation resources and program information. However, consumer participant agreements and OPA-LDC Master Agreements and program schedules for the OPA's standard province-wide programs under the current framework are longer and more prescriptive than equivalent documents under previous frameworks, which makes program participation and administration more cumbersome.

Evaluation, measurement & verification (EM&V)

Question	Short Answer
1. Does Ontario have well-defined protocols for tracking, evaluating, verifying, and reporting on program results?	Yes
2. Are these protocols applied consistently across the province and updated regularly?	Yes
3. Does an audit office review and report on energy savings?	Yes
4. Do cost-effectiveness tests and performance metrics assign value to program results in a manner that is consistent with social and environmental policy objectives?	Social: Yes Environmental: No
5. Is the budget and time devoted to EM&V activities appropriate?	Budget: Yes Time: typical, so yes, but some complaints

Ontario's CDM policy framework is quite strong with respect to EM&V. The province has well-defined protocols for tracking, evaluating, verifying and reporting on CDM program results. These protocols are applied consistently across the province and updated regularly, and the Environmental Commissioner of Ontario (ECO) reviews and reports on Ontario's energy savings. Furthermore, while some concerns have been raised with respect to the amount of time and effort the framework requires be devoted to EM&V, Ontario's EM&V funding and time allocation guidelines seem generally to be in line with the practices of leading states and international organizations. Moreover, the framework's rules surrounding the use of cost-effectiveness tests as screening tools for CDM programs support the government policy objective of offering CDM programming to low-income consumers. However, despite the Ontario government's description of one of the Ministry of Energy's responsibilities as "promoting the development of a safe, reliable, secure and *environmentally sustainable* energy supply" (Government of Ontario, 2012, my emphasis), the cost-effectiveness tests used to screen CDM programs for inclusion in CDM program portfolios assess cost and benefit in purely monetary terms without considering environmental costs and benefits (OPA, 2011d). Thus, the cost-effectiveness tests do not adequately support the policy objective of promoting an environmentally sustainable energy system in Ontario.

Section 11: Recommendations

Energy planning

Although many of the recommendations that emerge from this report can be grouped to align with assessment criteria themes, a number of the recommendations are cross-cutting in nature. This is the case with the first four recommendations below, which address a number of issues relating to electricity system planning in Ontario — not just Ontario's lack of prioritization of CDM in energy policy and planning, but also Ontario's lack of long term stability in energy policy, and the inappropriate assignment of roles in Ontario's energy planning process:

P.1. Limit the Minister of Energy's power to direct the province's energy planning process through issuing supply mix directives to the OPA.

The current energy planning arrangement (in which the use of different electricity resources is dictated in supply mix directives from the Minister of Energy) is problematic not only because it means that the degree to which CDM will be prioritized in Ontario may change every three to four years[102], but also because the Ontario Power Authority is a more appropriate player than the Minister of Energy to be directing the energy planning process[103].

P.2. Articulate Ontario's energy policy objectives in legislation and make those objectives the basis for developing long term energy plans.

Making a set of energy objectives articulated in legislation the foundation for long term energy plans would make energy planning less susceptible to frequent swings in direction, as any amendments to the list of energy policy objectives would have to pass through the Legislature and thus be subject to parliamentary debate (Legislation Act, 2006, s. 7. (1)).

102 In Ontario, regulation O. Reg. 424/04 guides the OPA in its development of the IPSP, stating that the IPSP shall cover a 20 year period and shall be updated every three years. It also states that in developing the IPSP, the OPA "shall follow directives that have been issued by the Minister under subsection 25.30 (2)" (O.Reg. 424/04, s. 2.). It then goes on to say that the OPA shall also "do the following," and lists eight further guiding instructions, one of which is to "Identify and develop innovative strategies to accelerate the implementation of conservation, energy efficiency and demand management measures." (O.Reg. 424/04, s. 2.). However, these regulatory instructions do not require the OPA to prioritize CDM – rather, they effectively leave the degree to which CDM will be prioritized to the discretion of the Minister of Energy, through his or her directives under subsection 25.30(2) of the Electricity Act.

103 One of the OPA's objectives under the Electricity Act is to "conduct independent planning for electricity generation, demand management, conservation, and transmission and to develop integrated power system plans for Ontario" (EA, 1998, s. 25.2(1))(b)).

P.3. Adopt a CDM-first loading order as one of Ontario's energy policy objectives.

A CDM-first loading is a policy objective stipulating that all available cost-effective conservation and demand management measures should be pursued before meeting electricity demand with new supply-side resources.

P.4 Have the OEB review and approve the IPSP on the basis of whether or not it serves the province's energy policy objectives, as articulated in legislation.

The restriction of the OEB's energy planning oversight role to assessing whether the IPSP is cost effective and adheres to the Minister of Energy's directives deprives the IPSP of a meaningful review with respect to whether the planning decisions contained within it are appropriate to Ontario's energy needs and objectives.

The above recommended changes to Ontario's energy planning process would together have the effect of prioritizing CDM in energy planning, lending more stability to Ontario's energy policy, and appropriately clarifying the roles of the players involved in the energy planning process. Such changes are necessary and appropriate, and promote the type of pproach to energy planning that has been successful in promoting CDM in leading jurisdictions like California and British Columbia[104].

Long-term commitment

The first major problem theme identified with respect to making a long term commitment to conservation in Ontario was the lack of energy policy stability in the province. This issue is addressed by the changes to Ontario's energy

104 In California, the state's energy agencies (i.e. the California Energy Commission (CEC), the California Public Utilities Commission (CDUC), and the California Consumer Power and Conservation Financing Authority) first introduced an energy resource loading order into the state's Energy Action Plan in 2003 (CEC, 2005, p. E-1). The loading order guides California's energy decisions and stipulates that the state's growing energy needs must first be met through energy efficiency and demand response, second through the addition of renewable energy and distributed generation, and third through the addition of clean fossil-fueled energy sources and infrastructure improvements (State of California, 2003, p. 4; CEC, 2005).

British Columbia has taken a similar approach by setting the direction to prioritize CDM down in *legislation*. British Columbia's Utilities Commission Act (which is the piece of legislation governing energy utilities and energy planning in that province) requires public utilities to submit long term resource plans outlining how utilities will reduce electricity demand through CDM measures, and explaining why planned supply-side measures are not being replaced by demand-side measures (Utilities Commission Act, 1996, s. 44.1 (2)). The Act also specifies that when BC's regulator (the British Columbia Utilities Commission (BCUC)) reviews utility resource plans for approval, it must consider whether plans show that utilities intend to pursue adequate, cost-effective demand side measures, and whether plans are consistent with the province's energy objectives, as articulated in BC's Clean Energy Act (Utilities Commission Act, 1996, s. 44.1 (8)(a),(c)).

While not the same as a loading order, the list of energy objectives laid out in British Columbia's Clean Energy Act serves a similar purpose: it explicitly sets the pursuit of CDM as a priority in energy policy. In fact, the pursuit of CDM is second only to achieving electricity self-sufficiency in BC's list of energy objectives (Clean Energy Act, 2010, s. 1). BC's CDM-oriented energy objective is to "take demand-side measures and to conserve energy, including the objective of the authority reducing its expected increase in demand for electricity by the year 2020 by at least 66%" (Clean Energy Act, 2010, s. 2) (b)). This provides energy planners in BC with consistent long term policy direction to prioritize CDM.

planning process recommended in the previous section. The second major problem theme that emerged is the lack of attention that Ontario's CDM policy framework pays to market transformation and to building a culture of conservation in the province.

Under Ontario's 2006 CDM policy framework, the government set two high level targets for energy conservation: 1) to reduce electricity demand by 6300MW within 25 years, and 2) to create a culture of conservation in the province (Love, 2006, p. 12). Ontario's current CDM policy framework has retained the focus on achieving demand savings and added an energy savings target as well, but it has let the goal of building a culture of conservation fall by the wayside.

Several of the LDC representatives interviewed advocated for a more holistic approach to conservation and lamented how the current framework for delivering CDM programming is not conducive to market transformation because it drives LDCs to meet savings targets through resource acquisition at the expense of engaging in capability building activities like social marketing and education. The section of this paper discussing long term commitment identified several contributing factors to the framework's lack of support for capability building and market transformation-oriented activities, including the tests used to screen CDM programs for inclusion in program portfolios and the metrics used to set conservation targets and to measure progress.

Therefore, recommendations for changes to the current CDM framework in order to strengthen the province's long term commitment to conservation include the following:

L.1. Set targets and milestones for progress towards achieving market transformation and building a culture of conservation in the province.

Energy and demand savings targets expressed in terms of kW's and kWh are great for encouraging resource acquisition programs, but they do not encourage utility engagement in capability building and market transformation activities. For this reason, the long term goal of market transformation would be better served by two sets of targets: 1) energy and demand savings targets, and 2) market transformation targets[105]. This approach was advocated in 2006 by Ontario's Chief Conservation Officer, who asserted that in order to create a culture of conservation and achieve sustainable energy savings, "targets must be set for capability building and market transformation as well as consumption and demand savings." (Love, 2006, p. 34).

The metrics used to set targets for and measure progress towards capability building and market transformation would need to be discussed and stakeholdered with the various CDM players to arrive at metrics that are both useful and fair. However, since the government has in the past set capability building and market transformation targets (e.g. engaging in education and

105 If the framework were to incorporate two sets of targets – quantitative energy and demand savings targets for resource acquisition activities, and qualitative program outcome targets for market transformation activities – then the incentives offered to utilities would also need to be tied to both sets of targets to encourage utilities to meet and exceed both sets of targets.

public outreach and setting aggressive targets for the installation of smart meters (Office of the Premier, 2004)), and the OPA has developed a metric for measuring tracking, and reporting on progress in the development of a 'culture of conservation' in Ontario (which it has been using to track growth in a culture of conservation in the province since 2007 (OPA, 2011a, pp. 8-9)), it does not seem unreasonable to expect that it would be possible to develop appropriate targets and performance metrics for driving and assessing progress on capability building and market transformation.

Under the previous CDM framework, some examples of market-transformation-oriented targets included levels for the penetration of smart meters into Ontario homes, and timeline targets for the phase-out of inefficient incandescent light bulbs (Office of the Premier, 2004; ECO, 2012a).

L.2 Establish regular review cycles for energy efficiency standards for products and appliances sold in Ontario.

One appropriate place to begin in terms of setting targets for progress towards market transformation would be to establish a timeline for the introduction of more stringent ENERGY STAR standards for products and appliances in Ontario, and to establish a regular review cycle for energy efficiency standards for products and appliances sold in the province. This would require establishing processes for reviewing and updating the province's energy efficiency standards and assigning responsibility for doing so to a particular entity[106] — something the current CDM policy framework does not do[107].

L.3. Modify the criteria used to screen CDM programs in order to better represent the value of difficult-to-quantify program benefits.

Modifying the cost-effectiveness tests used to screen programs for inclusion in CDM portfolios so that they take into account non-quantitative program benefits would allow a greater proportion of capability building and market transformation-oriented programs to be included in the CDM program mix.

One possible approach to this issue would be use different screening tools for resource acquisition programs and market transformation programs. However, many programs include both resource acquisition and capability building and market transformation components, so another, perhaps simpler approach would be to modify the OPA's cost-effectiveness tests to include an adder for long term market transformation potential. This would allow a greater number of capability building and market transformation-oriented programs to pass the cost-effectiveness screening tests and to be included in CDM program portfolios.

106 For example, legislation could specify that the Ministry of Energy is responsible for reporting to parliament on needed updates to Ontario's efficiency standards, possibly informed by the advice of an energy standards advisory council in the same manner that the Ministry of Municipal Affairs and Housing's responsibilities with respect to building code updates are laid out in legislation.

107 The reality that prior to the most recent update to Ontario's energy efficiency standards (which added standards for general service lamps in February of 2012) there was a six year gap when no energy efficiency standards were updated speaks to the ineffectiveness of the current arrangement (O. Reg. 13/12; O. Reg. 38/06).

Areas of further research

Further research would be needed to determine:

- What screening tests would be most appropriate to use for screening capability-building and market-transformation-oriented programs.
- What form capability building and market transformation targets and milestones should take and in what metrics they should be expressed.
- The optimal length of review cycle for energy efficiency standards for products and appliances.
- The degree to which Ontario's efficiency standards should become more stringent over time.
- The process by which reviewing and updating Ontario's standards can most appropriately be accomplished.

Roles and responsibilities

As with the theme of long term commitment, two of the main recommendations with respect to the assignment of roles and responsibilities under the existing policy framework have already been outlined in the discussion above. The first is the recommendation to set the province's energy objectives in legislation rather than having the Minister of Energy set and re-set energy planning priorities every three to four years through supply mix directives. The second is the recommendation to give the OEB a more meaningful oversight role in reviewing the province's integrated power systems plan (IPSP). Additional recommendations that follow from this paper's analysis of the assignment of roles and responsibilities under the current policy framework include the following:

R.1. Provide LDCs with more flexibility with respect to their roles in developing and delivering CDM programs.

The roles currently assigned to LDCs do not recognize their diversity of size and capability, and do not exploit LDCs' ability to create programs tailored to local market conditions. In addition, having all LDCs offer their consumers the same standard programs does not foster innovation. The reality that many of the OPA's standard programs are actually based on programs originally developed by the LDCs during the Third Tranche period shows that some LDCs are capable of designing quality CDM programs. This capacity for program design should be encouraged and exploited, not stifled.

At the same time, some LDCs lack the capacity to design and deliver their own programs, and so require support if they are to be placed in a CDM program delivery role. Some observers have suggested that some of Ontario's 80 LDCs should be amalgamated in order to reduce the range of their differences in size and capacity. However, as long as the issue of amalgamation remains unpalatable among key players, and the diversity of Ontario's LDCs persists, Ontario's CDM policy framework should recognize and accommodate that diversity.

R.2. Modify legislation to require action on CDM rather than simply giving the government and Ministry of Energy the power to require action on CDM.

Putting the government and the Ministry of Energy in the director's chairs requires that they prioritise making CDM-related regulations over making other regulations. Given the demands on government and Ministry attention, it would seem more prudent and effective in promoting conservation to simply set down in legislation that particular parties must engage in CDM activities. For example, rather than giving the government the ability to require energy reports and conservation plans from public agencies, legislation should simply require public agencies to report annually on their energy use and CDM activities and to prepare energy conservation plans on a permanent basis[108]. Although the government did pass a regulation In August of 2011 prescribing five types of public agencies that would have to report annually on their energy use and CDM activities (hospitals, school boards, post-secondary institutions, municipalities, and municipal boards) (O. Reg. 397/11, s. 4), the reality that the government had had this power for five years prior to exercising it (since the passing of the Energy Conservation Leadership Act in 2006) emphasizes the need for legislation to require action rather than just grant powers.

R.3 Add the compliance and enforcement-related provisions from the Energy Efficiency Act, 1990 and the Energy Conservation Leadership Act, 2006 back into the Green Energy Act.

Without these provisions, the government has no means of providing oversight and enforcement for the implementation of standards for energy efficiency and energy efficiency disclosure for products, appliances and properties sold in Ontario.

R.4 Restore stakeholder input and oversight to the energy planning process by making the IPSP subject to environmental assessments.

Although the 2011 supply mix directive was posted on the Environmental Registry for a 45 day public comment period, a far more meaningful and appropriate process for soliciting and incorporating stakeholder input into the development of the IPSP would be the type of stakeholder consultation process outlined in the Environmental Assessment Act[109]. Exempting the IPSP from undergoing environmental assessments severely restricts the opportunity for stakeholders to provide input on the major planning decisions at the heart of the IPSP. It also means that the degree to which safety, environmental protection

108 The same principle applies to giving the Ministry of Energy the power to require other government departments to report on energy use. To avoid the politics involved in one government department electing to require another government department to do something, legislation would be better employed simply requiring all Ministries to report on the energy use in their buildings. If one were ambitious, one might even find some way of stipulating that any monetary savings from reductions in a Ministry's energy use be added to that Ministry's budget for the next year and be devoted to future CDM projects.

109 Subjecting the IPSP to environmental assessments would provide a formal channel for soliciting feedback from important stakeholders like non-governmental organizations that can provide valuable critiques of the overall energy system and CDM plan, and so complement the role played by the ECO in evaluating the efficacy of the province's CDM policy framework and plan.

and environmental sustainability are actually considered in developing the IPSP is not subject to any oversight.

R.5 Reform the OEB's interrogatory process to reduce the administrative burden on LDCs and to avoid duplication of efforts between OEB staff and intervenors.

The OEB's process for evaluating applications for Board-Approved CDM programs is a long one that that is not only administratively burdensome for LDCs, but also eats significantly into the four-year window of program delivery allowed by the CDM Code. In July of 2012, Ontario's Electricity Distributors Association (EDA) issued a report entitled *The Case for Reform: How regulatory streamlining could benefit Ontario's electricity consumers*, which made several relevant recommendations regarding revisions that would streamline the intervenor process (EDA, 2011). These included screening interrogatories for duplication, relevance and materiality, and changing the eligibility requirements for intervenor status and the eligibility rules for cost awards (EDA, 2011, p. 9).[110]

R.6. Remove the CDM Code's requirement that LDCs must pass a centrality test in order to claim 100% of the benefits that accrue from CDM programs on which they collaborate with other LDCs or CDM players (e.g. natural gas companies or municipalities), or clarify that distributors may claim 100% attribution of electricity savings that occur within their service territories.

These changes are needed in order to encourage cooperation among CDM players and remove a financial disincentive to collaboration.

Areas of further research

Areas that would need further research with respect to these recommendations include the following:

- Research into the most appropriate arrangement of roles and responsibilities for the OPA and LDCs with respect to designing CDM programs.

  The ill-fitting nature of LDCs' roles under the current framework suggests that there was insufficient consultation with LDCs during the development of the current policy framework for CDM programming. If this is the case, more consultation with the major CDM players, and particularly the LDCs, during the development of the next policy framework for CDM programming might result in a more appropriate allocation of CDM programming roles under the post-2014 CDM policy framework.

110 In its report, the EDA asserted that "requests for information from intervenors and OEB staff are essentially duplicative in nature, however are worded such that they appear subtly different, necessitating a tailored response. This results in additional administrative burden with limited added value" (EDA, 2011, p. 8). Furthermore, the EDA noted that many intervenors are eligible to recover the costs of their participation in hearings from the applicant (i.e. the LDC) (EDA, 2011, p. 4). This means that the LDC (and ultimately the ratepayer) is burdened not only with the costs incurred in responding to all of the interrogatories submitted in an application process, but also with the costs of posing those questions (EDA, 2011, p. 9).

Financial and incentive structures

One of the recommendations that emerged from the analysis of financial and incentive structures, but which has already been listed in the recommendations springing from the analysis of the current framework's assignment of roles and responsibilities is the recommendation to get rid of the centrality test that LDCs must pass in order to receive financial incentives for the savings that result from programs on which LDCs collaborate with other CDM players. Additional recommendations to emerge from the analysis of financial structures and incentives under Ontario's existing CDM policy framework include the following:

F.1. Cancel the Clean Energy Benefit

This subsidy artificially lowers the cost of using electricity, which counteracts the load-shifting incentive created by time-of-use electricity pricing and undermines CDM program efforts.

F.2. Increase the price differential between on-peak and off-peak electricity rates, and introduce critical peak pricing.

These changes would create a greater incentive for consumers to change their energy use patterns, and so would likely induce more significant load-shifting from peak to off-peak periods. The difference between Ontario's on-peak and off-peak electricity rates may not be large enough to produce significant load-shifting (Faruqui, A., et. al, 2010, pp. 3, 5). A 2010 review of existing TOU rates in other jurisdictions found the average peak:off-peak ratio to be 4:1, and found that most effective rates (with respect to encouraging permanent load shifting) had peak:off-peak ratios higher than 4:1. For reference, Ontario's current peak:off-peak ratio for RPP TOU consumers is approximately 1.8:1 (IESO, n.d.e). However, research shows that critical peak pricing[111] is even more effective than time-of-use pricing with respect to inducing customers to shift their electricity use to non-peak periods — resulting in an average reduction in peak demand of 13–20%, compared to TOU pricing's 3-6% drop (Faruqui & Sergici, 2010, p. 221).

F.3. Prioritize the installation of enabling devices (such as in-home displays and remotely controllable switches).

The use of enabling devices (such as in-home displays and remotely controllable switches), has been shown to significantly augment the load-shifting effects of dynamic electricity pricing (Faruqui & Sergici, 2010, p. 216; Faruqui, Sergici, & Sharif, 2010, pp. 1603-1604)[112]. This recommendation would be appropriate to convert into a capability building target.

111 For discussions of the effects of TOU rates, critical peak pricing, and the use of enabling devices on electricity use, see section 6 of Appendix D.

112 For discussions of the effects of TOU rates, critical peak pricing, and the use of enabling devices on electricity use, see section 6 in Appendix D.

F.4. Remove barriers to innovative financing mechanisms like property-assessed financing and on-bill financing.

Lack of access to affordable financing has consistently been identified as an important barrier to the adoption of energy efficient retrofits. In order to encourage municipalities to develop property-assessed energy improvement financing programs, Ontario legislation needs to specifically define energy improvements on private property as a form of work that is appropriate to fund through local improvement charges (LIC's), or the province needs to send municipalities a clear message that it is in agreement with such an interpretation of the existing legislation. Furthermore, municipalities have noted that the process for setting up LIC's is complex and costly for municipalities because it requires setting up by-laws for each area and obtaining multiple approvals, etc., which can result in LIC's taking years to implement (Persram, 2011b, p. 26). This suggests the need for a simplified and streamlined process for implementing LIC's specifically for energy improvements on private properties[113]. One change to Ontario's CDM policy framework that facilitate on-bill financing through consumers' local utilities would be greater openness on the part of the OEB with respect to funding innovative financing programs proposed by LDCs in their applications for Board Approved Programs.

F.5. Consult with LDCs to develop more effective performance incentives and more usable penalties for underperforming.

Issues that undermine the effectiveness of the current performance incentive mechanism need to be resolved, and the impracticality of revoking a utility's operating licence as a penalty for failing to meet its savings targets suggests the need for a more usable mechanism for making CDM targets binding.

Areas of further research

Areas that would need further research with respect to these recommendations would include the following:

- Research into the optimal price differential for inducing time-of-use shifting behaviour among Ontario electricity consumers,
- Research into which enabling devices would be most appropriate to promote in Ontario, and what target levels of penetration for those devices should be adopted,
- Research into how performance incentives and penalties might be modified or replaced in order to increase their effectiveness in driving conservation and their usablility in cases of LDC underperformance
- Research into the most appropriate means of encouraging and facilitating the use of alternative innovative financing arrangements such as on-bill financing.

113 For more detailed information about regulatory and legislative changes needed in order to facilitate the use of LIC's by municipalities as a means to provide financing for energy-saving retrofits on private property, see Sonia Persram's 2011 report entitled *Property Assessed Payments for Energy Retrofits: Recommendations for Regulatory Change and Program Features* (Sonia Persram, 2011b).

Comprehensive programming

The most important theme to emerge from the analysis of Ontario's CDM program offerings is the recommendation that LDCs be allowed more flexibility in the roles that they play in designing and delivering CDM programming. Allowing LDCs to take a larger role in program design would likely result in more innovative programming and more programming tailored to local market conditions. However, this recommendation was discussed under the roles and responsibilities theme, so it will not be discussed again here. Additional recommendations flowing from this paper's analysis of CDM programming produced under the current policy framework include the following:

C.1. Require LDCs to offer low-income programs to low-income consumers in their service areas

This recommendation is necessary because the CDM Code only requires LDCs to state in their CDM strategies whether they will offer CDM programs to low income customers, and to provide a rationale for their choice (OEB, 2010c, p. 7). Thus, the current policy framework does not ensure that low income consumers will actually be reached with targeted conservation programming. Requiring LDCs to offer low-income programs in their service areas would ensure that a greater proportion of low-income consumers have access to low-income CDM programs.

C.2. Streamline and simplify the processes that allow consumers to participate in CDM programs.

Complexity and administrative burden act as disincentives for consumers when considering participation in CDM programs. The length and level of detail of some of the participant agreements and contracts included in the OPA's program schedules suggest that there is room for simplification.

C.3. Allow for the inclusion of more programs targeting winter peak.

Winter-peak-oriented CDM programs (e.g. street lighting or car engine block heater programs) would be particularly useful for consumers and LDCs in the more northern areas of the province, but the current policy framework's focus on summer peak demand reduction has resulted in a province-wide program portfolio that does not include such programs.

Areas of further research

Areas of further research that follow from the above recommendations include research into which winter peak-focused programs would be most appropriate to offer northern electricity consumers, and research into which types of changes to CDM program participation processes would be most helpful in simplifying program participation and administration. (Stakeholdering with LDCs and program participants would likely be useful here).

Evaluation, measurement & verification

Only one recommendation emerged from the analysis of Ontario's EM&V processes:

E.1. Incorporate environmental sustainability criteria in the tests used to screen CDM programs for inclusion in program portfolios, and in the metrics used to measure program performance.

CDM activities have monetary and non-monetary benefits, but the cost-effectiveness tests currently used to screen CDM programs for inclusion in program portfolios assess costs based only on the avoided financial costs of electricity generation. As a result, the environmental sustainability of CDM programs in comparison to other energy options is not considered when assessing their costs and benefits and evaluating their cost-effectiveness. One means of including environmental sustainability criteria in the screening tests and performance metrics applied to CDM programs would be to incorporate environmental externalities into cost-effectiveness calculations. This would make investment in CDM programs look even more favourable when compared with investments in generation resources. Another means of modifying cost-effectiveness tests to try to capture some of the social and environmental impacts of programs would be to incorporate adders to represent non-energy benefits like decreased air pollution.

Areas of further research

Further research would be required in order to arrive at the most appropriate means of incorporating environmental sustainability criteria into Ontario's screening tests and performance metrics.

Summary of recommendations

All of the recommendations discussed above are listed in priority sequence in the table below.

Table 11.1: Summary of Recommendations

Recommendations	Assessment Criteria Addressed					
	Priority Resource	Long Term Commitment	Roles and Responsibilities	Financial Structures	Comprehensive CDM Programs	EM&V
1. Limit the Minister of Energy's power to direct the province's energy planning process through issuing supply mix directives to the OPA.	X	X	X			
2. Articulate Ontario's energy policy objectives in legislation and make those objectives the basis for developing long term energy plans.	X	X	X			
3. Adopt a CDM-first loading order as one of Ontario's energy policy objectives.	X	X	X			
4. Set targets and milestones for progress towards capability building, market transformation and building a culture of conservation in the province.		X				
4.1. Establish regular review cycles for energy efficiency standards for products and appliances sold in Ontario.		X				
4.2. Prioritize the installation of enabling devices (such as in-home displays and remotely controllable switches).		X		X		
5. Provide LDCs with more flexibility with respect to their roles in developing and delivering CDM programs.			X		X	
6. Modify legislation to require action on CDM rather than simply giving the government the power to require action on CDM.		X	X			
7. Cancel the Clean Energy Benefit				X		
8. Increase the price differential between on-peak and off-peak electricity rates, and introduce critical peak pricing.				X		
9. Add the compliance and enforcement-related provisions from the Energy Efficiency Act, 1990 and the Energy Conservation Leadership Act, 2006 back into the Green Energy Act.			X			
10. Have the OEB review and approve the IPSP on the basis of whether or not it serves the province's energy policy objectives, as articulated in legislation.	X	X	X			
11. Restore stakeholder input and oversight to the energy planning process by making the IPSP subject to environmental assessments.	X		X			
12. Incorporate environmental sustainability criteria in the tests used to screen CDM programs, and in the metrics used to measure program performance.	X					X
13. Modify the criteria used to screen CDM programs in order to better represent the value of difficult-to-quantify program benefits.	X	X				
14. Require LDCs to offer low-income programs to low-income consumers in their service areas					X	

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Recommendations	Assessment Criteria Addressed					
	Priority Resource	Long Term Commitment	Roles and Responsibilities	Financial Structures	Comprehensive CDM Programs	EM&V
15. Streamline and simplify the processes that allow consumers to participate in CDM programs.					X	
16. Consult with LDCs to develop more effective performance incentives and more usable penalties for underperforming.			X	X		
17. Remove barriers to innovative financing mechanisms like property-assessed financing and on-utility bill financing.				X		
18. Allow for the inclusion of more programs targeting winter peak.					X	
19. Reform the OEB's interrogatory process to reduce the administrative burden on LDCs and to avoid duplication of efforts between OEB staff and intervenors.			X			
20. Remove the CDM Code's requirement that LDCs must pass a centrality test in order to claim 100% of the benefits that accrue from CDM programs on which they collaborate with other LDCs or CDM players (e.g. natural gas companies or municipalities), or clarify that distributors may claim 100% attribution of electricity savings that occur within their service territories.			X	X		

Final Thoughts

This paper has been written in the hope that it will help to inform the next (post-2014) policy framework for CDM in Ontario. However, twenty recommendations may seem a bit overwhelming, so if readers take nothing else away from this report, they should take note of the following four cross-cutting themes.

Changes to energy planning

First, in order to prioritize CDM in Ontario over the long term, changes need to be made to Ontario's energy planning processes. This means limiting the Minister of Energy's ability to set energy planning priorities through supply mix directives, setting Ontario's energy policy objectives in legislation, making one of those objectives a CDM-first loading order, and having the OEB review the IPSP on the basis of whether it serves the energy objectives set down in legislation.

The role of LDCs in designing and delivering CDM programs

Second, the LDCs need to be given more flexibility under the post-2014 CDM policy framework with respect to their roles in designing and delivering CDM programs. By giving all LDCs the same role and by severely constraining their ability to design CDM programs, the current policy framework fails to exploit the strength that many LDCs have demonstrated in the past with respect to

designing innovative programs that respond to local conditions — often through collaborating with each other[114].

Permissive versus prescriptive legislation

Third, many of the provisions in the Green Energy and Green Economy Act are permissive rather than prescriptive, meaning that they give the government powers to require action on conservation rather than simply requiring action on conservation in the provisions themselves. As a result, the degree to which conservation activities are pursued depends on the priorities of those in positions of power (e.g. the government and the Minister of Energy) rather than conservation being prioritized and pursued on a permanent basis.

A culture of conservation

Fourth, in order to achieve deep and sustained energy savings over the long term, it is essential to invest in conservation efforts aimed not just at achieving immediate energy savings, but also at building a culture of conservation. This means investing in education, capability-building, and market-transformation-oriented CDM activities, as well as setting targets and milestones for progress on capability building and market transformation in addition to energy savings targets.

This leads to some final thoughts that I would like to highlight. The first three of the above cross-cutting recommendations address structural problems in the existing policy framework that allow conservation efforts to be derailed by key CDM players' lack of buy-in to the spirit or intent of CDM policies. In order for CDM to be maximized under the current policy framework, multiple players must choose to make conservation a priority. The degree to which CDM will be prioritized in energy planning depends on the Minister of Energy choosing to prioritize CDM in supply mix directives. The degree to which LDCs may design their own CDM programs depends on the OEB choosing to interpret government direction and program screening criteria in a way that allows for the possibility that applications for CDM program funding might be approved. And the degree to which government ministries and agencies are required to report on their energy use and create energy conservation plans depends on the government and Minister of Energy choosing to require such reports. Thus, the current CDM policy framework makes possible a situation where very little conservation may be pursued in the province even when all players comply with the existing CDM policy to the letter. Not surprisingly then, the recommendations for changing Ontario's energy planning process, for changing the roles of the LDCs in designing CDM programs, and for making the Green Energy and Green Economy Act's provisions prescriptive rather than permissive all aim to change the CDM policy framework in ways that make it more difficult for CDM efforts to be derailed by key players not buying into the spirit or intent of CDM policies.

114 (For example, as part of the Coalition of Large Distributors)

It seems clear, therefore, that having a strong CDM policy framework is critical to achieving success in exploiting conservation as an energy resource. However, even if all the above recommended changes to the structure of Ontario's CDM policy framework were made, and Ontario had a superb post-2014 CDM policy framework, lack of buy-in from key players could still impede progress on CDM. For example, even with well-defined processes for consulting with stakeholders, the degree to which stakeholder feedback will be incorporated into policy documents depends on the authors of those documents choosing to incorporate the feedback they have received[115]. At the end of the day, therefore, in order for the intent of a policy to be borne out in its implementation, key players must not only comply with the letter of a policy, but they must also buy in to the spirit or intent underpinning the policy.

Successful CDM strategies require buy-in from not just from key energy sector players, but also from the energy-consuming public. Even the degree to which CDM programs will be successful in achieving energy savings depends on electricity consumers choosing to avail themselves of such programs –and to do so, they must be convinced that CDM is the best, most cost-effective option available. Thus, fostering buy-in to the philosophy of conservation — both among consumers and among energy policy players — can be crucial to the success or failure of a CDM policy framework. This is one of the reasons why, even with a robust CDM policy framework, investing in building a *culture* of conservation is so key to the success of CDM efforts.

115 For example, as mentioned earlier, during the OEB's development of the CDM Code and CDM Guidelines, the OEB accepted feedback from stakeholders, but it elected not to incorporate any of that feedback into the final drafts of those documents in the form of material changes, despite stakeholders having pointed out legitimate issues that ought to have been addressed.

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EA see: Electricity Act

EBR see: Environmental Bill of Rights

ECO see: Environmental Commissioner of Ontario

ECLA see: Energy Conservation Leadership Act

ECRA see: Energy Conservation Responsibility Act

ECSTF see: Electricity Conservation & Supply Task Force.

EDA see: Electricity Distributors Association.

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NRCan see: Natural Resources Canada

NYSEFC see: New York State Environmental Facilities Corporation

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Appendix A: CDM policy in Ontario: the current framework

Appendix B gives a brief history of the development of CDM policy in Ontario from 1980 to 2009. Appendix A continues this history by describing the changes made to CDM policy since 2009 and describing Ontario's CDM policy framework in its current state. As is demonstrated in Appendix B, CDM-related policy in Ontario shows up in several places: Acts and Regulations, directives, codes, and agreements. Each of these chief policy venues is discussed below with respect to Ontario's current CDM policy framework, starting with the Green Energy and Green Economy Act, 2009.

Acts

The Green Energy and Green Economy Act, 2009

The Green Energy and Green Economy Act (GEAGEA) was enacted in May of 2009. It is enabling legislation that requires the creation of further regulations to implement many of its provisions and powers. The first schedule of the GEAGEA (Schedule A) enacts a new Act called the Green Energy Act (GEA), which includes a collection of provisions from the Energy Efficiency Act, 1990, and the Energy Conservation Leadership Act, 2006 – both of which are repealed by the GEAGEA. Subsequent schedules of the GEAGEA (Schedules B through L, which make up the bulk of the GEAGEA) are devoted to amending existing Acts. With respect to electricity conservation, chief among the Acts amended include the Electricity Act, the Ministry of Energy Act, the Ontario Energy Board Act, the Environmental Bill of Rights, and the Building Code Act.

The Green Energy Act, 2009

The GEA incorporates most of the provisions from the Energy Efficiency Act, 1990, and the Energy Conservation Leadership Act, 2006, with the notable exception of provisions in both acts related to compliance and enforcement, which were neither transferred into the GEA, nor replaced with new compliance and performance provisions (ECLA, 2006, s.2. (2-4), ss. 8, 9; EEA, 1990, ss. 4, 5).

Provisions from the Energy Efficiency Act, 1990

Those provisions of the Energy Efficiency Act, 1990 that were incorporated into the Green Energy Act require that products and appliances sold in Ontario the meet minimum energy efficiency standards set by regulation (GEA, 2009, s. 15 (1)(a)), and specify that such products and appliances must be labelled to confirm their compliance with such standards (GEA, 2009, s. 15 (1)(b)). The

regulation which set these efficiency standards (O. Reg. 82/95) was recently amended (in March of 2012) in order to add standards for general service lamps (O. Reg. 13/12). However, prior to this change, the efficiency standards regulations was last amended (updated for at least one appliance) in 2006 (O. Reg. 38/06).

Provisions from the Energy Conservation Leadership Act, 2006

The Energy Conservation Leadership Act permitted the government to make regulations prescribing information that people selling or leasing property would have to provide to prospective leasers or buyers (ECLA, 2006, c. 3, Sched. A, s. 2(1)). The Green Energy Act version of this provision goes further and makes the disclosure of a home's energy efficiency mandatory – giving any person who makes an offer to purchase property the right to receive energy consumption and efficiency information about that property from the seller (unless the person making the offer opts out of receiving such information) (GEA, 2009, s. 3).

The GEA also adopts the Energy Conservation Leadership Act's provision permitting the government to make regulations to designate particular goods, services, and technologies for the promotion of energy conservation. This means that using such goods, services or technologies cannot be restricted or prevented by other laws such as municipal by-laws or condominium by-laws (GEA, 2009, s.4). Although this provision has existed since 2006, it has generally not been implemented by regulations; to date, the only goods that have ever been prescribed under this provision are clotheslines and clothes trees, in a regulation from 2008 (O. Reg. 97/08).

The Energy Conservation Leadership Act also contained provisions concerning energy use by public agencies. The Act allowed the government to set energy conservation targets for public agencies, to require public agencies to prepare annual energy conservation plans (ECLA, 2006, s. 4), and to require public agencies to consider energy conservation and energy efficiency when making capital investments and acquiring goods and services (ECLA, 2006, s. 6). The GEA adopts and modifies these provisions by allowing the government to additionally prescribe both the period covered by the conservation plans and the frequency of such plans, and, further, allows the government to require not just public agencies, but also any consumer to prepare an energy conservation and demand management plan (GEA, 2009, s. 6(2)).

In August of 2011, the government passed Ontario Regulation 397/11, which prescribed five types of public agencies for the purposes of the Act (hospitals, school boards, post-secondary institutions, municipalities, and municipal boards) and specified that these agencies must report annually on their energy use and greenhouse gas emissions and on any previous, current and proposed measures for conserving and reducing their energy use. Furthermore, the agencies must forecast the results they expect from their current and proposed CDM measures (O. Reg. 397/11, s. 4). This regulation comes into force on January 1, 2012, and will require public agencies to submit their first plans no later than July 1, 2013 (O.Reg. 397/11, s. 5(6)).

New provisions in the Green Energy Act, 2009

In addition to collecting existing energy conservation policy into one place, the GEA also contains some new provisions relating to energy conservation. One of them specifies that when constructing, acquiring, operating and managing government facilities, the Government of Ontario shall be guided by four principles: (1) clear and transparent reporting of energy use and GHG emissions, (2) planning and designing facilities to use energy efficiently, (3) making environmentally and financially responsible investments in government facilities, and (4) using renewable energy sources to provide energy for government facilities (GEA, 2009, s. 10.(1)).

Another provision grants the Minister of Energy the new power to issue directives to other Ministries within the government, requiring them to report on energy consumption and GHG emissions with respect to specific government facilities. The Minister may also issue directives establishing minimum energy and environmental standards for new construction or major renovations of government facilities (GEA, 2009, s. 10.(2)). However, it does not appear that any such directives have been issued[116].

Provisions amending the Electricity Act, 1998

The GEAGEA makes a few conservation-related amendments to the Electricity Act, 1998. One of the most significant of these is to extend the Minister of Energy's directive power by allowing him or her to direct the OPA to undertake any type of initiative or activity related to conservation or reducing or managing electricity demand, without reference to a limiting time frame (GEAGEA, 2009, Sched. B, s. 5.(2); EA, 1998, s. 25.32(4.1)). This contrasts to the Minister's previous power to direct the OPA to undertake conservation initiatives, which was framed as a transitional power that was necessary only until the OPA had established its own procurement processes and had had those processes approved by the OEB (EA, 1998, s. 25.32(4)(a)).

Another significant change the GEAGEA makes to the Electricity Act is to repeal the provision that created the Conservation Bureau and the position of Chief Conservation Officer within the OPA (GEAGEA, 2009, Sched. B, s.3). As mentioned in the history section of this paper, the Conservation Bureau and position of Chief Conservation Officer were created by the Electricity Restructuring Act in 2004, in order to provide leadership in planning and co-ordinating electricity CDM, and to report on the progress of government CDM activities (ERA, 2004, Sched. A, s. 29; EA, 1998, s. 25.11). Through amendments to the Environmental Bill of Rights, the GEAGEA transfers the reporting function of the Energy Conservation Officer to the Environmental Commissioner, giving him the responsibility of reporting annually on the progress of activities in Ontario to "reduce the use or make more efficient use of electricity, natural gas, propane, oil and transportation fuels" (EBR, 1993, s. 58.1).

116 Section 10(4) of the GEA specifies that the Minister shall ensure that any such directives are published in The Ontario Gazette. However, the reality that the Ontario Gazette is not functionally searchable for directives is a problem in confirming that no such directives have been issued. Nevertheless, I have been as of yet unsuccessful in finding any, and my interviewee from the Ministry of Energy was not aware of any such directives having been issued.

Provisions amending the Ministry of Energy Act, 1990

The Ministry of Energy already had two existing conservation-related objectives: (1) to encourage prudence in the use of energy in Ontario (Ministry of Energy and Infrastructure Act [MEI Act], 1990, s. 8(1)), and (2) to make recommendations about priorities for, and research into, conservation and energy efficiency (MEI Act, 1990, s. 8 (1)(e)). The GEAGEA adds to these conservation-related responsibilities by also requiring the Ministry to "do any one or more of encouraging, promoting, developing, or participating in such activities, projects and programs as the Minister considers appropriate" to stimulate energy conservation and load management (GEAGEA, 2009, Sched. C, s.6. (1); MEI Act, 1990, s. 8 (1)(h)(iv)). Furthermore, in addition to the Ministry's existing authority to make grants and loans, the GEAGEA grants the Minister the authority to make grants subject to conditions to encourage energy conservation (MEI Act, 1990, s. 8 (2)(f) and (g)).

Provisions amending the Ontario Energy Board Act, 1998

The GEAGEA restores promoting electricity conservation and demand management as one of the OEB's electricity-related guiding objectives (OEB Act, 1998, s. 1 (1)3.). Furthermore, while the Minister of Energy already had the ability to issue directives to the OEB requiring it to take steps to promote energy conservation, energy efficiency, and load management (granted by the Electricity Pricing, Conservation and Supply Act [EPC&S Act], 2002, s. 4 (4); OEB Act, 1998, s. 27.1(1)), the GEAGEA gives the Minister of Energy the additional authority to issue directives specifically requiring the OEB to establish conservation and demand management targets for electricity distributors, and to make meeting those targets a condition of electricity distributors' licences (GEAGEA, 2009, Sched. D; s. 7; OEB Act, 1998, s. 27.2). Ministerial directives may also allow distributors to meet their conservation targets using any combination of province-wide OPA programs and Board-Approved programs tailored to a distributor's service area. Ministerial directives to the OEB may also require that distributors report publically on their progress towards meeting their CDM targets (OEB Act, 1998, s. 27.2).

The GEAGEA also amends the OEB Act to allow the OEB to assess LDC's, the IESO, and any other prescribed person to cover Ministry of Energy expenses with regard to energy conservation programs (GEAGEA, 2009, Sched. D, s. 6; OEB Act, 1998, s. 26.1(1)). However, the Act places restrictions on the special purposes which such assessments may fund. These include, (1) conservation aimed at decreasing the consumption of **two** or more specified fuels, (2) switching from one specified fuel to another, (3) decreasing peak electricity demand while changing the level of consumption of another type of fuel, (4) research and development into CDM, (5) CDM aimed at specific sectors of Ontario, and (6) to reimburse the Province for expenses due to the above purposes (OEB Act, 1998, s. 26.2 (2)).

The Building Code Act, 1992

The GEAGEA amends the Building Code Act in three important ways. First, although the building code has contained energy efficiency standards since its inception in 1976 (MMAH, 2010c, p. 7), the GEAGEA clarifies that one of the purposes of creating building-standard regulations under the Act is to establish standards for energy conservation (GEAGEA, 2009, Sched. J, s. 1; Building Code Act [BCA], 1992, s. 34. (5) (a)). Second, GEAGEA requires the establishment of a Building Code Energy Advisory Council[117] to advise the Minister of Municipal Affairs and Housing on energy conservation standards in the building code (GEAGEA, Sched. J, s. 2; BCA, 1992, s. 34.4 (1)). Third, the GEAGEA specifies that energy conservation standards in the code must be reviewed every five years (GEAGEA, Sched. J, s. 1.; BCA, 1992, s. 34 (6)).

As mentioned above, legislation forms only part of the post-GEAGEA CDM policy framework. Other parts of the framework consist in regulations, directives, codes, and contracts or agreements between LDC's and the OPA regarding the delivery of conservation programming.

Regulations

Relevant regulations made or adopted under the GEA-proper have been discussed in the section describing the GEA-proper. However, regulations have also been made under the Electricity Act and Ontario Energy Board Act following the passing of the GEAGEA, and these also represent pieces of the CDM policy framework. These include a regulation specifying that off-peak time-of-use rates shall start at 7pm (O. Reg. 494/10), regulations specifying that the IESO shall pay the OPA amounts to cover its obligations with respect to CDM procurement contracts (O. Reg. 428/10; O. Reg. 143/10), and a regulation instructing the Ontario Energy Board to assess the IESO and LDC's for $53,695,310 in Ministry of Energy expenses with respect to renewable energy and energy conservation programs (O. Reg. 66/10)[118].

117 The name of the Building Code Energy Advisory Council has since been changed to the Building Code Conservation Advisory Council, and the council's mandate has been expanded to include conservation of water in addition to energy (BCA, 1992, s. 34.1(1)).

118 This regulation ordered the OEB to assess the IESO and LDC's for a total of $53,695,310 in the form of a special purposes charge to cover Ministry expenses with respect to the Ministry's renewable energy and CDM programs (O. Reg. 66/10): specifically, to cover provincial expenses related to the federal Home Energy Savings Plan ("HESP") program and the Ontario Solar Thermal Heating Initiative ("OSTHI") (OEB, 2011e, p. 2). This amount was to be recovered from electricity ratepayers and paid to the Minister of Finance no later than July 30, 2010 (O. Reg. 66/10). However, on April 26, 2010, the Consumers Council of Canada launched a motion with the OEB contesting the constitutionality of the assessment on the basis that it represented an indirect tax (OEB, 2010a, p. 1; OEB, 2010b, p. 3). The OEB gave the Attorney General of Ontario until June 30, 2011 to submit evidence on the matter (OEB, 2011h, p. 3), and both parties gave submissions leading up to a final oral hearing on Oct. 6, 2011 (OEB, 2011e, p. 2). On Dec. 8, 2011, the OEB issued a decision and order dismissing the Consumer Council of Canada's motion (OEB, 2011e). However, due to the politically contentious nature of funding CDM activities through assessments on the IESO and LDC's it seems unlikely that this mechanism will be used by the Ministry of Energy to fund CDM in future, which is reflected in the Minister of Energy's statement in the Legislature in November of 2010 that the government has no plans to reintroduce assessment in future years (OEB, 2011e, p.4).

Directives

In addition to regulations, numerous directives have also been issued by the Ministry of Energy to the OPA and the OEB, further adding to the CDM policy framework. In December of 2009, the Minister extended the 2006 CDM funding framework by directing the OPA to make an additional $50 million of funding for LDC-run CDM programs available until the end of 2010 (Phillips, 2009). A new model for funding and delivering CDM programs was initiated in the spring of 2010 when the minister issued a series of directives to the OEB and OPA.

First, at the end of March 2010, the Minister directed the OEB to amend each LDC's licence to add a condition requiring the LDC's to collectively meet a CDM target of 1330 MW in peak demand reduction and 6000 GWh in energy use reduction between January 1, 2011 and Dec. 31, 2014 (DuGuid, 2010d, p. 2). The directive specified that LDC's should meet their mandatory targets through any combination of LDC-designed, Board-approved CDM programs and OPA-designed, OPA-contracted province-wide CDM programs. It also instructed the Board to issue a CDM Code setting reporting requirements and rules pertaining to CDM program performance incentives, as well as rules governing the planning, design, approval, implementation and EV&M (evaluation, measurement and verification) of Board-Approved CDM programs (DuGuid, 2010d, p. 3).

Shortly thereafter, in April of 2010, the Minister issued the OPA a directive instructing it to advise the OEB on the appropriate allocation of CDM targets among the LDC's and on aspects of administering LDC CDM activities, like the use of OPA's cost effectiveness tests. It also required the OPA to design, deliver and fund OPA-contracted Province-Wide CDM programs for the period from January 1, 2011 to Dec. 31, 2014 (DuGuid, 2010a, p. 2). Furthermore, the directive called on the OPA to design and coordinate the delivery of CDM programs for First Nation and Metis communities, and to continue to support and fund CDM research and innovation through its Conservation Fund (DuGuid, 2010a, p. 4). Additional CDM-related directives issued to the OPA in 2010 instructed the OPA to create and deliver an industrial energy efficiency program for transmission-connected customers (DuGuid, 2010c), and to design, implement and fund a CDM program for low-income residential customers (DuGuid, 2010b).

The most recent conservation-related directive issued to the OPA is the February 17, 2011 supply mix directive, which instructed the OPA to include 7,100MW of peak demand reduction and 28TWh of energy savings in its integrated power system plan (IPSP) up to the year 2030. The Supply Mix directive also set interim targets of 4,550MW and 13TWh in demand and energy savings by the end of 2015, 5,840MW and 21TWh by the end of 2020, and 6,700MW and 25TWh by the end of 2025 (DuGuid, 2011, p. 1). The CDM targets in this last directive came directly from the Ontario government's Long Term Energy Plan, which was developed in collaboration with the OPA and released in November of 2010. It called for $12 billion of investment in CDM to reach the targets set out in the supply mix directive (Ministry of Energy, 2010, p. 41).

CDM code

In response to the Minister's March 31st, 2010 directive, the OEB posted a draft CDM Code on its web site for comment on June 22, 2010. A finalized version of the Code followed on Sept. 16, 2010 (OEB, 2010f). The Code requires each LDC to submit to the Board a CDM strategy with a year-by-year plan, annual milestones, and descriptions of CDM programs covering all customer types in the LDC's service area (OEB, 2010c, pp. 6-7). The Code also requires LDC's to submit annual reports reviewing their CDM activities in terms of rates of participation, funds spent, progress towards energy savings targets, and any changes or modifications to the LDC's CDM strategy (OEB, 2010c, pp.7-8). In addition, it specifies that LDC's must coordinate with the OPA to deliver province-wide programs, and specifies under which conditions and in what format the LDC's may apply to the Board for funding for Board-Approved CDM Programs (OEB, 2010c, pp. 8-11). These conditions specify that proposed Board Approved Programs will only be eligible for funding if they are non-duplicative of OPA-contracted province-wide programs (OEB, 2010c, p. 8), and that the Board will not approve funding for programs aimed at investing in or maximizing the efficiency of LDC infrastructure, or for initiatives related to the OPA's Feed-in Tariff (FIT) or microFIT Programs (OEB, 2010c, p. 10). Furthermore, with the exception of low-income programs, pilot programs, and educational programs, LDC's may only apply to the Board for funding for CDM programs that are cost-effective, as measured by the OPA's cost-effectiveness test (OEB, 2010c, p. 11).

The Code has additional sections on measuring program cost-effectiveness, accounting treatment, program EM&V, and performance incentives. The EM&V section specifies that the results of an LDC's Board-Approved CDM Programs must be reviewed and evaluated by an independent third party using the OPA's EM&V Protocols (OEB, 2010c, p. 14). The performance incentive section specifies that LDC's must achieve 80% of their CDM targets before being eligible to receive per kW and per kWh incentives, and that incentives may increase with performance in tiers until 150% of CDM targets have been reached (OEB, 2010c, pp. 15, 23).

Guidelines for Electricity Distributor Conservation and Demand Management (EB-2012-0003)

In January 2012, the OEB released a supplementary document to the CDM Code Guidelines for Electricity Distributor Conservation and Demand Management (EB-2012-0003). This document provides more specific guidance with respect to some of the provisions in the CDM Code, including provisions about counting savings towards targets, determining duplication with OPA programs, and conducting EM&V on CDM programs. It also provides details on the lost revenue adjustment mechanism (LRAM) that applies to CDM programs implemented under the CDM Code (OEB, 2012b, p. 3).

Master agreements

The last major piece of the new CDM policy framework to be discussed is the Master Agreements between the OPA and the LDC's with respect to delivering OPA-contracted province-wide programs. The Master Agreement is a contract between the Ontario Power Authority and each local distribution company that sets out elements of the CDM programs to be delivered, the processes for managing changes to the agreement, rules for funding and terms of payment, reporting and EM&V requirements, and other administrative details. The main document, with administrative schedules A-1 to A-7, is 96 pages long, and is accompanied by an additional 14 program schedules, which describe the programs in detail and bring the total page count for the document to 813 (OPA, 2011j; OPA, 2011l-2011aa).

Appendix B: CDM policy in Ontario: a brief history

The concept of conservation and demand management is not a new one in Ontario. In 1975, the Ontario government formed a Royal Commission on Electric Power Planning in order to review the factors affecting demand for electricity in Ontario to the year 2000, and to examine Ontario Hydro's long-term planning concepts for 1983- 1993 and beyond (Porter, 1980, vol. 1, pp. iii, xvii). This commission, informally known as the Porter Commission (after Commission Chairman Arthur Porter), produced a report in 1980 recommending that "future planning philosophy should be reoriented to emphasize demand management increasingly rather than maintain the focus on supply expansion, as is traditional" (Porter, 1980, vol. 1, p. xvii). It asserted that energy policies have a major impact on the demand for electricity (Porter, 1980, vol. 3, p. 61), and suggested that conservation and the measures taken to encourage it are "a central criterion of good government," stating that "all levels of government, especially senior levels, have leadership roles to play, through example and demonstration, in ensuring that a conserver society can become a reality" (Porter, 1980, vol. 1, p. 142).

1980 to1989: building nuclear power plants and preparing the Demand/Supply Plan (DSP)

Despite the Porter commission's endorsement of making demand management central to power system planning, the 1980's was dominated by supply-side initiatives. In 1982, Ontario Hydro had three electricity generation megaprojects on the go: Pickering B, Bruce B, and Darlington Nuclear Power stations (Macaulay, 1982). However, the level of electricity demand that was anticipated when these stations were planned a dozen or so years before had not fully materialized – in part because a recession in the early 1980's had caused a marked decrease in electricity demand (Yeremian, 2009, p. 2). As a result, Ontario Hydro was projecting several years of surplus generating capacity once the new stations came online (Macaulay, 1982). This put pressure on Ontario Hydro to increase electricity sales revenues in order to avoid raising electricity rates, as low rates were seen as essential to Ontario's manufacturing sector and overall economy. As a result, Ontario Hydro embarked on a quasi-schizophrenic strategy of continuing existing efforts to encourage the careful and wise use of energy, while simultaneously attempting to boost sales revenue by "selectively" encouraging the use of electricity as an alternative to other sources of energy (Macaulay, 1982). For example, the Canada Oil Substitution Program provided incentives for Ontarians to switch from oil-burners to electric heating, which was promoted as a way to reduce Canada's dependence on foreign oil and OPEC in light of the 1973 and 1979 oil crises (Macaulay, 1982). However, the campaign

to increase electricity sales was decried in the media as contradictory in light of recent messaging to conserve energy (Globe and Mail, 1984, p. H5), and the massive sales campaign was ultimately abandoned in the late 1980s as a result of political pressure (Mallinson, 2011b).

Although the 1980's was dominated by supply-side initiatives, the decade still saw some investment in demand side management. In 1982, Ontario Hydro's corporate strategy called for 1000 MW of load shifting and 1000 MW of conservation by 2000 (Mallinson,2011b), and from 1982 to 1988, the agency ran a time-of-use rate experiment with 500 residential customers (Mountain, 1993, p.190). Furthermore, the agency's Residential Energy Advisory Program (REAP) offered homeowners loans of up to $3,000 (at Ontario Hydro's borrowing rates) to help improve their homes' energy efficiency (Globe and Mail, 1984, p. H5).

Some government investment in conservation and efficiency also occurred during this decade. Between 1975 and 1985, the Ministry's Energy's Conservation and Renewable Energy Group had been developing policies and programs aimed at achieving more efficient energy consumption in Ontario. The Group worked to develop energy conservation techniques, increase public awareness of the need for energy conservation, and co-ordinated conservation programs across multiple ministries (Archives of Ontario, 2009a). In 1985, when the Ministry of Energy was restructured, the responsibilities of the Energy Conservation and Renewable Energy Group were passed on to a new Programs and Technology Division, whose Conservation and Community Programs section then ran energy programs aimed at encouraging energy management, conservation and efficiency (Archives of Ontario, 2009b).

By the mid 1980's, electricity demand had recovered and Ontario was experiencing the greatest growth it had yet seen in electricity use (Yeremian, 2009, p. 2; Ontario Hydro, 1992, p.2). As a result, from 1984 to 1989, Ontario Hydro conducted a Demand/Supply Options study in order to determine how best to meet Ontario's future electricity needs (Ontario Hydro, 1989, p. xi). In addition to examining supply options, the study identified demand-side options like conservation behaviour, energy efficiency, and load shifting. Consumer research and stakeholder input during the study indicated that homes, industrial plants, and commercial and institutional buildings had the potential to yield significant energy savings at less cost than building and operating new power plants (Ontario Hydro, 1992, p. 3).

The Demand/Supply Plan (DSP) that came out of this process called for approximately $1 billion in demand management programs by 1994 and $3 billion by 2000 (Ontario Hydro, 1989, p. 7-1). The Plan also forecasted that Ontario Hydro's Demand Side Management (DSM) programs would achieve 1,825MW of peak reduction by 1994 and 3,702MW of peak reduction by 2000 in a median load forecast scenario. To provide some context for those targets, the DSP forecasted that peak load would reach 26,900MW in 1994 and 31,100MW in the year 2000 (Ontario Hydro, 1989, p. 7-19).

In describing how Ontario Hydro would meet its DSM targets, the agency's DSP outlined DSM strategies for each of the residential, commercial and

industrial market sectors, and proposed programs and initiatives to achieve electrical load reduction (Ontario Hydro, 1989, p. 7-25). In 1989, Ontario Hydro submitted this Demand/Supply Plan to the Minister of Environment for a public hearing before the Environmental Assessment Board (Ontario Hydro, 1989, p. i).

Energy Efficiency Act, 1990

An important legislative development that occurred in 1990 was the passing of the Energy Efficiency Act, which required products and appliances sold in Ontario to meet minimum energy efficiency standards set by regulation (EEA, 1990, s. 3 (1)(a); O. Reg. 82/95). The Act also specified that such products and appliances must be labelled to confirm their compliance with efficiency standards (EEA, 1990, s. 3 (1)(b)).

1989 to 1993: Ontario Hydro's province-wide conservation programs

While the DSP was being examined in the Environmental Assessment process, Ontario Hydro went ahead with its demand-side management plans. The utility had launched its first four province-wide energy efficiency and DSM programs in January of 1989, and by September of 1992, the utility was running over 30 programs (Ontario Hydro, 1992, pp. 1-3). Most of these programs used a combination of financial incentives, audits, information, and customer services to reduce the cost and risk to consumers associated with making energy efficiency improvements. Residential programs focused on such technologies as low-flow showerheads, light timers, and energy efficient light bulbs, and in commercial and industrial sectors, incentive programs typically offered up to 50% of the incremental cost of adopting energy-reducing measures (Ontario Hydro, 1992, p. 3). Audits and subsidized feasibility studies helped customers assess efficiency and load shifting opportunities, and trade and technical associations were assisted with training and education in electrical efficiency improvements. Ontario Hydro also introduced industrial time-of-use (TOU) rates (Ontario Hydro, 1989, p. 7-25).

Ontario Hydro's DSM/CDM programming met with much success, both in achieving savings and in building CDM expertise within the utility. In its first three years of offering full-scale DSM programs, Ontario Hydro achieved load savings of almost 1000MW (Ontario Hydro, 1992, p. 3). However, in 1993, the last of Darlington's nuclear reactors came online, marking the completion of Ontario Hydro's nuclear megaprojects (OPG, 2010, p. 1; OPG, 2011b; Bruce Power, 2012). However, Darlington had come in massively over-budget (i.e. $9.3 billion in cost-overruns) (OPA, 2005, p. 217). Combined with other factors such as the 1991 economic slowdown and subsequent decrease in energy demand, this saddled Ontario Hydro with an enormous debt. In a 1993 speech to the Empire Club of Canada, then-Chairman and CEO of Ontario Hydro Maurice Strong announced that the utility would be embarking on a massive cost and debt-reduction program, which involved identifying up to $23 billion in capital expenditure cuts, and reducing its workforce by 6000 people (Strong, 1993). In the face of a substantial surplus of electricity supply, a budget deficit

problem and staff reductions, Ontario Hydro cancelled all of its DSM programs (Mallinson, 2011b). By the time the conservation and efficiency programs were shut down in 1993, they had achieved 1200MW in savings on a load of approximately 22,000-23,000MW, which represents a reduction in demand of about 5% (Mallinson, 2011a, 2011b; OPA, 2011g, p. 18).

1992 to 1995: government programs

Following the cancellation of Ontario Hydro's DSM programs in 1993, the provincial Ministry of Energy continued to run a full range of commercial, industrial, residential and transportation programs; however, following the change in provincial government in 1995, these programs were dismantled (Mallinson, 20llb).

1995 to 2002: dismantling Ontario Hydro and creating a wholesale electricity market

Between 1995 and 2003, there were no provincially-run electricity conservation programs (Ministry of Energy, 2010, p. 37). In 1995, the new Ontario government established an Advisory Committee on Competition in Ontario's Electricity System, to investigate and assess the options for phasing in competition in the province's electricity system (MacDonald, 1996, p. ii). The committee's resulting report (called the MacDonald Report for the committee's chairman, Donald. S. MacDonald) recommended that Ontario transition to a competitive electricity system, starting with a competitive wholesale electricity market. Concomitantly, it advocated the dissolution of Ontario Hydro's monopoly on electricity generation (MacDonald, 1996, p. iii).

Energy Competition Act, 1998

In November of 1998, the government passed the Energy Competition Act, which created the Electricity Act, 1998 and the Ontario Energy Board Act, 1998. The Electricity Act set the legal framework for the creation of a competitive electricity market in Ontario (EDA, 2010a) and split Ontario Hydro into five separate entities: Ontario Power Generation Inc. (OPG), Hydro One, the Independent Electricity System Operator (IESO), the Electrical Safety Authority (ESA) and the Ontario Electricity Financial Corporation (OEFC) – with this last entity inheriting Ontario Hydro's $38.1 billion in debt and other liabilities (OEFC, 2010; OEFC, 2008). The Electricity Act also mandated the commercialization of the distribution industry by requiring that municipalities transfer the assets of their electric utilities to municipally-owned, for-profit corporations, which would then be eligible to earn commercial rates of return (EDA, 2010a).

The Ontario Energy Board Act, 1998 outlined the Ontario Energy Board's mandate with respect to electricity and natural gas regulation, and gave the Ontario Energy Board (OEB) responsibility for regulating local distribution companies (LDC's) and all electricity market participants (OEB, 2011f). The OEB Act also made the OEB responsible for setting distribution rates (whereas the power rate portion of electricity rates, which was previously set by Ontario Hydro, would be set by the market) (OEB, 2011f; Strong, 1993). In March of

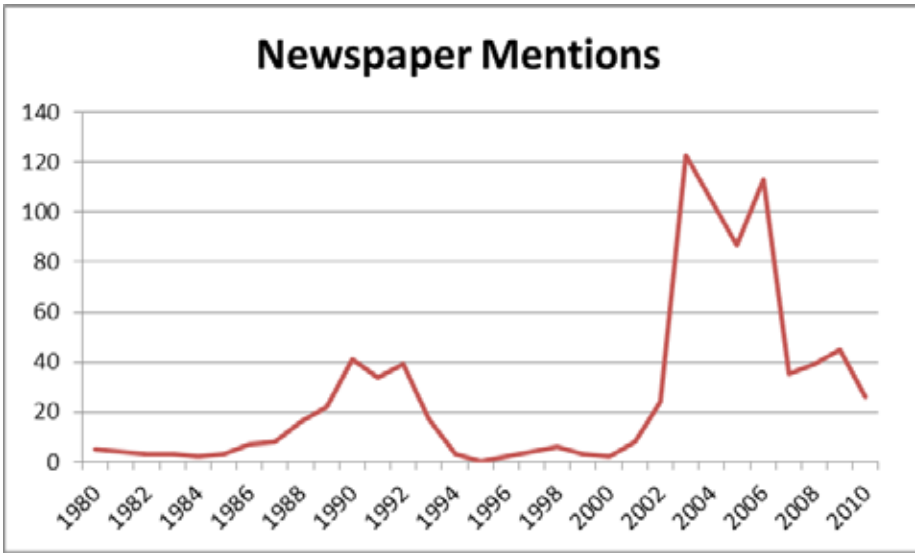
2000, the OEB released an Electricity Distribution Rate Handbook, which set the rules for initially unbundling distribution rates and for making subsequent rate adjustments under the Board's new performance based regulation (PBR) scheme (OEB, 2008).

After four years of work by the electricity industry, the IESO, the OEB, market participants, and the Ontario government, Ontario's electricity market opened on May 1, 2002 (OEB, 2011f).

As described above, the late 1990's and early 2000's was a tumultuous time for energy policy in Ontario, and energy conservation did not feature prominently. For example, in the process of developing its first generation performance based regulation (PBR) and draft Rate Handbook, staff at the Ontario Energy Board determined that since the electric industry was still in a state of flux, and the role of the distribution sector and the issues surrounding DSM not been adequately examined, consideration of DSM should be deferred to the review for the second generation of PBR (OEB, 2000a, p. 55; OEB, 2000b, p. 8-1).

This minimal attention to CDM was characteristic of this period. When the Ministry of Energy was restructured in 1997, for example, (to become the Ministry of Energy, Science and Technology), the Programs and Technology Division, which had been responsible for developing and administering the Ministry of Energy's programs to encourage energy conservation and efficiency, simply ceased to exist (Archives of Ontario, 2009b).

Furthermore, a search of newspaper articles from all the major Canadian daily newspapers from 1995 to 2001 reveals that there were on average fewer than four instances per year when the words electricity, conservation (or efficiency) and Ontario were mentioned in the same article. This compares to an average of more than 28 articles per year between 1988 and 1993 (Canadian Newsstand Major Dailies, 1980-2010).



federal-level policy development from this period that was driven by attention to CDM was Natural Resources Canada's (NRCan's) release of the first Model National Energy Code for Buildings in 1997 (Natural Resources Canada's Office of Energy Efficiency [OEE], 2012, p.1). NRCan's Model National Energy Code for Buildings (MNECB), specified comprehensive minimum energy-efficiency standards for new building construction (The Canada/Manitoba Business Service Centre [CMBSC], 2009; OEE, 2012), and was developed to provide provinces and territories with standards that reflected economically justified thermal performance levels based on regional differences in climate, construction costs, and energy prices (CMBSC, 2009). In 1997, references to the MNECB were added into Ontario's building code as an alternative to designing buildings to the American Society of Heating, Refrigerating and Air-Conditioning Engineers' (ASHRAE) 90.1 – 1989 energy efficiency standards (O.Reg. 403/97, Division B, s. 2.1.1.11, & s. 6.2.1.1 (1)(k)).

Electricity Pricing, Conservation and Supply Act, 2002

As mentioned above, Ontario's wholesale electricity market opened in May of 2002. However, the summer of 2002 was particularly hot and electricity demand skyrocketed, driving up its market price (OEB, 2011f). There was such public outcry over the high price of electricity that by December of 2002, the government did an about-face and passed the Electricity Pricing, Conservation and Supply Act, 2002. This piece of legislation capped the price of electricity at 4.3 cents per kWh for residential, small business, and other low-volume customers (Electricity Pricing, Conservation and Supply Act [EPC&S Act], 2002, ss. 79.4(1), 79.11). The government also retroactively compensated consumers for any payments they had made in excess of 4.3¢/kWh since the opening of the market on May 1st, 2002 (OEB, 2011f).

The Electricity Pricing, Conservation and Supply Act, 2002 introduced several conservation measures. It introduced a year-long provincial tax rebate for the purchase of energy efficient appliances[119] (EPC&S Act, 2002, s. 5. (1)), and specified that providing services related to promoting energy conservation, energy efficiency, and load management was a permitted business activity for local distribution companies (EPC&S Act, 2002, s. 4(9); OEB Act, 1998, s. 73 (1) 9.).

The Act also gave the government the ability to make regulations to require the installation or use of electricity meters "for the purpose of promoting energy conservation, energy efficiency or load management" (EPC&S Act, 2002, s.3 (24); EA, 1998, s. 114(1)(l1)), and gave the Minister of Energy the power to direct the OEB to take steps to promote energy conservation, energy efficiency, and load management (EPC&S Act, 2002, s. 4(4); OEB Act, 1998, s. 27.1(1)).

Finally, the Electricity Pricing, Conservation and Supply Act adjusted one of the purposes of the Electricity Act, 1998 from 'facilitating' to 'promoting' energy conservation, energy efficiency, and load management (EPC&S Act, 2002, s. 3 (1)),and modified one of the OEB's objectives from 'facilitating' to 'promoting' energy conservation, energy efficiency, and load management (OEB, 2011f; EPC&S Act, 2002, s.4(1); OEB Act, 1998, PIT Law, s. 1 (1) 6).

119 (The tax rebate on energy efficient appliances was later given a four month extension (Fiscal Responsibility Act, 2003, s. 17 (3)).

2003 to 2005: rebuilding the electricity system

In 2003, the media was abuzz with talk of energy and the need for conservation in Ontario, with 123 articles that year touching on the subject (Canadian Newsstand Major Dailies, 2003). One concern was the re-emergent threat of electricity demand outstripping supply, which was highlighted on March 3rd, when a cold snap caused the IESO (then the IMO) to issue a "power warning" asking Ontarians to cut back on their electricity use in order to prevent service interruptions like brownouts (Benzie, 2003, p. A5). This concern surfaced again in August when, in the weeks following the August 14th 2003 Blackout that affected Ontario and the US east coast, Ontarians were urged to conserve energy in order to avoid further rolling blackouts (Mackie, 2003, A6). Another issue of concern in 2003 was the idea that artificially low electricity prices under the price cap were not only removing any financial incentive for consumers to conserve energy, and that subsidizing the cost of electricity was driving up the stranded debt being managed by the Ontario Electricity Financial Corporation (Benzie, 2003, p. A5; O. Reg. 435/02, s. 3). In light of these realities, in June of 2003, the provincial government created an Electricity Conservation & Supply Task Force (ECSTF) to develop an action plan for attracting new generation and identifying demand side management mechanisms. The task force was also asked to identify barriers to developing long-term electricity supply and demand management solutions, and to make recommendations on how to enhance the reliability and responsiveness of Ontario's electricity grid (ECSTF, 2004, p. iv).

At the same time, the government also directed the Ontario Energy Board to consult with stakeholders to identify and review options for how to deliver electricity demand-side-management and demand response activities, as well as to review the role of local distribution companies with respect to such activities (Baird, 2003, p. 3). The Board was charged with reporting back to the Ministry with recommendations on how DSM and demand response (DR) activities should be implemented in Ontario's electricity sector in both the short and long term (Baird, 2003, p. 3).

Ontario Energy Board Amendment Act (Electricity Pricing), 2003

On October 2, 2003, there was another provincial election and change of government (Elections Ontario, 2003). In December of 2003, the new government passed a piece of legislation called the Ontario Energy Board Amendment Act, 2003. This legislation allowed the government to introduce a new two-tiered interim electricity pricing structure to replace the 4.3cent/kWh price cap that had been imposed the year before (Ontario Energy Board Amendment Act [OEBA Act],2003, s. 11 (1)). It also called on the OEB to create a new pricing mechanism to ensure reasonable charges for delivering electricity, stipulating that the OEB would determine electricity prices starting May 1, 2005 (OEBA Act, 2003, s. 5 (1); OEB, 2011f).

Electricity Conservation & Supply Task Force report - 2004

In January of 2004, not long after the passing of the Ontario Energy Board Amendment Act, 2003, the previous government's Electricity Conservation & Supply Task Force released its report, entitled *Tough Choices: Addressing Ontario's Power Needs*. Among other recommendations, the report called for the creation of a "conservation culture" in Ontario. Specifically, it recommended that Ontario 1) adopt new market rules to promote demand-side bidding by large volume electricity customers, 2) remove rules that financially penalize local distribution companies for engaging in conservation efforts, 3) promote technologies and electricity rates that facilitate time-of-use shifting, and 4) create a conservation champion to monitor and co-ordinate conservation efforts across the province (ECSTF, 2004, p. ii). In a manner similar to the Porter commission report in 1980, the Electricity Conservation & Supply Task Force report asserted that "demand reduction should be given the opportunity to compete with supply side alternatives, and be evaluated on a level playing field" (ECSTF, 2004, p. ii).

Ontario Energy Board report to the Minister of Energy - 2004

Three months later on March 1, 2004, the OEB submitted its report on electricity demand-side management and demand response to the Minister of Energy. Like the report of the Electricity Conservation & Supply Task Force, the OEB's report recommended creating a conservation agency that would act as a champion for conservation in Ontario. The OEB envisioned such an agency performing several functions, namely: 1) developing a province-wide CDM plan, 2) coordinating efforts with the Ministry of Energy, the IESO, and the OEB, 3) funding and contracting out the design and delivery of CDM programs, 4) setting monitoring and evaluation protocols, 5) contracting for independent audits of CDM activity results, and 6) reporting annually to the Minister of Energy (OEB, 2004d, pp. 2-5). The OEB's report further recommended that CDM programs should be funded through a charge on electricity consumption, and that distributors be allowed to develop and deliver DSM programs for the conservation authority by bidding for contracts on equal terms with other market players. The OEB proposed that it should itself licence the conservation agency, regulate and oversee distributor CDM activities, and take on responsibility for overseeing the province-wide CDM plan, approving the conservation agency's budget, and approving the CDM consumption charges (OEB, 2004d, p. 3). In addition, the OEB recommended that it take on a role providing consumers with more information about CDM and the impacts of their energy choices (OEB, 2004d, p. 5).

Conservation action team - 2004

In response to the issues raised in the Electricity Conservation & Supply Task Force's report, the government formed a Conservation Action Team, comprised of Parliamentary Assistants from nine different Ontario government ministries

(Ministry of Energy, 2004). At this point, the government had committed to replacing all coal-fired generation by 2007 and had determined that 25,000MW, or approximately 80% of Ontario's generating capacity, would have to be refurbished, rebuilt, replaced, or made redundant through conservation by the year 2020 (OEB, 2009a). In this context, the Conservation Action Team was given the task of investigating conservation and demand-side management options, working to identify and remove barriers to conservation in existing government policies and programs, and developing a CDM action plan aimed at reducing electricity use through conservation activities by five per cent by 2007 (Conservation Action Team [CAT], 2005, p. 5). The expressed aim of the Conservation Action Team was to help create a conservation culture and to make demand management a cornerstone of Ontario's energy policy framework (CAT, 2005, p. 4).

Government conservation measures - 2004

Some conservation-driven measures taken by the government in 2004 included updating and adding efficiency standards for several products under the Energy Efficiency Act (O.Reg. 44/04), and extending (by three months) the provincial sales tax rebate on energy efficiency appliances that had originally been introduced in November of 2002 under the Electricity Pricing, Conservation and Supply Act (Budget Measures Act, 2004, s. 16 (1); Retail Sales Tax Act, 1990, s. 9.1 (2) (a); EPC&S Act, s. 5. (1)). The government also acted on the power granted it by the Ontario Energy Board Amendment Act, 2003 to set an interim pricing structure for commodity electricity. The new pricing structure stipulated that after April 1st, 2004, low-volume customers and designated customers would pay 4.7 cents/kWh for electricity up to a conservation threshold of 750kWh/month, after which they would pay 5.5 cents/kWh (O.Reg 42/04).

In April of 2004, in addition to confirming the target of reducing Ontario's peak electricity consumption by 5% by 2007, the Premier of Ontario announced that the provincial government would try to reduce its own electricity consumption by 10% by 2007 (Office of the Premier, 2004). In this same announcement, the Premier announced that the government's conservation plan would include putting smart meters into all Ontario homes by 2010, allowing local distribution companies to invest $225 million in local community-based conservation programs, and creating incentives for LDC's and Hydro One to reduce distribution and transmission losses (Office of the Premier, 2004).

Electricity Restructuring Act, 2004

In June of 2004, the government introduced its Electricity Restructuring Act, 2004 (which would be passed in December). The Electricity Restructuring Act made some major changes to the electricity system in Ontario. It created the Ontario Power Authority for the purpose of conducting independent long-term planning for electricity generation, demand management, conservation, and transmission, through developing integrated power system plans for the province (Electricity Restructuring Act [ERA], 2004, Sched. A, s.29; EA, 1998, Part II.1, s. 25.1, s. 25.2). The Act gave the OPA two conservation-related objectives: 1) engaging in activities that facilitate load management, and 2) engaging in

activities that promote electricity conservation and the efficient use of electricity (ERA, 2004, Sched. A, s. 29; EA, 1998, Part II.1, s. 25.2). The Act also gave the OPA the mandate to enter into contracts to procure demand management measures, at its discretion (ERA, 2004, Sched. A, s. 29; EA, 1998, Part II.1, s. 25.32 (1) (b)), and created a Conservation Bureau within the OPA, that would be headed by a Chief Conservation Officer with a mandate to provide leadership in planning and co-ordinating measures for electricity conservation and load management (ERA, 2004, Sched. A, s. 29; EA, 1998, Part II.1, s. 25.11). Under the Electricity Restructuring Act, the Conservation Bureau was required to submit annual reports detailing its proposals for steps to be taken to promote CDM in the following year, as well as the steps taken to implement the year's current proposals with results achieved. In addition, each report was to include a review of the Government of Ontario's progress in meeting is CDM goals, and a section identifying any government policies or pieces of legislation that were creating barriers to CDM (ERA, 2004, Schedule A, s. 29; EA, 1998, Part II.1, s. 25.11 (4)).

However, perhaps due to the creation of the Conservation Bureau, the Electricity Restructuring Act shortened the OEB's list of electricity-related objectives so that it no longer included promoting energy conservation, energy efficiency and load management (ERA, 2004, Sched. B, s. 1.).

In addition to creating the OPA, the Electricity Restructuring Act also gave the Ministry of Energy the power to set provincial targets for conservation, and to direct the OPA to develop and implement conservation measures, programs and targets (ERA, 2004, Schedule A, s. 34; EA, 1998, PART II.2, s. 25.30 (2)(d)).

With respect to electricity rates, the Electricity Restructuring Act required the IESO and LDC's to make adjustments to their billing and settlement systems to ensure that over time, electricity prices paid by consumers reflected the amounts paid to generators, the OPA, and the OEFC (ERA, 2004, Sched. A, s. 37; EA, 1998, s. 25.33 (1)&(2)). However, for low-volume customers, the OEB was given responsibility for determining fair and reasonable rates through a Regulated Rate Plan, which would come into effect in May of 2005 (ERA, 2004, Sched. B, s. 25; OEB Act, 1998, s. 79.16; O. Reg. 93/05; OEB, 2009a).

2005 to 2007: LCD conservation and demand management "third tranche" programs

The year 2005 was an important one for conservation in Ontario because it marked the re-emergence of utility-run electricity CDM programs after dry-spell of more than a decade. As mentioned earlier, the Electricity Competition Act, 1998 required electrical utilities to become for-profit corporations. Utilities were allowed to earn market-based rates of return of up to 9.88% (OEB, 2000c, p. 3-6). The incremental revenue that a utility required in order to recover this maximum allowable return was called the incremental market adjusted revenue requirement (or 'MARR') (OEB, 2004a, p.1). However, utilities were only permitted to recover this incremental MARR by phasing-in rate increases over three rate-adjustment periods (OEB, 2000c, p. 3-1).

The first and second instalments (or 'tranches') of the incremental MARR were recovered in the 2001 and 2002 rates; however, the government's 2002 rate-freeze prevented utilities from recovering the third instalment (or 'tranche') of their incremental MARR's (OEB, 2004a, p. 1). After the rate freeze was lifted in 2004, the Minister of Energy wrote a letter to all of the LDC's, granting them approval to apply to the OEB for an increase in their 2005 rates to recover the third 'tranche' of their incremental MARR's (OEB, 2011b). However, the recovery of this third tranche was contingent upon each utility investing an equivalent amount of money in conservation and demand management initiatives (OEB, 2004a, p. 1).

Starting in 2004, therefore, LDC's began to submit CDM program plans to the OEB for approval (OEB, 2004a, p. 2). A total of $163 million in CDM funding was approved by the Board for such programs as street and traffic light LED conversions, appliance rebates and exchanges, CFL giveaways, home energy audits, and consumer training and education (OEB, 2009b, pp. 1-6). LDC's were also required to submit annual and quarterly reports (OEB, 2009b, pp. 3-4). Over the three years (2005 to 2007) that the third tranche CDM programs ran, they saved approximately 1,045 GWh of energy and shaved 357 MW off of peak demand (Love, 2008, p. 8).

In addition to CDM programs run by the LDC's, the OPA and IESO also ran their own conservation and demand response programs during the third tranche period. The OPA's portfolio of programs included such initiatives as the Every Kilowatt Counts campaign and the Home Heating and Cooling program, and achieved 598MW of demand reduction (Love, 2008, p. 10). The IESO's demand response/ dispatchable load program achieved and 273MW in peak demand reduction (Love, 2008, p. 10).

The year 2005 was also the year that the government's Conservation Action Team submitted their report (*Building a Conservation Culture*) to the Minister of Energy. The team had consulted with over 300 stakeholders across different sectors of the economy and had emerged with 30 recommendations to respond to the issues and barriers they identified (CAT, 2005, p. 4). Recommendations covered such topics as building a long-term conservation strategy, leading by example, improving codes and standards, and reaching 'hard-to-reach' low-income customers (CAT, 2005, pp. 17-20).

One month after the report was submitted, the government passed a regulation updating energy efficiency standards for such products as stoves, clothes and dish washers, electric water heaters, thermostats, lamp ballasts, and refrigerated display cabinets (O. Reg. 384/05). Further updates to the energy efficiency standards for air conditioners and heat pumps followed in 2006 (O.Reg. 38/06).

By June 2005, the Minister of Energy had begun using the directive power granted him under the Electricity Restructuring Act, 2004. In June and October, the Minister issued directives requiring the OPA to initiate a procurement process for additional demand management, demand response and high efficiency combined heat and power (CHP) for the Toronto area, and to embark on CDM initiatives aimed at increasing appliance and lighting efficiency, as well

as reducing overall electricity and energy use in low-income and social housing (OPA, 2010g).

In 2006, the Minister continued to issue CDM-related directives to the OPA, directing the agency to undertake CDM initiatives aimed at reducing demand by 150MW in both the residential sector and the commercial buildings and MUSH sector (OPA, 2010g). However, the most important conservation directives that the Minister issued to the OPA in 2006 were the supply mix directive issued June 13th, and the CDM programs directive issued July 13th. The supply mix directive called on the OPA to create an integrated power system plan that included 6,300 MW of peak demand reduction by 2025, with an interim target of 1,350MW of peak demand reduction by 2010 - in addition to the existing target of 1,350MW by 2007 (Duncan, 2006a, p. 1).

The July 13th directive instructed the OPA to organize the delivery and funding of province-wide CDM programs through the LDC's, with funding limited to $400 million over three consecutive years following the Third Tranche period (Duncan, 2006b, p. 2). This directive was based on the principles that a) LDC's have a legitimate role in delivering CDM, b) LDC's should be provided with stable multi-year funding to deliver CDM, c) that the relationship between the OPA and LDC's should be managed contractually, and d) that the OPA's Conservation Bureau should manage the overall CDM program design and the evaluation, measurement and verification of program results (Duncan, 2006b, p. 2). It essentially called for the OPA to design and fund CDM programs that would then be delivered by the LDC's under contract.

Energy Conservation Responsibility Act, 2006

The Energy Conservation Leadership Act, 2006 responded some of the Conservation Action Team's recommendations regarding leading by example. The Act created the Energy Conservation Leadership Act, 2006 and made a number of amendments to the Electricity Act, 1998 and the Ontario Energy Board Act, 1998. In addition to introducing provisions to allow government to overrule local bylaws acting as impediments for energy conservation measures (ECLA, 2006, s. 3), the Act permitted the government to require public agencies to prepare energy conservation plans (ECLA, 2006, s. 4) and to consider energy conservation when acquiring goods or services and when making capital investments (ECLA, 2006, s.6).

The amendments that the Energy Conservation Responsibility Act made to the Electricity Act and Ontario Energy Board Act centred on the creation of a Smart Metering Entity to aid the government in implementing its smart metering initiative, which would allow for time-of-use electricity pricing (Energy Conservation Responsibility Act [ECRA], 2006, Sched. B, s. 2; EA, 1998, Part IV.2). The IESO was designated as the Smart Metering Entity in 2007 (O.Reg. 393/07), and by the end of that year, over 1 million smart meters had been installed (surpassing the government's goal of 800,000 smart meters by 2007) (Love, 2008, p. 1).

Also in 2006, the government updated the energy efficiency provisions in the provincial building code so that the new code referenced ASHRAE 90.1 – 2004 efficiency standards and included improved standards for windows and insulation in ceilings and basements[120] (O. Reg. 350/06).

2008 to 2010: post-third tranche OPA-funded conservation programs

In accordance with the Minister of Energy's July 13th, 2006 directive, for the three years following the third tranche period (from 2008 to 2010), distributor-run CDM programs were funded primarily through a $400 million Distributor CDM Fund administered by the OPA and funded through the Global Adjustment Mechanism (GAM). The Distributor CDM Fund funded standard programs designed by the OPA and non-standard programs designed by the LDC's themselves. However, in anticipation that such programs might not be sufficient to allow LDC's to meet the government's CDM targets, LDC's were also given option of applying to the Ontario Energy Board for distribution rate funding for programs uniquely targeted at consumers in a distributor's own service area and employing initiatives not already being delivered to the area by the OPA or any other entity (e.g. line loss reduction initiatives) (OEB, 2007d, p. 6).

Initially, at the beginning of the 2008 rate year (in October of 2007), the OPA was funding only five standard programs for LDC's. However, by the end of 2008, the portfolio of OPA-funded programs had increased to include over 20 program initiatives targeted at residential, business and industrial consumers (OPA, 2010a, p. 3). The results from the OPA's portfolio of programs in 2008 were 386 GWh in energy savings and 387 MW of demand reduction (OPA, 2010i, p. 3).

As it did during the Third Tranche period, from 2007 to 2009, the Ontario Government continued to run various CDM programs. Some examples included a retail sales tax exemption on ENERGY STAR appliances and lights, a Ontario Home Energy Retrofit Program, which partnered with Natural Resources Canada to provide homeowners with grants for undertaking home energy improvements, and the Ministry of Energy's Community Conservation Initiatives, which aimed to raise awareness and foster long term behavioural change through funding to not-for-profit organizations which enhanced their local communities' capacity to conserve (Marbek & Seeline, 2008, pp. 35-40; Ministry of Energy, 2009).

This brings us to the year 2009 when the government of Ontario passed the Green Energy and Green Economy Act, 2009. This Act made several important changes to the policy framework for CDM in the province. Appendix A discusses these changes in detail.

120 Changes for standards in new homes included a 29% increase in ceiling insulation, a 50% increase in basement wall insulation, and a 67% improvement in window efficiency (SHS Consulting, 2010, p. 56).

Appendix C: Assessment criteria

Table C1: Best Practices and Successful Strategies Literature Survey

Report		Description
Title:	*National Action Plan for Energy Efficiency*	The US Department of Energy and US Environmental Protection Agency's *National Action Plan for Energy Efficiency* (2006) summarizes the key findings of a portfolio-level review of many successful and established energy efficiency programs in the United States, and provides an overview of best practices in the areas of target setting, program design and delivery, EM&V, and human and political factors that have led to increased reliance on energy efficiency as a resource. The report's recommendations for best practices with respect to CDM programs included recognizing energy efficiency as a high priority energy resource, making a strong, long-term commitment to cost-effective CDM, broadly communicating the benefits of and opportunities for CDM, and providing sufficient and stable program funding for cost-effective CDM (The Leadership Group, 2006, p. 6-1).
Author:	The Leadership Group, a collection of more than 50 leading electric and gas utilities, state utility commissioners, state air and energy agencies, energy service providers, energy consumers, and energy efficiency and consumer advocates. The work of the Leadership Group was supported and facilitated by the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA).	
Date:	2006	
Title:	*Energy Efficiency/DSM Performance Measurement and Reporting*	Navigant Consulting's report on *Energy Efficiency/DSM Performance Measurement and Reporting* (2006) identifies common characteristics of successful EE/DSM frameworks, based on its evaluation of different combinations of frameworks, programs, and jurisdiction characteristics.
Author:	Navigant Consulting	
Date:	2006	
Title:	*Successful Strategies for Energy Efficiency: A Review of Approaches in Other Jurisdictions and Recommendations for Canada*	The Pembina Institute's *Successful Strategies for Energy Efficiency: A Review of Approaches in Other Jurisdictions and Recommendations for Canada* (2006) reviews six jurisdictions that have succeeded in improving energy efficiency in buildings, and describes the common elements in these jurisdictions' strategies towards acquiring energy efficiency.
Author:	Alison Bailie, Roger Peters, Matt Horne, and Kristin Zarowny of The Pembina Institute	
Date:	2006	
Title:	*A Quick-Start Energy Efficiency Strategy for Ontario*	Pembina's *A Quick-Start Energy Efficiency Strategy for Ontario* (2006) uses the above-mentioned assessment of the best energy-efficiency policy practices in the US and other countries to propose an electricity and natural-gas energy efficiency strategy for Ontario.
Author:	Roger Peters, Stephen Hall, and Mark Winfield of The Pembina Institute	
Date:	2006	
Title:	*Proposed Regulatory Framework for Conservation and Demand Management by Ontario Electricity Distributors in 2007 and Beyond*	A staff discussion paper from the OEB entitled *Proposed Regulatory Framework for Conservation and Demand Management by Ontario Electricity Distributors in 2007 and Beyond* (OEB, 2007c) proposes regulatory treatment of LDC CDM activities that includes clearly defined funding channels for CDM activities, utility revenue protection and performance incentive mechanisms, and defined processes for performing evaluation, measurement, and verification on CDM activities.
Author:	OEB Staff	
Date:	2007	

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Report		Description
Title:	*IEA Energy Efficiency Policy Recommendations to the G8 2007 Summit, Heiligendamm*	The IEA's report provides background on the twelve recommendations for improving energy efficiency that it intended to make to the G8 Summit in Heiligendamm, Germany in June 2007. All of the recommendations met the criteria of being likely to save a large amount of energy at low cost, addressing market imperfections or barriers, addressing a significant gap in existing policy, and being supported by a high degree of international consensus. Their recommendations included the following: • Strengthen building code energy efficiency requirements and invest in monitoring energy efficiency improvement in existing buildings. • Implement mandatory energy efficiency performance standards and energy labelling across the full range of mass-produced equipment and appliances. • Phase out the most inefficient incandescent bulbs as soon as commercially and economically viable. • Improve the coverage, reliability, and timeliness of industry's energy-use data. • Provide adequate resources for energy efficiency policy agencies. • Publish energy efficiency action plans and report progress with implementing energy efficiency actions. • Encourage investment in energy efficiency. (IEA, 2007)
Author:	International Energy Agency	
Date:	2007	
Title:	*Unlocking Energy Efficiency in the U.S. Economy*	McKinsey & Company's *Unlocking Energy Efficiency in the U.S. Economy* (2009) investigates opportunities for greater efficiency in the stationary uses of energy in the US economy, with a focus on identifying past barriers to the capture of efficiency opportunities and evaluating potential measures to overcome such barriers. The report offers five main recommendations for an overarching strategy on how best to pursue energy efficiency opportunities: 1. recognizing CDM as an important energy resource, 2. launching an integrated portfolio of proven, piloted, and emerging approaches to unlocking CDM potential, 3. identifying means of providing significant up-front funding for plans to capture CDM, 4. forging greater alignment between utilities, regulators, government agencies, manufacturers, and energy consumers, and 5. Foster innovation in the development and deployment of next-generation CDM technologies (McKinsey & Company, 2009, pp. iii-iv).
Author:	McKinsey & Company	
Date:	2009	

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Report		Description
Title:	*States Stepping Forward: Best Practices for State-Led Energy Efficiency Programs*	The American Council for an Energy-Efficient Economy's *States Stepping Forward: Best Practices for State-Led Energy Efficiency Programs* (2010), is ACEEE's first-ever awards project for exceptional state-led energy efficiency programs, and not only recognizes exceptional programs, but also extracts and summarizes key features of leading state-led energy efficiency programs
Author:	Michael Sciortino of the American Council for an Energy-Efficient Economy (ACEEE)	
Date:	2010	
Title:	*Review of Demand Side Management (DSM) Framework for Natural Gas Distributors*	Concentric Energy Advisors' *Review of Demand Side Management (DSM) Framework for Natural Gas Distributors* (2010) examined DSM policies and frameworks adopted by regulatory bodies in Canada, the United States, Great Britain, Australia, and New Zealand, in order to critically review, compare, and assess Ontario's DSM framework with respect to best practices in other jurisdictions.
Author:	Concentric Energy Advisors	
Date:	2010	
Title:	CEA Backgrounder: Energy Efficiency/ DSM Performance Measurement and Reporting	In 2009, the Canadian Electricity Association (CEA) was commissioned by the Demand Side Management Working Group to report on effective frameworks for deploying CDM programming. The CEA's report draws on findings and lessons learned from other studies, as well as primary research with utilities and regulators. While it notes the difficulty of identifying 'best' practices due to the diversity of utility ownership, operating and regulatory environments in Canada, the CEA's report offers the following four recommendations for overall good practices with respect to an effective framework for CDM: 1. clearly defining roles and responsibilities for all entities involved, 2. involving knowledgeable stakeholders in program development, taking local energy demand and end uses into account, 3. implementing an appropriate program measurement and verification system, and 4. measuring and reporting on results on a regular basis (CEA, n.d.).
Author:	The Canadian Electricity Association (CEA)	
Date:	n.d.	
Title:	The Report of the Royal Commission on Electric Power Planning	The Porter Commission (after Commission Chairman Arthur Porter), produced a report in 1980 recommending that "future planning philosophy should be reoriented to emphasize demand management increasingly rather than maintain the focus on supply expansion, as is traditional" (Porter, 1980, v.1, p. xvii). The Porter Commission report further recommended that 1. the Ministry of energy should establish long range energy efficiency goals for industry, 2. the government should enact mandatory heating, insulation, and lighting standards for new residential and commercial construction, 3. that legislation should be enacted to put into effect progressively stricter efficiency standards for all major energy-consuming appliances, and 4. that the government should provide direct loans and other economic incentives to finance the retrofitting of houses, multi-unit residences, and commercial buildings with conservation equipment (Porter, 1980, v. 1, pp. 142-143).
Author:	The Royal Commission on Electric Power Planning (A.K.A. the Porter Commission after chairman Arthur Porter)	
Date:	1980	

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Report		Description
Title:	*Building a Conservation Culture*	In 2005, the Ontario government's Conservation Action Team submitted its report to the Minister of Energy. The report outlined 30 recommendations for government with respect to creating a culture of conservation and making demand management the cornerstone of Ontario's long-term energy policy framework. The team grouped their recommendations under four categories: 1) Building a long-term conservation strategy, 2) Leading by example, 3) Improving codes and standards, and 4) Reaching 'hard-to-reach' consumers and those most vulnerable to rising energy costs. Under the category of building a long-term conservation strategy, the report recommended developing robust estimates of economic and market potential for conservation to inform both government target setting and LDC CDM programs, assessing the effectiveness of LDC conservation programs and performance incentives, pursuing sector-specific strategies, and working with industry and trade associations (CAT, 2005, pp. 16-19).
Author:	Conservation Action Team	
Date:	2005	
Title:	*California Energy Efficiency Strategic Plan: January 2011 Update*	California's Energy Efficiency Strategic Plan asserts that California's success in driving investment in energy efficiency has been enabled by a comprehensive policy framework that supports such investment. The plan identifies the following four elements as the foundation upon which an aggressive scale-up of energy efficiency can be built: 1) clear policy direction to make conservation California's first priority among energy resources and to set specific savings goals; 2) adequate funding for CDM through a public goods charge, the provision of performance-based incentive mechanisms to encourage utility investment in CDM, and financial mechanisms to decouple utility sales from revenues; 3) robust government oversight of CDM activities, including program evaluation, measurement and verification of claimed energy savings; and 4) the establishment of minimum energy efficiency standards for buildings and appliances that are regularly ratcheted upwards (CEC, 2011, p. 2).
Author:	California Energy Commission	
Date:	2011	
Title:	TOUGH CHOICES: Addressing Ontario's Power Needs - Final Report to the Minister	The Electricity Conservation and Supply Task Force consulted with more than 90 experts over a period of six months, and called for the creation of a "conservation culture" in Ontario. The following were included among its many recommendations: 1. Adopt new market rules to promote demand-side bidding by large volume electricity customers, 2. Remove rules that financially penalize local distribution companies for engaging in conservation efforts, 3. Promote technologies and electricity rates that facilitate time-of-use shifting, and 4. Create conservation champion to monitor and co-ordinate conservation efforts across the province (ECSTF, 2004, p. ii).
Author:	Electricity Conservation and Supply Task Force	
Date:	2004	

Table C2: Assessment Criteria Scorecard

Treating CDM as a priority resource in energy planning		
1.	Is CDM recognized and treated as a resource in energy policy?	
2.	Is CDM integrated into energy planning and given priority over other energy resources?	
3.	Does the framework set aggressive and binding targets for both energy (GWh) and demand (MW) savings?	
4.	Does Ontario have a clearly defined CDM strategy and action plan with milestones?	
Making a long-term commitment to CDM		
1.	Is long-term, rate-based funding for CDM provided?	
2.	Is funding provided for the research and development of new energy-saving processes and technologies?	
3.	Do building codes and appliance standards have regular review cycles?	
4.	Are CDM players who design and delivery CDM programs provided with sufficient policy stability to make long term plans and investment decisions?	
5.	Are there processes in place to change and update CDM plans as information, technologies, and circumstances change over time?	
6.	Does the framework support market transformation as a long term policy goal?	
6.1	Is responsibility for market transformation assigned to an appropriate entity?	
6.2	Is the OPA's strategic approach to CDM explicitly market transformation-oriented?	
6.3	Do the metrics used to set targets and measure success encourage market-transformation-oriented activities?	
6.4	Do tests used to screen programs for inclusion in CDM program portfolios encourage market transformation-oriented activities?	
6.5	Has the framework produced a portfolio of CDM programs that emphasizes market transformation-oriented activities?	
Clearly defining roles and responsibilities		
1.	Are the roles of the different CDM players clearly defined?	
2.	Are the roles defined in the framework appropriate for the players involved?	
3.	Does the framework facilitate cooperation between the various CDM players?	
4.	Does the framework include processes for incorporating the input of key stakeholders?	
Aligning funding and incentive structures with policy objectives		
1.	Is adequate funding provided to achieve the targets that have been set?	
2.	Does the framework provide utilities with incentives for meeting and exceeding CDM targets, and remove disincentives for engaging in CDM?	
3.	Do electricity pricing policies send price signals to customers to engage in CDM?	
4.	Does the framework attempt to address financial barriers to customers investing in CDM (e.g. high first costs and inability to access capital)?	

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Offering a comprehensive portfolio of CDM programs		
1.	Has the framework produced CDM programs that cover all sectors and geographic areas in the province?	
2.	Has the framework produced programs targeted at hard-to-reach customer segments like low-income consumers, First Nation communities, and very small business customers?	
3.	Does the framework encourage the development of innovative programs?	
4.	Does the framework produce programs tailored to local markets using information about local users, energy end-uses and market conditions?	
5.	Does the framework clearly define which activities and programs qualify to meet the targets?	
6.	Does the policy framework allow participation in CDM programs to be simple?	
Performing Evaluation, Measurement, & Verification (EM&V) on CDM activities		
1.	Does Ontario have well-defined protocols for tracking, evaluating, verifying, and reporting on program results?	
2.	Are these protocols applied consistently across the province and updated regularly?	
3.	Does an audit office review and report on energy savings?	
4.	Do cost-effectiveness tests and performance metrics assign value to program results in a manner that is consistent with social and environmental policy objectives?	
5.	Is the budget and time devoted to EM&V activities appropriate?	

Appendix D: Miscellaneous supplementary information

Section 1: The overly prescriptive nature of the OPA's program schedules

That the existing policy framework treats all LDC's as if they have very little experience in delivering CDM programs can be seen in the overly prescriptive nature of the Master Agreement and program schedules, which define how LDC's are to deliver the OPA's standard programs so specifically that they read like instructions manuals geared towards readers who have never delivered CDM programs before. This is particularly true of the industrial program schedules (e.g. Schedule D-1 (OPA, 2011u, p. 9)). For example, the Process and System Upgrade Initiative schedule is 195 pages long, and in a section of the schedule describing incentives to be provided for engineering studies, the program schedule specifies the following:

> "*During the review of the Application, the LDC will arrange for appropriate communication between the Technical Reviewer and the Applicant, or the Technical Reviewer will communicate directly with the Applicant, if the Technical Reviewer requires contact with the Applicant on any aspect in relation to its review*." (OPA, 2011u, p. 9)

This is essentially a long-winded and very specific way of saying "reviewers should communicate with applicants as needed during the application review process," which really goes without saying. It is just one example of the unnecessarily prescriptive level of detail included in the program schedules. Another example is found in the standard Project Incentive Contract included with the Process and Systems Upgrades Initiative (Schedule D-1); the program participation contract is 48 pages long – not counting the 11 schedules attached to the contract (OPA, 2011u, pp. 70-117).

The excessive detail and lack of implementation flexibility found in the program schedules also extends to the Master Agreement's stipulations about how program funding is to be spent. The current Master Agreement's section on funding and incentive structures is more than twice as long as the same section in the previous Master Agreement under the 2008-2010 policy framework[121],

and unlike the previous contract, divides funding payments into amounts specifically designated for program administration, participant-based activities, participant incentives, and capability building activities (OPA, 2011j, pp. 18-24).

The excessively prescriptive level of detail in the Master Agreement and Program Schedules pertaining to both how programs are to be implemented and how program funding is to be spent does not allow LDC's a lot of flexibility or creativity in how they deliver the OPA's programs. It also implies a lack of trust in LDC's ability to appropriately manage the implementation of the OPA's programs, which has the potential to contribute to a feeling of ill-usage on the part of LDC's, many of which have experience successfully designing and delivering CDM programs without OPA assistance.

Section 2: The CDM code's non-duplication rules

2.3.3 CDM Programs that will be considered duplicative of OPA-Contracted Province-Wide CDM Programs include, but are not limited to, CDM Programs that have:

a) different customer incentive levels on products or services already offered through the OPA-Contracted Province-Wide CDM Programs;

b) different qualification requirements to receive customer incentives or services already offered through the OPA-Contracted Province-Wide CDM Programs;

c) different technology specifications for technologies already incentivized or utilized through the OPA-Contracted Province-Wide CDM Programs;

d) different marketing approaches for promoting customer incentives or services already offered through the OPA-Contracted Province-Wide CDM Programs; and

e) different budgets for delivering customer incentives or services already offered through the OPA-Contracted Province-Wide CDM Programs.

(OEB, 2010c, pp. 8-9)

121 Where the OPA's previous Master Agreement with the LDC's under the 2008-2010 policy framework devoted only three of its 44 pages to payment terms and required LDC's to submit proposed program budgets and invoices for the costs of activities and materials (OPA, 2008a, pp. 17-19), the current 2011-2014 Master Agreement devotes seven of its 96 pages to funding and incentive structures (OPA, 2011j, pp. 18-24).

Section 3: A brief history of applications for board-approved programs under the current CDM policy framework

The only LDC's have submitted applications for Board-Approved programs to the OEB under the existing policy framework: Hydro One (and Hydro One Brampton), and Toronto Hydro (OEB, 2011c).

Hydro One submitted an application for six proposed Board-Approved programs on Nov. 1, 2010 (OEB, 2011g, p. 1; OEB, 2011c). On March 8, 2011 (more than four months later) the Board issued an order in which the OEB determined 1) that the application could not proceed until Hydro One had developed complete EM&V plans for its six proposed programs, and 2) that whether or not the OPA's CDM programs had been established was still an open question, and thus, the OEB could not determine whether Hydro One's proposed programs were duplicative of the OPA's programs. The Order required Hydro One to submit (within the next ten days) completed evaluation plans for each proposed program and a table describing the similarities and differences between its proposed programs and the OPA's standard programs in order to establish that the proposed programs were not duplicative of OPA's programs (OEB, 2011g, p. 5). Hydro One responded by withdrawing its application for board approved programs altogether, citing as reasons, the utility's concern that it would take considerable time to move EM&V plans for its proposed programs from the draft stage to completion, as doing so would require additional work to further develop the programs, as well as the utility's concern that the OEB did not consider the OPA's programs to be sufficiently "established, described and taken up" for the Board to be able to determine whether Hydro One's proposed programs were duplicative of the OPA's programs (HONI, 2011, pp. 1-2).

Toronto Hydro was the second LDC to submit an application for Board-Approved Programs, which it did on January 10, 2011 (OEB, 2011d, p. 1). On July 12th, 2011 (more than six months later), the OEB issued a decision that deemed Toronto Hydro's nine proposed programs to be duplicative of the OPA's programs and declined the utility's request for $56.3 million in funding for them. Instead, the OEB offered Toronto Hydro $5.32 million in funding for 18-month 'test program' versions of two of its proposed programs (OEB, 2011d, pp. 2, 30). In response to the OEB's decision, Toronto Hydro issued a letter stating that 'test program' versions of its programs would be uneconomic to implement and would not materially contribute to meeting the LDC's targets, and so Toronto Hydro would not pursue such test programs but would rather work with the OPA to develop the programs in its application into standard province-wide programs ("Tier 1 programs") (THESL, 2011b, p. 1). Several LDC's were waiting to see what would happen with Toronto Hydro's application before deciding whether to apply for Board-Approved programs themselves (Mallinson, 2011f); however, since the OEB's decision on Toronto Hydro's application, no further applications for Board-Approved CDM programs have been submitted to the Board (OEB, 2011c) - nor are any more applications likely to be forthcoming, given the length of time currently left in the four-year period covered by the CDM Code.

Section 4: Technical potential, economic potential, and achievable potential

One thing that is important to define when talking about capacity or potential for conservation savings, is what is meant by potential. Studies examining conservation potential often perform calculations to ascertain *technical potential*, *economic potential*, and *achievable potential*. *Technical potential* can be understood as the savings that would be achieved by immediately implementing all technically feasible energy efficiency measures, regardless of cost (ICF, 2005, p. 9). *Economic potential* can be understood as the portion of the technical potential that is cost-effective (according to whichever cost-effectiveness test is used for screening, usually a TRC test) (ICF, 2005, p. 9). Finally, *achievable potential* can be understood as those savings that can realistically be expected to result from a particular set of policy and programming interventions over a particular timeframe - this is over and above the savings attributable to existing CDM programs and normal consumer and market behaviour (ICF, 2005, pp. 26-27).

Achievable potential is typically lower than economic potential because it recognizes that even when measures are cost-effective, they may not be immediately adopted. For example, equipment is only likely to be replaced once it has reached the end of its useful life, and the level of CDM uptake by consumers in response to policies and program interventions depends on many factors, and so is unlikely to be 100%. Nevertheless, because calculations of achievable potential are dependent upon assumptions about a particular set of policy interventions, it is theoretically possible that an achievable potential calculation for a scenario involving very aggressive policy interventions might exceed the economic potential calculated for the same market (e.g. if the government incentives were so large as to make previously un-economic CDM projects economically viable).

So, when comparing CDM targets to CDM potential estimates, which estimates does it make the most sense to use in the comparison? If CDM interventions are likely to have to pass a cost-effectiveness test to justify government funding (which is usually the case), then it makes sense to compare targets to estimates of economic potential rather than technical potential. Similarly, if one is interested in CDM potential over an extended period of time, it makes sense to compare CDM targets to estimates of achievable potential.

However, estimates of achievable potential depend on many factors, one of which is the demand forecast used, as the higher the forecasted demand, the greater the potential for conservation savings (OPA, 2011i, p. 7). One way to compare conservation targets and conservation potentials calculated using different demand forecasts is to express a target or potential estimate as a percentage of a demand forecast rather than in terms of TWh of energy or MW of peak demand. In such a way, it becomes possible to compare the conservation targets and potential estimates calculated using different demand forecasts or for jurisdictions that have vastly different electricity loads (ICF, 2005, p. 15).

Section 5: Revenue decoupling and performance incentive mechanisms

Revenue decoupling mechanisms

Lost revenue adjustment mechanisms (LRAM's) require utilities to calculate both their projected electricity sales and the reduction in sales caused by their CDM programs. Utilities can then apply for compensation for the reduction in distribution rate revenue attributable to their CDM activities (Lowry & Makos, 2010, p. 4).

True-up plans, on the other hand, typically do not require utilities to calculate the amount of distribution rate revenue lost as a result of CDM activities, but rather, simply make use of variance accounts to periodically true-up differences between the revenue that a utility actually recovers from its customer base and a utility's approved revenue requirement (OEB, 2011k, p. 2). (Revenue requirement refers to the regulated allowable level of revenue that a utility is allowed to recover from its customers. The revenue requirement typically specifies that a utility is allowed to earn a particular return on investment over and above covering its costs with respect to providing consumers with electricity).

A third option, **straight variable pricing** (SFV) is an approach to rate design that uses fixed charges to recover fixed costs (i.e. most of the distribution costs) and volumetric charges to recover costs that vary with system use (e.g. energy charges) (OEB, 2011k, p. 2).

Performance incentive mechanisms

Performance target incentives allow a utility to earn financial rewards based on their performance in achieving CDM targets. Depending on the target(s) and performance metric(s) being used, incentives may be calculated in terms of $ per kW (or kWh) of savings achieved, or in $ per number of contractors trained, number of low-income houses audited, etc.. Incentives are typically only paid after a utility achieves some minimum portion of its savings target(s) (e.g. 70%), and then are capped at some level above the savings target(s) (e.g. 130% of targets) (NAPEE, 2007, p. 6-3).

Rate of return adders (also called enhanced rate of return incentives) allow utilities to collect an increased rate of return on CDM investments, or collect a bonus return on total equity investment as a reward for superior performance in implementing CDM programs (Kushler & York, 2010; NAPEE, 2007, p. 6-11).

Shared savings incentive mechanisms (SSM's) measure the net economic benefits that result from a utility's CDM activities (often calculated from the utility's avoided costs, as determined by a cost-effectiveness test), and allow the utility to receive an incentive equivalent to a percentage of those net benefits (NAPEE, 2007, p. 6-4). As with performance target incentives, SSM's typically only start calculating incentives once a utility has achieved a certain percentage of their CDM targets, and stop being calculated once a utility reaches a certain threshold above their CDM targets. Some incentive mechanisms will also involve penalties for failing to reach targets (NAPEE, 2007, p. 6-4).

Section 6: Dynamic Electricity pricing schemes

Time-of-use electricity pricing (TOU)

Time-of-use (TOU) electricity pricing refers to pricing schedules that make electricity more expensive during the times of day when demand is highest and electricity is most expensive to provide. Like research on the influence of price on electricity use, studies on time-of-use electricity pricing show that TOU rates can significantly alter consumers' electricity consumption. For example, a 2010 survey of North American studies on time-varying electricity pricing by Newsham & Bowker found that simple TOU programs can be expected to reduce on-peak demand by about 5% (Newsham & Bowker, 2010, p. 3294). Similarly, a survey of 15 mostly North American dynamic pricing experiments by Faruqui and Sergici (2010) put the figure between 3% and 6% (p. 221). The findings of these surveys are consistent with the results of a residential time-of-use rate experiment implemented by Ontario Hydro between 1982 and 1988, which assessed the responsiveness of 500 households to 14 different time-of-use rate treatments. This six-year rate experiment led Ontario Hydro to conclude generally that time-of-use rates really do make a difference in residential load shapes, and that three-part TOU rates can be very effective in achieving peak reductions if the peak:mid-peak:off-peak ratios are fairly large (e.g. 8.4¢:3¢:1.4¢, or 6:2.14:1) (Mountain, 1993, pp.190-191, 199). More specifically, the study revealed that a peak:off-peak price ratio of approximately 4:1 resulted in an almost 7% reduction in January peak demand (Mountain, 1993, p. 199).

Critical peak electricity pricing (CPP)

Critical peak pricing (CPP) is an electricity pricing regime that allows utilities to replace customers' default "normal" electricity pricing schedules (e.g. tiered rates or TOU pricing) with considerably higher prices during those few hours in the year when demand is the highest (EPRI, 2008, p. 5). According to Faruqui and Sergici's review of dynamic electricity pricing experiments, critical peak pricing is even more effective than time-of-use pricing with respect to inducing customers to shift their electricity use to non-peak periods – resulting in an average reduction in peak demand of 13–20%, compared to TOU pricing's 3-6% drop (Faruqui & Sergici, 2010, p. 221). Interestingly, Faruqui and Sergici also found that the use of enabling technologies like programmable two-way communicating thermostats and air conditioner-cycling switches substantially increased the demand response impacts of critical peak pricing – pushing peak reduction into the 27-44% range (Faruqui & Sergici, 2010, p. 216). This finding is similar to that of a 2007 Hydro One TOU pilot which found that in-home displays (enabling devices) augmented load-shifting when combined with TOU pricing (causing a 5.5% peak reduction as opposed to 3.7% with TOU rates alone), and that in-home displays actually resulted in greater reductions in overall energy use than time-of-use pricing (Faruqui, Sergici, & Sharif, 2010, pp. 1603-1604).

Section 7: How electricity pricing works in Ontario

Ontario has a hybrid market/regulated-non-market electricity system where different classes of consumers pay for electricity differently[122]. Ontario electricity consumers can be divided into three basic categories based on how much electricity they consume. Large volume consumers (i.e. industrial customers with demands greater than 5MW who are connected to the grid through the transmission lines) participate in Ontario's electricity market by either placing bids or paying the wholesale hourly Ontario energy price (HOEP).

Medium volume consumers (i.e. businesses with demands between 50kW and 5MW who are connected to the electricity grid through the distribution lines) pay wholesale prices for electricity – that is the HOEP for customers with interval meters capable of tracking hourly usage data, or a weighted wholesale price calculated by the LDC if a business does not have an interval meter (IESO, n.d.b).

Finally, low volume consumers (i.e. small businesses and residential customers who draw less than 50kW of power from the grid) pay for electricity usage through the regulated price plan (RPP), either under a tiered pricing structure (for consumer who do not have smart meters) or a time-of-use (TOU) pricing structure (for those who do have smart meters). The RPP rates are set by the OEB and updated every six months (IESO, n.d.e), and they include not only the market-derived commodity price for electricity, but also what is referred to as the "Global Adjustment" or GA. The Global Adjustment is a charge that accounts for the difference between the prices paid for electricity in Ontario's electricity markets and the prices actually paid to generators. In Ontario, although a portion of the electricity supply is paid for through payments to generators at prices determined in Ontario's electricity market, the price paid to generators for most of the electricity supplied in Ontario is determined either by regulation (i.e. the OEB-regulated rates paid for power from OPG's nuclear and baseload hydroelectric facilities), or by contracts (e.g. the OPA's contracts for power from such sources as new gas-fired facilities, wind farms, or conservation and demand management programs, and the former Ontario Hydro's contracts for power from non-utility generators, which are currently administered by the Ontario Electricity Financial Corporation) (OEB, 2011i, p. 9). As a result, the price consumers pay for electricity under the RPP depends on a combination of the market-determined commodity price for electricity, the cost of electricity contracts between generators and the OPA or generators and the former Ontario Hydro, and the regulated rates for electricity generation set by the OEB (IESO, 2012c).

122 Electricity consumers of all classes may also enter into retail contracts; however, such contracts will not be discussed here.

Large volume and medium volume consumers also contribute to the Global Adjustment, but they pay for the GA through charges as opposed to having the GA embedded in their electricity generation rate, as with low-volume consumers. Medium volume consumers pay a monthly global adjustment charge based on their monthly electricity use (IESO, 2012d; IESO, 2012c; IESO, 2011a), and large volume consumers are charged a percentage of the Global Adjustment based on their contribution to Ontario's five highest demand peaks in the previous year (IESO, 2012e; O. Reg. 398/10 amending O.Reg. 429/04). In this way, the Global Adjustment (and thus the full cost of electricity generation) is passed on to all electricity consumers (OEB, 2011i, p. 10).

The above discussion has focused exclusively on the price for electricity generation, but the charges on an electricity consumer's bill reflect not only the costs of generating electricity (i.e. the commodity price of electricity), but also the costs of transmitting and distributing electricity. As with the commodity price for electricity, different classes of consumers also pay for transmission and distribution costs differently. Low-volume RPP customers pay a delivery charge that includes transmission and distribution charges - some of which are fixed and some of which vary according to how much electricity they consume (IESO, n.d.c). In contrast, large volume and medium volume consumers pay transmission and distribution rates based on their peak demand rather than their overall use of electricity (IESO, n.d.a; IESO, 2011a). In addition, all customer classes also pay a collection of other fees for such things as administration of the electricity markets, regulatory charges, and service charges (IESO, n.d.a; IESO, n.d.c; WNHI, n.d.).

Section 8: Conventional and alternative financing options for CDM

Numerous studies have observed what appears to be an 'energy-efficiency gap' in the marketplace, meaning that energy users seem to implement energy saving measures at rates far below what would be expected given the cost-effectiveness of those measures (Weber, 1997, p. 833; Brown, 2001, p. 1198; Howarth & Andersson, 1993, p. 263). Several barriers contributing to this gap have been identified by such studies: among them, the high upfront costs of implementing energy-saving measures, and the lack of access to affordable financing (Fuller, 2009, p. 23; Persram, 2011b, pp. 10-12).

Up-front costs

Energy efficient products and services typically cost more than their standard efficiency or low-efficiency counterparts, which acts as a barrier to investment in CDM measures (Zhao et al., 2012, p. 296). One method of reducing the initial outlay of capital required to implement conservation measures is to provide financial incentives that cover some or all of the cost of purchasing an energy efficient product or service. Financial incentives can take different forms, such as tax credits, purchasing rebates, or grants (Zhao et al., 2012, p. 292). While research indicates that willingness to invest in energy-savings measures varies

with the type of measure and with the size of the incentive being offered (Zhou et al., 2012, p. 294)[123], generally, studies show that financial incentives do increase pace of investment in CDM measures (Stern et al, 1985, p. 136). This makes a case for programs that provide incentives to offset or eliminate the incremental cost of energy-saving products and services.

Lack of access to affordable financing

Financing allows the electricity consumer to spread the cost an investment in CDM measures over time, thus reducing the size of the initial capital outlay required. However, lack of access to affordable financing is consistently identified as a major barrier to increased engagement in CDM projects like building retrofits to increase energy efficiency (EVO, 2009; Morrison Park Advisors, 2010; Rodney Wilts, personal communication, Dec. 2, 2010; Persram, 2011b, p. 1; Porter, 1980, v. 1, pp. 142-143). To understand why this is the case, a brief discussion of conventional options for financing energy-saving retrofits would be useful.

Conventional financing options

One financing option for building retrofits is **cash, or owner self-financing**, where a building owner pays for a CDM measure up-front. The problem with this option is that retrofits can be expensive, and sufficient capital may not be readily available[124]. Another option is a **real estate mortgage**, wherein the building owner takes out a new or second mortgage on the property to be retrofitted, or refinances an existing mortgage so the cost of the retrofit is added on to it. However, this ties up a building owner's equity capital, putting the energy efficiency retrofit into competition with other potential uses of the equity which may yield shorter payback periods and higher internal rates of return (Morrison Park Advisors, 2010, p. 7). A third conventional financing option is an **unsecured commercial loan** from a bank or other financial institution, which has the advantage of not tying up a building owner's equity because it doesn't require a building owner to put forward collateral. However, such loans tend to have high interest rates[125], and if a retrofit project has a long payback period, a high interest rate can make an otherwise viable project unprofitable (Morrison Park Advisors, 2010, p. 7).

Alternatives to conventional financing

One alternative method of financing an energy savings project is to enter into a performance contract with an Energy Services Company (ESCO). In this type of arrangement, an ESCO finances and implements an energy-saving measure and

123 This observation is consistent with the views of some behvioural theorists, who suggest that incentives may also function as attention-getting devices, so the size of the incentive needs only to be large enough to attract attention to the need for the CDM measure (Stern et al, 1985, p. 135). This could account for different CDM measures of equivalent economic benefit needing different incentive levels to induce uptake.

124 For example, energy efficiency retrofits for high rise MURBs can cost in the millions of dollars, (Morrison Park Advisors, 2010, p. 9), and most building owners simply do not have that kind of money available to spend.

125 Energy saving retrofits are typically undertaken as "paid from savings" projects, which means that the cost project is repaid using the energy savings that result from the retrofit. However, banks and financial institutions tend not to view such savings as equivalent to a new revenue stream that can be used to pay off a loan, so they typically consider loans for energy saving retrofits relatively risky and thus charge higher interest rates on them (EVO, 2009, p. 1).

is paid for its services out of the savings delivered to the client by the project (Kaiser, Olatubi & Pulsipher, 2005, p. 873). ESCO's will typically guarantee a client a level of savings that will be sufficient to cover the capital and financing costs of the project. However, this model still depends on ESCO's being able to access commercially attractive financing, which is not always the case for ESCO's that are not large diversified consulting firms[126].

One potential policy option for governments wishing make financing energy-saving projects more affordable is to offer **grants** and or **subsidies** to offset loan interest payments (Zhao et al., 2012, p. 292). As essentially 'free' money, such subsidies are attractive from a building owner's point of view, but they rarely cover the full cost of the retrofit, and so have to be combined with other financing options (Government of Ontario, n.d.).

Therefore, another policy option to address this issue is for governments to make low-interest or no-interest loans available to building owners[127]. **Government loans** are attractive because they usually don't tie up a building owner's equity by requiring security, and they give the building owner access to the lower interest rates at which governments are able to borrow (Morrison Park Advisors, 2010, p. 8). However, direct government financing can be very expensive for governments, so these financing options tend to be unattractive from the government's point of view.

Credit-enhanced **capital pools** present an alternative to direct government financing. Money for a capital pool can be raised through the sale of government bonds and then loaned to building owners at a rate higher than (or equal to) the interest rate paid to bond-holders (Morrison Park Advisors, 2010, p. 26). Examples of the use of capital pools to fund loan programs for projects with public benefits include New York State's Clean Water State Revolving Fund (which provides municipalities with low-interest rate financing for water quality protection projects) (NYSEFC, n.d.), and Louisiana's state Energy Fund (which provides publically funded institutions with low cost, tax exempt financing for energy and water conservation projects) (Kaiser et al., 2005, p. 873).

Property-assessed financing is another alternative approach to financing. Under such arrangements, property owners receive financing for energy-saving retrofits from their local municipalities and then pay back the cost of the retrofits through increases on the property tax bill in the form of local improvement charges (LIC's). Because property-assessed financing is associated with the property, long term loans can be transferred to a new property owner if a property is sold before the cost of the retrofit has been repaid (Persram, 2011a, p. 29).

Utility-based financing arrangements are another option. In these types of arrangements, called 'on-bill financing', the building owner enters into a financing arrangement with his or her electric (or gas) utility whereby the utility

126 In addition, energy performance contracts with ESCO's have typically been limited to the public sector (i.e. municipalities, universities, schools and hospitals – the MUSH sector) (Fulton et al., 2012, p. 33).

127 Research suggests that CDM programs which offer zero-interest loans will see a higher proportion of program participants taking advantage of the loans than with CDM programs that only offer low-interest loans (Stern et al, 1985, p. 135).

provides financing and sets the rate of repayment to correspond with the expected energy savings to be achieved by the retrofit (Morrison Park Advisors, 2010, p. 23). Because such financing is tied to the utility meter rather than the utility customer, the loans may also be transferred to a new owner or occupant in the case of a change in ownership or occupancy.

Section 9: How much time and energy is appropriate to devote to EM&V activities?

There is no hard and fast rule for determining how much time and money to devote to EM&V activities for CDM programs. What is appropriate can vary widely between programs because many factors contribute to determining what allocation of resources to EM&V activities is appropriate (including but not limited to the type of program or policy being evaluated, the type of evaluation being undertaken, the level of detail and accuracy required, the overall program budget, as well as the size of the savings expected from the program) (TechMarket Works, 2004, pp. 75-76; EVO, 2012, p. 44).

According to the state of California's Evaluation Framework for energy efficiency programs, there is no single specific percentage of a program's budget that should be allocated for EM&V activities, but rather, appropriate allocation of funding to EM&V budgets depends strongly on the type of program being evaluated. For example, the EM&V budget for a pilot program testing new designs or delivery concepts might match or even exceed the budget for running the pilot program because such a level of funding could be necessary to determine whether to expand the pilot into a full, multi-year program. On the other hand, a program that has been run successfully for a number of years in a well understood environment, and which has been evaluated several times before, may only require an EM&V budget equivalent to 2% of the overall program budget (TechMarket Works, 2004, pp. 75-76). In California's experience, however, most projects fall between these two extremes, and as a general guideline, this leading state suggests that adequate EM&V budgets tend to be between four and ten percent of a program's budget (TechMarket Works, 2004, p. 76).

On the other hand, the Efficiency Evaluation Organization's 2012 International Performance Measurement and Verification Protocol (IPMVP) asserts that an EM&V budget should be based on a program's projected savings rather than a program's budget, and should generally be lower than 10% of expected savings[128] (EVO, 2012, pp. 44-45).

128 To illustrate, EVO gives the example of a project with an expected savings of $100,000 per year. If a basic approach to EM&V costs $5,000/yr (5% of expected savings), but only estimates energy savings with a precision of ±$25,000 per year with 90% confidence, it might be reasonable to increase the EM&V budget to $10,000/year (10% of the savings) in order to achieve to achieve a greater precision of ±$7,000 per year, but would likely not be reasonable to increase the EM&V budget to $20,000/year (20%) in order to achieve the same precision (EVO, 2012, p. 45).

In terms of the time it takes to conduct EM&V evaluations, that too depends on several factors, including the type of project being evaluated, what type of evaluation is being undertaken, how long it will take to collect the data necessary to verify that energy savings have occurred, and when the evaluation results are needed in order to inform decision-making (EVO, 2012, p. 12; Barnes, 2006, p. 20). One of the factors that is very influential in determining how soon EM&V results can be determined and reported is the length or the energy savings reporting period associated with the CDM program. EVO recommends reporting on energy use following the implementation of a CDM measure for at least one full normal operating cycle of the equipment or the facility that has been the subject of the CDM measure (EVO, 2012, p. 12). For example, evaluating the impacts of a home weatherization program might require collecting a year's worth of energy use data before and after program implementation in order to capture the impact the weatherization has on energy use during all the types of weather the home would typically experience. On the other hand, for a program that replaces inefficient lighting in a facility that is lit 24 hours a day, 365 days a year, a full year of data would not be necessary.

Section 10: The Ministry of Energy's assessment of the IESO and LDC's for expenditures related to CDM activities

The CDM program funding mechanism by which the Minister of Energy may assess the IESO or LDC's for expenditures related to certain CDM activities has only been used once (GEAGEA, 2009 Sched. D, s. 6; OEB Act, 1998, s. 26.1(1)). In 2010, regulation O. Reg. 66/10 ordered the OEB to assess the IESO and LDCs for a total of $53,695,310 in the form of a special purposes charge to cover Ministry expenses related to the federal Home Energy Savings Plan ("HESP") program and the Ontario Solar Thermal Heating Initiative ("OSTHI") (OEB, 2011e, p. 2). This amount was to be recovered from electricity ratepayers and paid to the Minister of Finance no later than July 30, 2010 (O. Reg. 66/10). However, on April 26, 2010, the Consumers Council of Canada launched a motion with the OEB contesting the constitutionality of the assessment on the basis that it represented an indirect tax (OEB, 2010a, p. 1; OEB, 2010b, p. 3). The OEB gave the Attorney General of Ontario until June 30, 2011 to submit evidence on the matter (OEB, 2011h, p. 3), and both parties gave submissions leading up to a final oral hearing on Oct. 6, 2011 (OEB, 2011e, p. 2). On Dec. 8, 2011, the OEB issued a decision and order dismissing the Consumer Council of Canada's motion (OEB, 2011e). However, due to the politically contentious nature of funding CDM activities through assessments on the IESO and LDCs it seems unlikely that this mechanism will be used by the Ministry of Energy to fund CDM in future, which is reflected in the Minister of Energy's statement before the Legislature in November of 2010 that the government has no plans to reintroduce assessment in future years (OEB, 2011e, p.4).

Section 11: The Conservation Fund

The Conservation Fund provides funding for projects in two main streams: the research stage, and the development and demonstration stage (OPA, 2011c, pp. 7-8). Organizations eligible for support from the Conservation Fund include non-profit corporations, consulting firms, industry associations, educational institutions, public sector agencies and LDCs. (Since 2005, the Conservation Fund has provided $15 million in funding support to over 95 projects, and leveraged $26.5 million in additional funding from third parties (OPA, 2011c, p. 4)).

Until September 2011, the OPA also used to administer the Technology Fund, which provided funding for CDM projects, but focused on promoting the development and commercialization of pre-commercial technologies and applications with the potential to improve either conservation, demand management, or distributed generation. The Technology Development Fund support was intended to help reduce the risks that companies face when developing and bringing new CDM products to market (OPA, 2011ab, p. 4). In September of 2011, the Technology Development Fund was merged into the Conservation Fund, so applications for projects involving research, development and demonstration of CDM technologies are now directed to the Conservation Fund's Emerging Technology Demonstration or Development streams (OPA, 2012h). In the OPA's 2011 budget, the amount of money slated to be available through the Conservation Fund and Technology Development Fund together was just over $18 million (OPA, 2010b, p. 48). (Since its inception in 2006, the Technology Development Fund provided 40 projects with $7.7 million in funding, which leveraged more than $70 million of funding from project partners (Ontario Ministry of Finance, 2011, p. 1-146; OPA, 2011ab, p. 4)).

Section 12: Misplaced incentive problems when using non-energy variables as a proxies for energy savings

Choosing a variable as a proxy for savings is the approach that is being taken with the OPA's province-wide mid-stream incentives program, for which savings will be proportionally allocated to LDCs based on the size of each LDCs residential customer base (OPA, 2010f, p. 6). However, this type of allocation can be problematic because the degree to which an LDCs efforts result in program savings is not necessarily dependent on size of residential customer base (the variable to which the allocation of those savings is tied). Rather, savings attributable to any particular LDC are more likely to reflect the level of investment an LDC makes in promoting the midstream incentive program. In addition, as is characteristic of capability building and market transformation activities, the market effects achieved by LDCs efforts in promoting the midstream incentive program (and the energy savings that result from those market effects) are not likely to be confined to the particular service area in which the program implementation efforts occurred. (For instance, if a manufacturer based in Toronto participates in a mid-stream incentive program that results in all of its products using less energy, the savings resulting from

those program efforts will be distributed throughout the province rather than being confined to the service territory of the participating manufacturer's LDC (i.e. Toronto Hydro in this particular example)). Allocating savings to utilities based on the size of their residential customer base provides utilities with little incentive to invest time and energy in promoting the midstream incentive program in their service areas. This problem could be remedied by better aligning the criteria for savings allocation with the efforts exerted by utilities to achieve those savings (e.g. number of program participants recruited).

Section 13: Costs and benefits under the TRC test and PAC test

Both the TRC and PAC tests calculate the value of a CDM measure by subtracting the costs of the measure from the benefits of the measure, but they differ in what they consider costs and benefits. The TRC test calculates a CDM program's net present value from a societal perspective, and the PAC test measures the net present value from the perspective of the program administrator (OPA, 2010i, p. 6). As a result, the PAC test considers utility incentives paid to consumers to be a cost, whereas the TRC test puts the value of incentive payments on both the cost (to the utility) and benefit (to the participant) sides of the equation so that incentives have no net impact on the cost-effectiveness of the CDM program (OPA, 2010i, p. 7).

The TRC test considers the costs of a CDM program to be the costs to the program administrator of administering the CDM program (i.e. design, implementation, marketing, EM&V), and the costs to the program participant of participating in the program (e.g. the difference in the cost of buying energy efficiency dishwasher using a utility incentive versus purchasing a standard efficiency dishwasher). By contrast, in the PAC test, the costs of a CDM program are the costs to the program administrator alone (i.e. program costs, including the cost of incentives paid to participants). In both tests, the benefits of a program are calculated as costs that can be avoided by implementing the program. However, the PAC test only considers avoided costs associated with the electricity system, whereas the TRC test also takes into account avoided costs associated with program-related reductions in the use of water and non-electric fuels like natural gas and propane (OPA, 2010i, p. 7).

Appendix D: Table of abbreviations

Abbreviation	Reference Term
ACEEE	American Council for an Energy Efficient Economy
BCA	Building Code Act
CAMA	Canadian Appliance Manufacturers Association
CAT	Conservation Action Team
CDM	Conservation and Demand Management
CEC	California Energy Agency
CLD	Coalition of Large Distributors
CMBSC	The Canada/Manitoba Business Service Centre
CPUC	California Public Utilities Commission
CSA	Canadian Standards Association
DSM	Demand Side Management
EA	Electricity Act
EBR	Environmental Bill of Rights
ECO	Environmental Commissioner of Ontario
ECLA	Energy Conservation Leadership Act
ECRA	Energy Conservation Responsibility Act
ECSTF	Electricity Conservation & Supply Task Force
EDA	Electricity Distributors Association
EEA	Energy Efficiency Act
EM&V	Evaluation, Measurement & Verification
EPC&S Act	Electricity Pricing, Conservation and Supply Act
EPRI	Electric Power Research Institute
ERA	Electricity Restructuring Act
EVO	Efficiency Valuation Organization
GEA	Green Energy Act
GEAGEA	Green Energy And Green Economy Act
HONI	Hydro One Networks Inc.
IEA	International Energy Agency
IESO	Independent Electricity System Operator
LDC	Local Distribution Company
LIEN	Low Income Energy Network
LRAM	Lost Revenue Adjustment Mechanism
MEI	Ministry of Energy and Infrastructure

MMAH	Ministry of Municipal Affairs and Housing
NAPEE	National Action Plan for Energy Efficiency
NRCan	Natural Resources Canada
NYSEFC	New York State Environmental Facilities Corporation
OEB	Ontario Energy Board
O. Reg.	Ontario Regulation
OEB Act	Ontario Energy Board Act
OEBA Act	Ontario Energy Board Amendment Act
OEE	Natural Resource Canada's Office of Energy Efficiency
OEFC	Ontario Electricity Financial Corporation
OGWC	Ontario Global Warming Coalition
OPA	Ontario Power Authority
OPG	Ontario Power Generation
PAC	Program Administrator Cost test
PCT	Participant Cost Test
RIM	Ratepayer Impact Measure
SCT	Societal Cost Test
SFV	Straight Fixed Variable pricing
TDSB	Toronto District School Board
THESL	Toronto Hydro-Electric System Ltd.
TRC	Total Resource Cost test
WNHI	Waterloo North Hydro Inc.

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