4. Conservation and Demand Management Programs

Third Tranche

2005-2007

- Conservation programs delivered by electricity distributors
- Programs delivered in a fragmented way
- Costs recovered from distribution rates

Agency Coordination

2008-2010

- OPA responsible for organizing and funding conservation programs
- Programs delivered by 3rd parties, including some distributors

CDM Framework*

2011-2014

- Targets of 1, 330 MW and 6, 000 GWh savings
- LDCs the face of conservation and deliver conservation programs as a condition of licence

Conservation First

2015-2020

- Target of 7TWh L
- DCs to deliver conservation programs
- LDCs provided with long term stable funding, more accountability for program development

* 1.7 $billion program cost, 6,553 GWh savings, and 928 megawatts MW at 4 cents/kWh vs. to 8 cents for new capacity

4.1 CDM Framework (2011-2014)

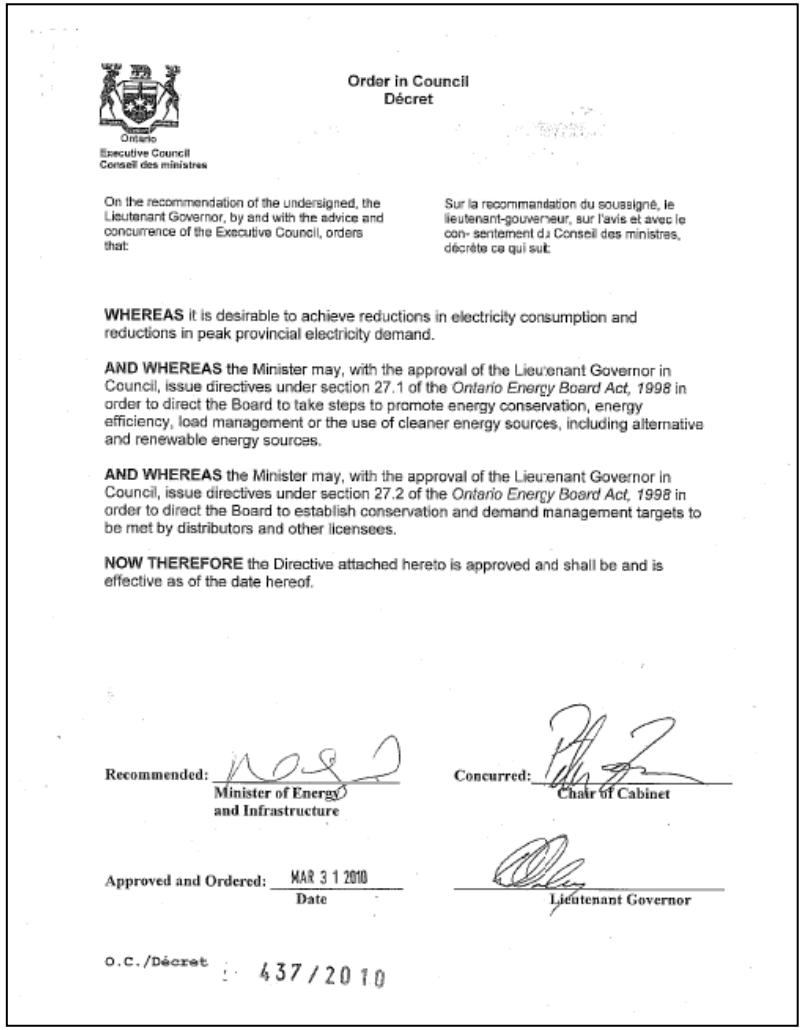
- Top-down approach in setting provincial targets
- Cost effectiveness tests for launching pilots and designing specific programs and initiatives
- The Measurement and Verification (M&V) methodologies and assumptions used for the bottom-up verifications of the savings are presented.
- The evaluation and reporting of program results at the utility level and the province levels

4.1 CDM Framework (2011-2014)

➢ Top-down approach in setting provincial targets

On March 31, 2010, the Minister issued a directive to the OEB, instructing it to establish:

- mandatory CDM Targets for LDCs to achieve reductions in electricity consumption and reductions in peak provincial electricity demand over a four year period beginning January 1 2011 (the "CDM Targets").
- That directive specified that the total of the CDM Targets established for all LDCs be equal to 1,330 megawatts (MW) of provincial peak electricity demand and 6,000 gigawatt hours (GWh) of electricity consumption over that four-year period ("LDC Provincial Aggregate Targets").



Ontario
Executive Council
Conseil des ministres

Order in Council
Décret

On the recommendation of the undersigned, the Lieutenant Governor, by and with the advice and concurrence of the Executive Council, orders that:

Sur la recommandation du soussigné, le lieutenant-gouverneur, sur l'avis et avec le con- sentement du Conseil des ministres, décrète ce qui suit:

WHEREAS it is desirable to achieve reductions in electricity consumption and reductions in peak provincial electricity demand.

AND WHEREAS the Minister may, with the approval of the Lieutenant Governor in Council, issue directives under section 27.1 of the *Ontario Energy Board Act, 1998* in order to direct the Board to take steps to promote energy conservation, energy efficiency, load management or the use of cleaner energy sources, including alternative and renewable energy sources.

AND WHEREAS the Minister may, with the approval of the Lieutenant Governor in Council, issue directives under section 27.2 of the *Ontario Energy Board Act, 1998* in order to direct the Board to establish conservation and demand management targets to be met by distributors and other licensees.

NOW THEREFORE the Directive attached hereto is approved and shall be and is effective as of the date hereof.

Recommended: _____
Minister of Energy and Infrastructure

Concurred: _____
Chair of Cabinet

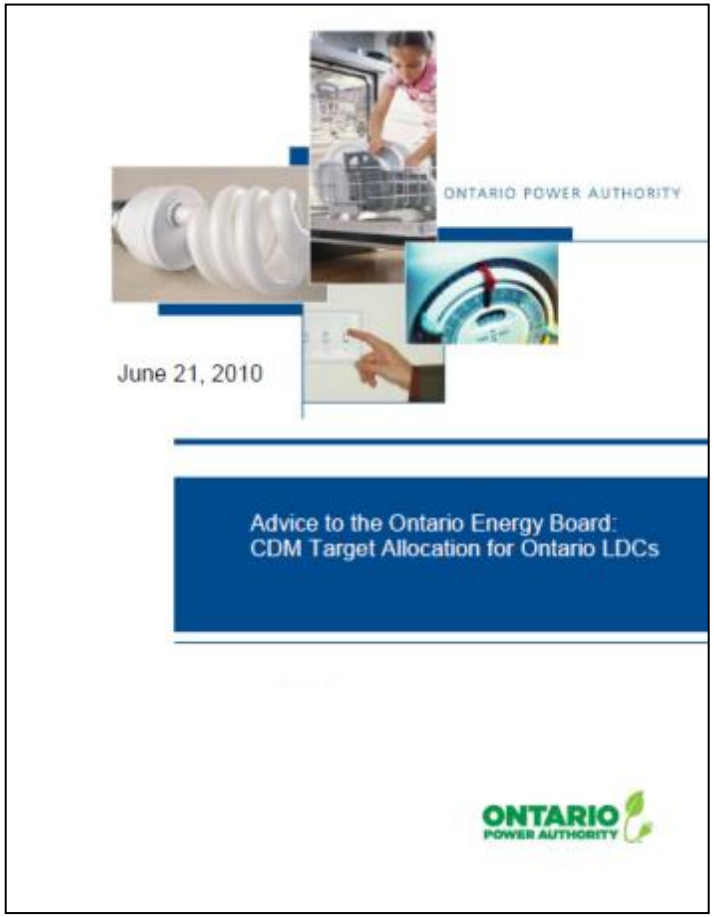
Approved and Ordered: MAR 31 2010
Date

_____
Lieutenant Governor

O.C./Décret : 437/2010

4.1 CDM Framework (2011-2014)

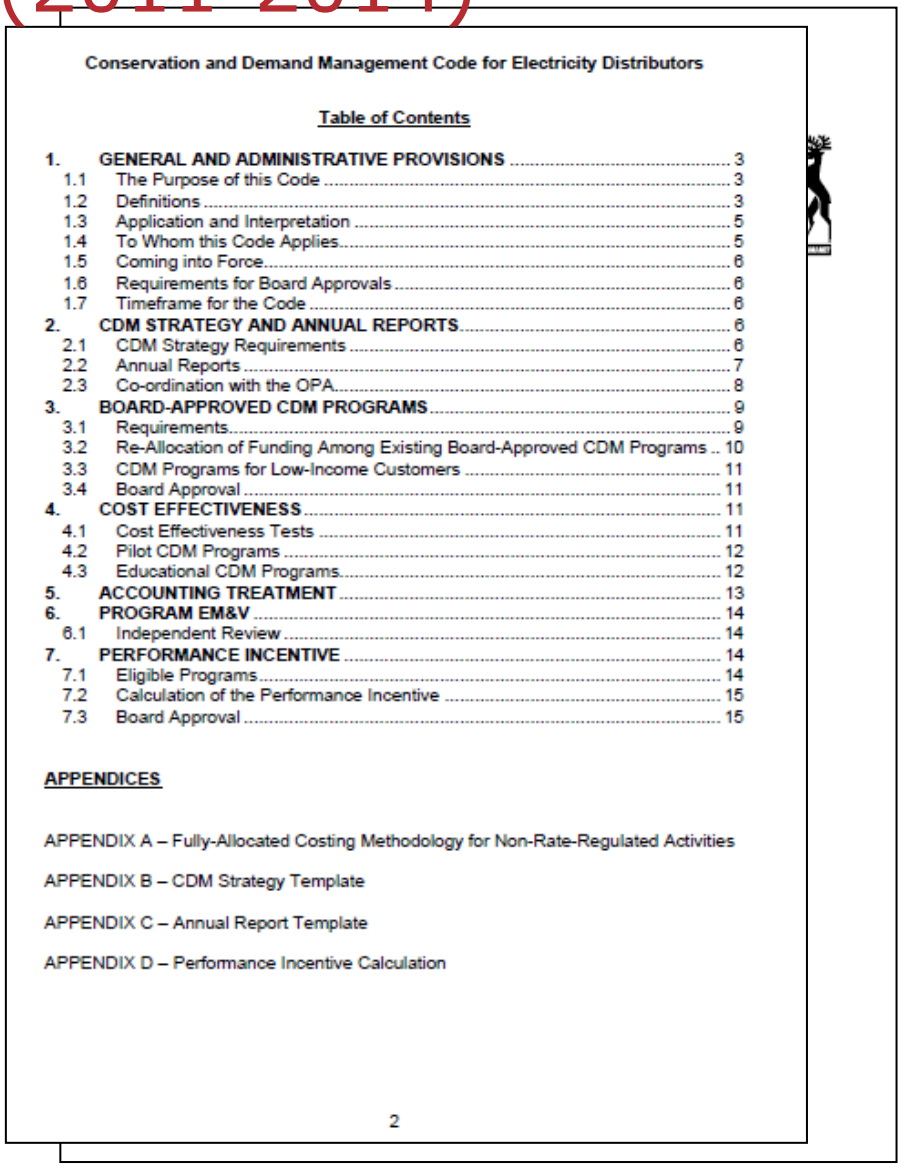
- Advise on assigning CDM Targets to LDCs



4.1 CDM Framework (2011-2014)
- CDM Code by OEB

The purpose of this Code is to set out the obligations and requirements that licensed distributors must comply with in relation to the CDM Targets set out in their licences.

This Code also sets out the conditions and rules that licensed distributors are required to follow



Conservation and Demand Management Code for Electricity Distributors

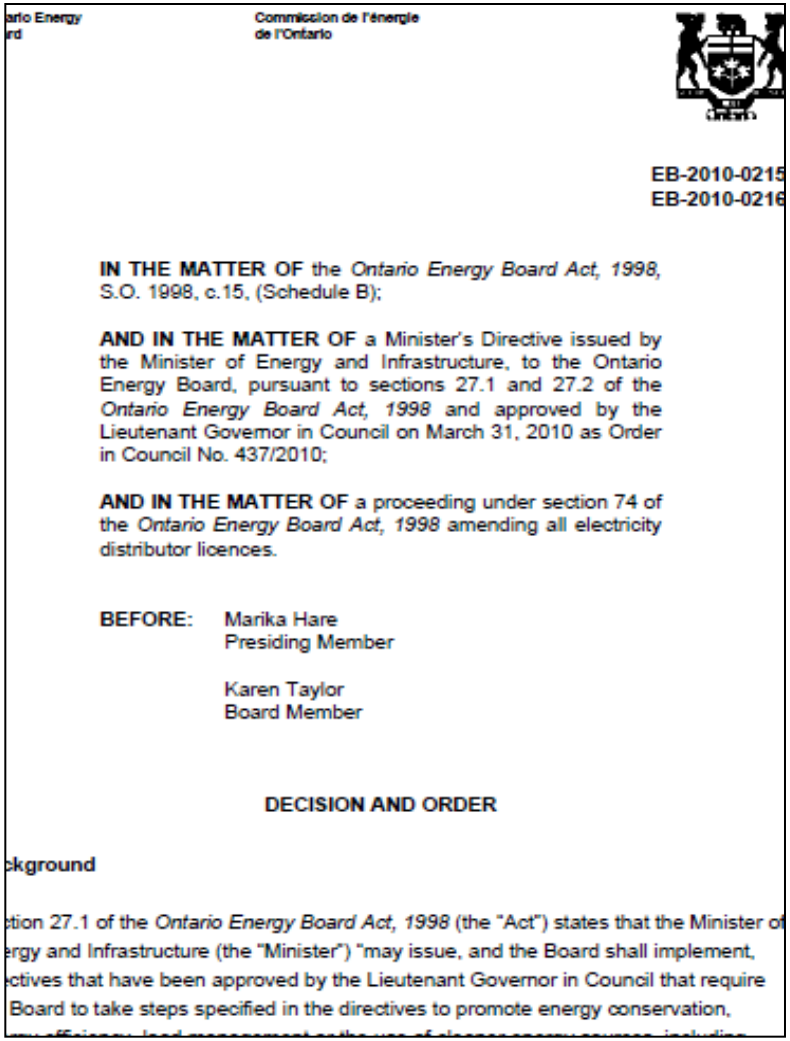
Table of Contents

APPENDICES

2

4.1 CDM Framework (2011-2014)

➢ Assignment of CDM Targets to LDC by OEB



ario Energy
rd

Commission de l'énergie
de l'Ontario

EB-2010-0215
EB-2010-0216

IN THE MATTER OF the *Ontario Energy Board Act, 1998*, S.O. 1998, c.15, (Schedule B);

AND IN THE MATTER OF a Minister's Directive issued by the Minister of Energy and Infrastructure, to the Ontario Energy Board, pursuant to sections 27.1 and 27.2 of the *Ontario Energy Board Act, 1998* and approved by the Lieutenant Governor in Council on March 31, 2010 as Order in Council No. 437/2010;

AND IN THE MATTER OF a proceeding under section 74 of the *Ontario Energy Board Act, 1998* amending all electricity distributor licences.

BEFORE: Marika Hare
Presiding Member

Karen Taylor
Board Member

DECISION AND ORDER

ckground

tion 27.1 of the *Ontario Energy Board Act, 1998* (the "Act") states that the Minister of
rgy and Infrastructure (the "Minister") "may issue, and the Board shall implement,
ctives that have been approved by the Lieutenant Governor in Council that require
Board to take steps specified in the directives to promote energy conservation,

	Savings Target (MW)	Savings Tar (GWh)
ydro One Brampton Networks Inc.	45.610	189
ydro One Networks Inc.	213.660	1,130
ydro Ottawa Limited	85.260	374
nisfil Hydro Distribution Systems Limited	2.500	9
ashechewan Power Corporation	0.070	0
enora Hydro Electric Corporation Ltd.	0.860	5
ingston Hydro Corporation	6.630	37
itchener-Wilmot Hydro Inc.	21.560	90
akefront Utilities Inc.	2.770	13
akeland Power Distribution Ltd.	2.320	10
ondon Hydro Inc.	41.440	156
iddlesex Power Distribution Corporation	2.450	9
idland Power Utility Corporation	2.390	10
ilton Hydro Distribution Inc.	8.050	33
ewmarket - Tay Power Distribution Ltd.	8.760	33
iagara Peninsula Energy Inc.	15.490	58
iagara-on-the-Lake Hydro Inc.	2.420	8
orfolk Power Distribution Inc.	4.250	15
orth Bay Hydro Distribution Limited	5.050	26
orthern Ontario Wires Inc.	1.060	5
akville Hydro Electricity Distribution Inc.	20.700	74
rangeville Hydro Limited	2.780	11
rillia Power Distribution Corporation	3.070	15
shawa PUC Networks Inc.	12.520	52
ttawa River Power Corporation	1.610	8
UC Distribution Inc.	5.580	30
arry Sound Power Corporation	0.740	4
eterborough Distribution Incorporated	8.720	38
ort Colborne Hydro Inc.	0.0	
owerStream Inc.	95.570	407
enfrew Hydro Inc.	1.050	4
ideau St. Lawrence Distribution Inc.	1.220	5
ioux Lookout Hydro Inc.	0.510	3
t. Thomas Energy Inc.	3.940	14
hunder Bay Hydro Electricity Distribution Inc.	8.480	47
llsonburg Hydro Inc.	2.290	10
oronto Hydro-Electric System Limited	286.270	1,303
eridian Connections Inc.	29.050	115
/asaga Distribution Inc.	1.340	4
/aterloo North Hydro Inc.	15.790	66
/elland Hydro-Electric System Corp.	5.560	20
/ellington North Power Inc.	0.930	4
/est Coast Huron Energy Inc.	0.880	8

4.1 CDM Framework (2011-2014)

➢ Cost Effectiveness Tests

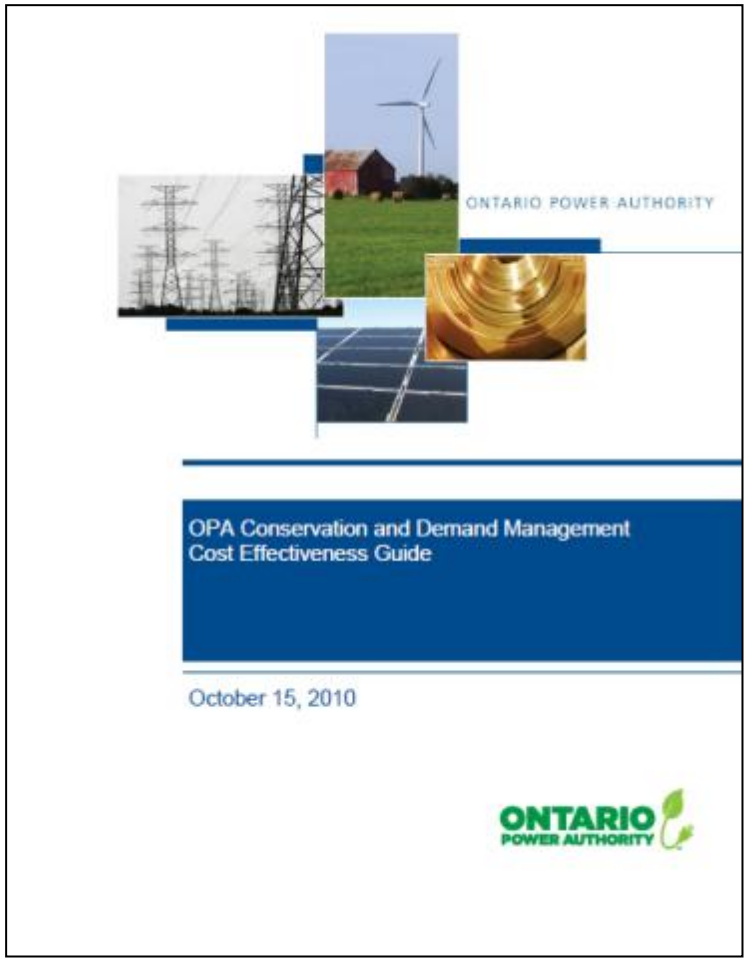


Figure 2: Overview of Cost Effectiveness Metrics

Metric	Key Question Answered	Summary Approach
Total Resource Cost (TRC) test	How will the total costs of energy and demand in the utility service territory be affected?	Compares the costs incurred to design and deliver programs and customers' costs with avoided electricity and other supply-side resource costs (e.g., generation, transmission, natural gas, etc.)
Societal Cost (SC) Test	Is the utility, state or nation better off as a whole?	Identical to TRC approach, but also includes the cost of "externalities" (e.g., carbon emissions, health costs, etc.)
Program Administrator Cost (PAC)Test	How will utility costs be affected?	Compares the costs incurred to design and deliver programs by the program administrator with avoided electricity supply-side resource costs[4]
Ratepayer Impact Measure (RIM) Test	How will utility rates be affected?	Compares administrator costs and utility bill reductions with avoided electricity and other supply-side resource costs
Participant Cost (PC) Test	Will the participant benefit over the measure life?	Compares costs and benefits of the customer installing the measure
Levelized Delivery Cost (LC)	What is the per-unit cost to the utility?	Normalizes the costs incurred to design and deliver programs per unit saved (i.e., peak demand or energy savings)

4.1 CDM Framework (2011-2014)

- Master Agreements

4.1 CDM Framework (2011-2014)

➢ Residential Conservation Programs

***peaksaver* PLUS®**

Free in-home energy display
If you have central air, an electric water heater or swimming pool pump, sign up for ***peaksaver* PLUS®** and get a FREE in-home energy display.

COUPON EVENT

Coupons for quick savings
Available until December 31, 2013 – Here's an instant way to make your home more energy efficient. Visit participating retailers for in-store coupons, LEDs, CFLs, dimmers, thermostats and much more!

HEATING AND COOLING INCENTIVE

$650 Heating and cooling rebate
Install a qualifying ENERGY STAR central heating and cooling system and receive a rebate of up to $650.

FRIDGE & FREEZER PICKUP

Save up to $125 a year
Got and old fridge or freezer you don't need? Call us for a FREE pickup and start saving on your electricity costs.

NEW HOME CONSTRUCTION

Buying a new home?
When you are shopping for a new home, make energy efficiency a priority and save on your annual electricity costs.

4.1 CDM Framework (2011-2014)

➢ Commercial Conservation Programs

Commercial | **Institutional** | **Industrial** | **Multi-Residential**

- **Audit Funding**
- **Retrofit Program**
- **Small Business Lighting**
- **High Performance New Construction**
- **Existing Building Commissioning**
- **Energy Managers**

- **Supports different types of "one-time" audit**
- **Funding to cover up to 50% of audit cost**
- **$0.05/sq ft to $0.10/sq ft up to $25,000 or $35,000 depending on type**
- **Covers 50% of most travel expenses**
- **Requires approved 3rd party auditor**

FEATURES!

- New Building Systems Audit can be focused on specific systems (multiple occurrences):
  - HVAC fans & pumps
  - Booster pumps
  - Air compressors
  - Refrigeration systems

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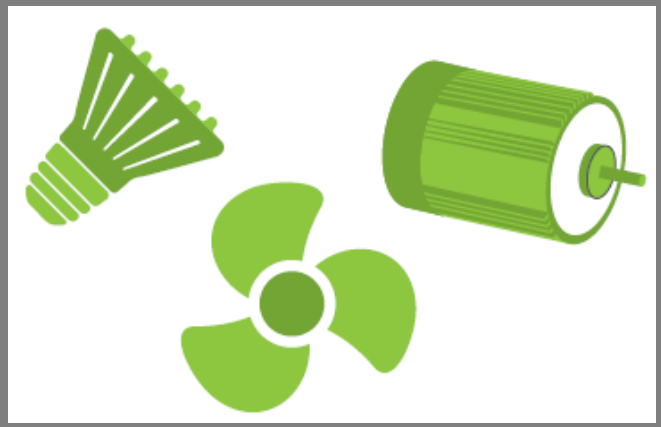
4.1 CDM Framework (2011-2014)

➢ Commercial Conservation Programs

Commercial ◆ **Institutional** ◆ **Industrial** ◆ **Multi-Residential**

- Audit Funding
- Retrofit Program
- Small Business Lighting
- High Performance New Construction
- Existing Building Commissioning
- Energy Managers

- **Funding to install high-efficiency equipment & control systems**
- **Cover up to 50% or project costs**
- **$800/kW or $0.10/kWh (non-lighting)**
- **$400/kW or $0.05/kWh (lighting)**



Prescriptive

Prescriptive Track applications are ideal for quick system upgrades.

Engineered

Engineered Track applications are for more complex equipment upgrades and provide the potential for higher incentives.

Custom

Custom track applications provide flexibility for more comprehensive projects with opportunities for increased energy savings.

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4.1 CDM Framework (2011-2014)

➢ Commercial Conservation Programs

Commercial | **Institutional** | **Industrial** | **Multi-Residential**

- **Audit Funding**
- **Retrofit Program**
- **Small Business Lighting**
- **High Performance New Construction**
- **Existing Building Commissioning**
- **Energy Managers**

- **A free, no-obligation assessment**
- **Up to $1,500 in energy-efficient lighting upgrades**
- **Free installation and clean up, at your convenience, using a Toronto Hydro approved vendor**

FEATURES!

- Includes LED lamps
- Also applies to tenants in a multi-tenant building such as
  - Strip commercial
  - Office buildings
  - Hotels

RCREEE

4.1 CDM Framework (2011-2014)

➢ Commercial Conservation Programs

Commercial | **Institutional** | **Industrial** | **Multi-Residential**

- **Audit Funding**
- **Retrofit Program**
- **Small Business Lighting**
- **High Performance New Construction**
- **Existing Building Commissioning**
- **Energy Managers**

- **100% of 3rd party modeling costs up to $10,000**
- **Tiered incentives for design decision-makers up to $150/kW, or $0.01875/kWh**
- **Custom track will depend on level of savings to lesser of:**
  - **$400/kW, or $0.05/kWh of energy saved up to 25% above code;**
  - **$600/kW, or $0.75/kWh of energy saved between 25% to 50% above code; and**
  - **$800/kW, or $0.10/kWh of energy saved for greater than 50% above code.**
  - **Up to 50% of incremental project costs**

- Prescriptive, engineered and custom track streams available
- Available until new 2017 Ontario Building Code

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4.1 CDM Framework (2011-2014)

➢ Commercial Conservation Programs

Commercial | **Institutional** | **Industrial** | **Multi-Residential**

- Audit Funding
- Retrofit Program
- Small Business Lighting
- High Performance New Construction
- Existing Building Commissioning
- Energy Managers

- **Evaluate and implement retro-commissioning strategies of buildings with chilled water plants**
- **Four-phased approach :**
  - ✓ **Scoping Study Phase**
  - ✓ **Investigation Phase**
  - ✓ **Implementation Phase**
  - ✓ **Hand-off/Completion Phase**
- **Cover up to 50% or project costs**
- **$800/kW or $0.10/kWh**

FEATURES!

- Scoping phase incentives pay 100% of cost up to $2,500
- Hand-off/Completion phase incentives pay 100% of cost up to $2,500
- Investigation phase pays up to $6 per ton for a data acquisition system, **plus** $18 per ton for a detailed report

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4.1 CDM Framework (2011-2014)

Commercial ◆ **Institutional** ◆ **Industrial** ◆ **Multi-Residential**

- Audit Funding
- Retrofit Program
- Small Business Lighting
- High Performance New Construction
- Existing Building Commissioning
- Energy Managers

Energy managers are trained to:

- **find energy savings,**
- **identify smart energy investments,**
- **secure financial incentives,**
- **and unleash competitive advantage.**

Embedded Energy Managere

Are and add on hired by large facilities with salary subsidized from the distribution company to meet agreed on electricity savings and demand reduction

Roving Energy Manager

Are Hired by the Electricity Distribution companies and assigned to many sites.

Both have to Certified Energy Mangers with reporting requirements such as:

- Annual CDM plan,
- Quarterly reports

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4.1 CDM Framework (2011-2014)

➢ Incentive Application Process

Register

Both customer and 3rd Party register at **www.saveonenergy.ca/**

Submit application to the OPA

Customer submits application/ assigns a 3rd party

Agree on M&V method with LDC beforehand (larger projects)

OPA routes application to LDC for Review/Approval

May require a pre-project site visit

Customer Receives Pre-Approval from LDC

4.1 CDM Framework (2011-2014)

➢ Incentive Application Process

Customer Implements Project

Submits post-project documents to LDC

LDC Post Project Review and Approval

May require a post project site visit

Customer submits invoice to LDC

LDC submits to the OPA for settlement

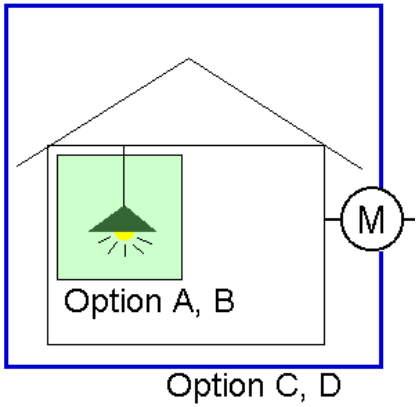
OPA pays LDC and LDC pays customer

4.1 CDM Framework (2011-2014)
- M&V

International Performance Measurement and Verification Protocol (IPMVP)

Volume I - Energy Savings Concepts and Tools: Defines basic M&V terminology (4 "Options")

- General procedures to achieve reliable and cost-effective determination of savings
- Applicable to energy or water efficiency projects in buildings and industrial plants



M&V Option	How savings are calculated
Option A: Based on *measured* equipment performance, measured or *stipulated* operational factors, and annual verification of "*potential to perform.*"	Engineering calculations.
Option B: Based on *periodic or continuous measurements* taken throughout the term of the contract at the device or system level.	Engineering calculations using measured data.
Option C: Based on *whole-building* or facility level utility meter or sub-metered data adjusted for weather and/or other factors.	Analysis of utility meter data.
Option D: Based on *computer simulation* of building or process; simulation is calibrated with measured data.	Comparing different models.

Options A and B are retrofit-isolation methods
Options C and D are whole-facility methods
The difference is where the boundary lines are drawn

4.1 CDM Framework (2011-2014)
- M&V

saveONenergy Project Level M&V and QA/QC Requirements

Project Type	Criteria	Method	Pre/Post Visit	M and V Plan Required
Large Project	Including only Prescriptive and/or Engineered measures with incentives >$20K	Not applicable	Yes	No
Large Project	Including “Custom Measures” with incentives > $10K and < $25K	Basic	Yes	Yes
Large Custom	Including custom measures > $25K	Enhanced	Yes	Yes
Other	Not defined above (i.e. small projects)	Not applicable	Statistical Sampling	No

4.1 CDM Framework (2011-2014)
- M&V

saveONenergy Measure Type M&V Requirements

Measure Type	Basic	Enhanced
Lighting Retrofit	LR-B	LR-E
Equipment Replacement	ER-E	
HVAC Redesign	HVAC-E	
Variable Speed Drives	VSD-B	VSD-E
BAS	BAS-B	BAS-E
Lighting Controls	LC-B	LC-E
Sub-metering	SM-E	
Elevator Retrofit	ELR-E	
Building Envelope	BE-B	BE-E

4.1 CDM Framework (2011-2014)
- M&V

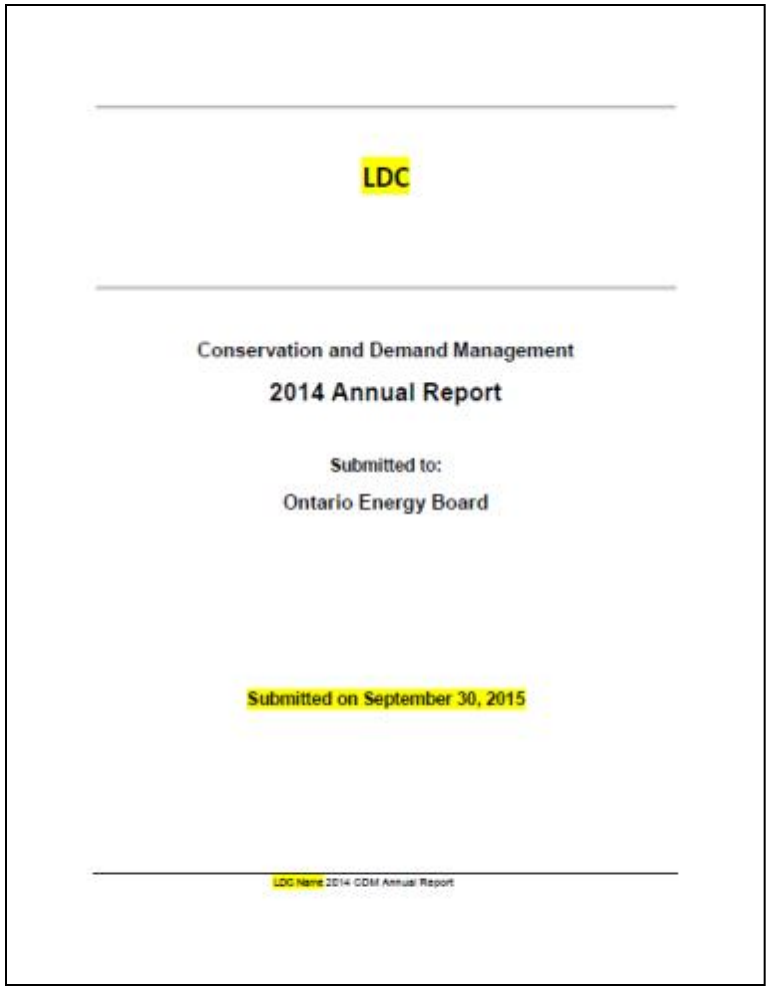
After the Incentive Cheque

- Programs are independently evaluated
- Evaluation determines net to gross ratios
- LDC Target

4.1 CDM Framework (2011-2014)

- Reporting and evaluation

LDC Quarterly and Annual reports



LDC

Conservation and Demand Management

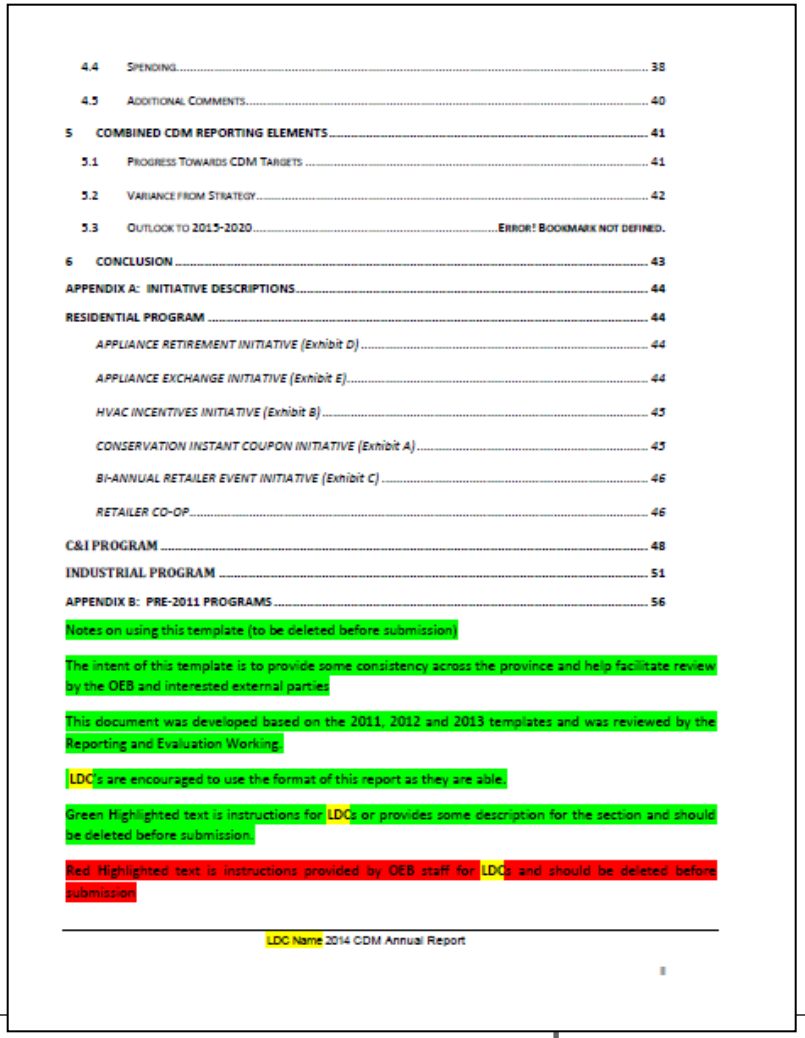
2014 Annual Report

Submitted to:

Ontario Energy Board

Submitted on September 30, 2015

LDC Name 2014 CDM Annual Report



Notes on using this template (to be deleted before submission)

The intent of this template is to provide some consistency across the province and help facilitate review by the OEB and interested external parties

This document was developed based on the 2011, 2012 and 2013 templates and was reviewed by the Reporting and Evaluation Working.

LDC's are encouraged to use the format of this report as they are able.

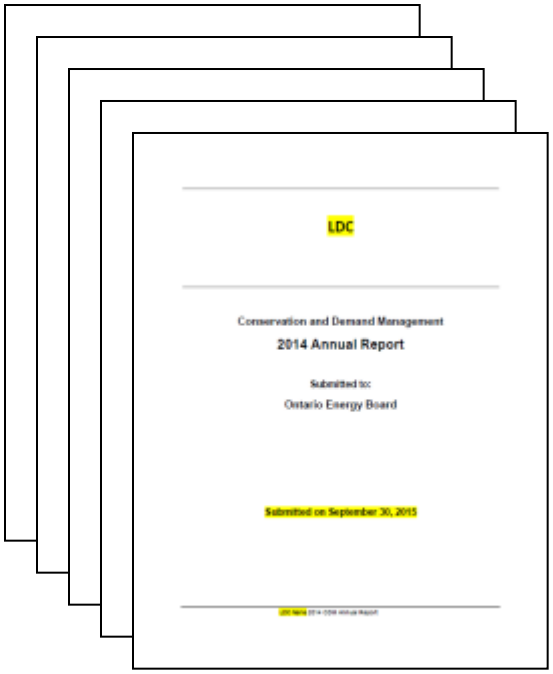
Green Highlighted text is instructions for LDCs or provides some description for the section and should be deleted before submission.

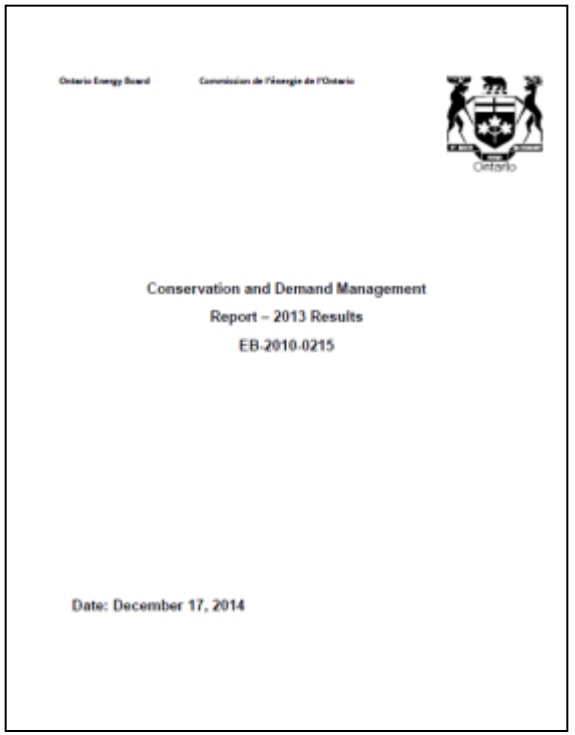
Red Highlighted text is instructions provided by OEB staff for LDCs and should be deleted before submission

LDC Name 2014 CDM Annual Report

4.1 CDM Framework (2011-2014)

- Reporting and evaluation

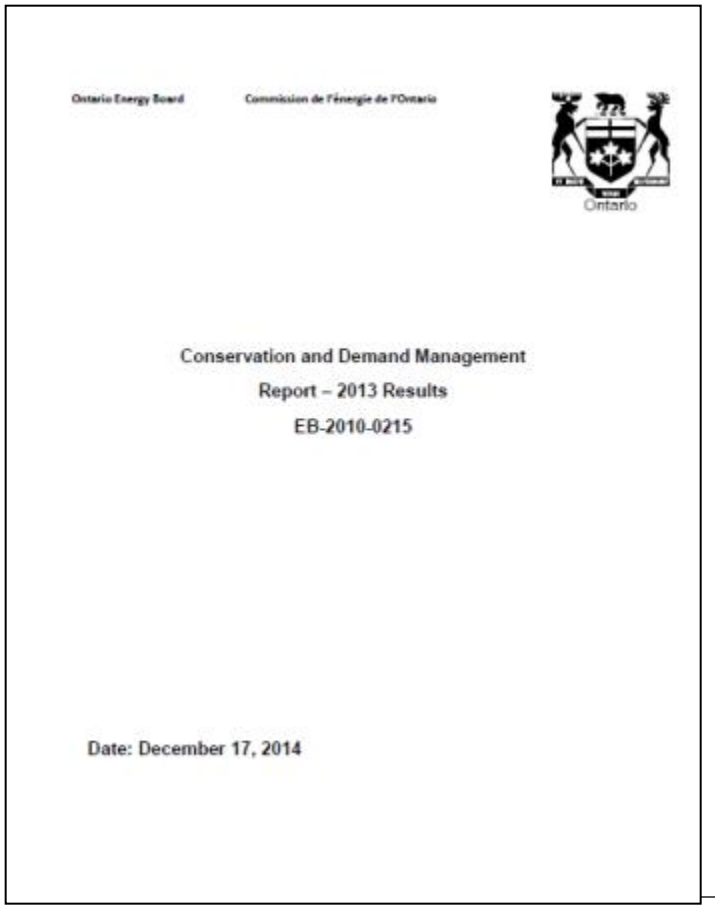




4.1 CDM Framework (2011-2014)

- Reporting and evaluation

OEB Annual reports



Ontario Energy Board Commission de l'énergie de l'Ontario

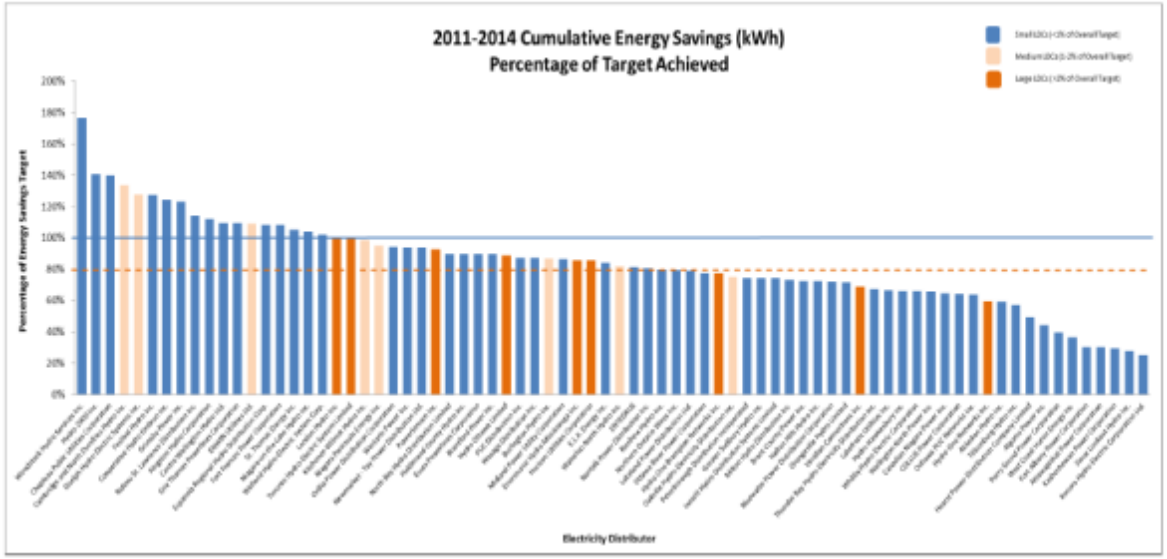
Ontario

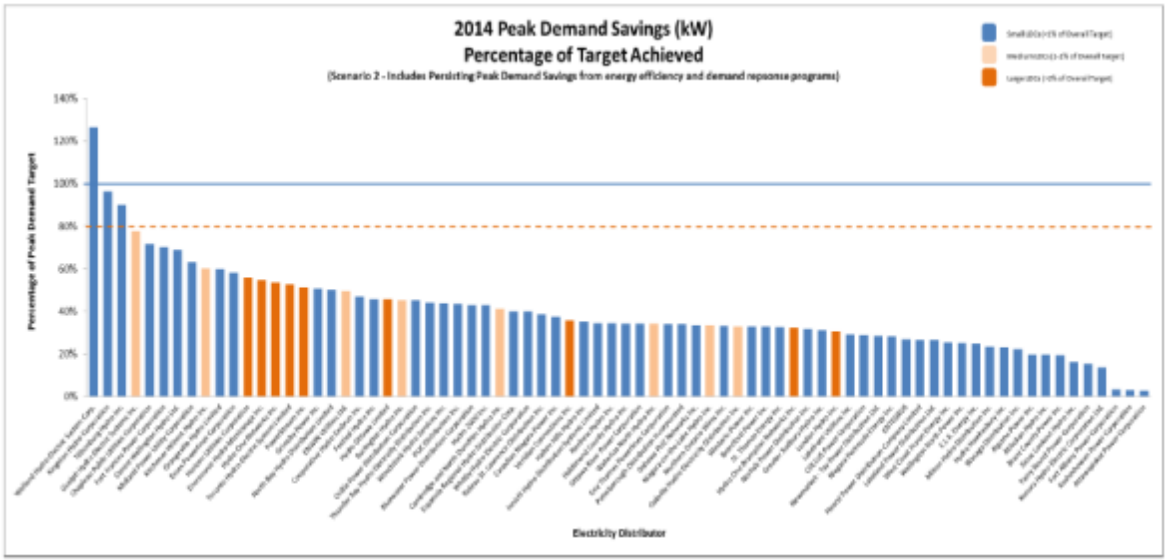
Conservation and Demand Management

Report – 2013 Results

EB-2010-0215

Date: December 17, 2014

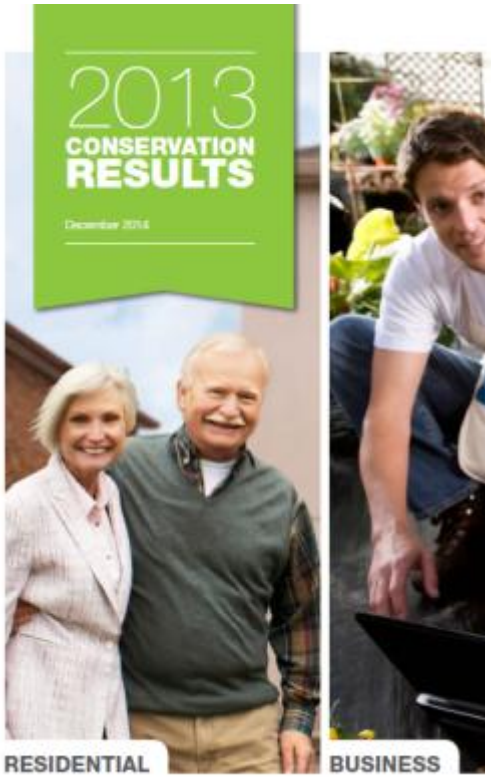




4.1 CDM Framework (2011-2014)

- Reporting and evaluation

OPA Annual reports



APPENDIX B

Cost-Effectiveness Evaluation

The OPA's cost-effectiveness evaluations are used to identify the value of conservation for Ontario. Cost effectiveness is calculated using a range of standard industry benefit-cost analyses and metrics. The tests evaluate the cost-effectiveness of the saveONenergy programs delivered by the OPA and LDCs. A more detailed explanation of these tests can be found in Appendix C.

2012 Total Resource Cost Test	2013	2011-2013
Benefit ($ millions)	563	1420
Cost ($ millions)	461	1182
Net Benefit ($ millions)	102	238
Net Benefit Ratio	**1.22**	**1.20**
2012 Program Administrator Cost Test		
Benefit ($ millions)	568	1452
Cost ($ millions)	334	711
Net Benefit ($ millions)	234	741
Net Benefit Ratio	**1.70**	**2.04**
Levelized Delivery Cost (Demand Response)	9,368 $/MW-Month	12,024 $/MW-Month
Levelized Delivery Cost (Energy Efficiency)	44 $/MWh (4.4¢/kWh)	37 $/MWh (3.7¢/kWh)

RCREEE

4.1 CDM Framework (2011-2014)
- Results

At 1.7 $billion program cost

In Total the 4 year (2011- 2014) suite of saveONenergy program achieved:

- 6,553 gigawatt-hours (GWh) of energy savings,
- and 928 megawatts (MW) of demand reduction,
- at a total cost of 4 cents/kWh in comparison to 8 cents for additional capacity
- For each dollar invested in end users being more efficient, two dollars are saved in avoided generation.