4. Conservation and Demand Management Programs

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

Agency Coordination

- 2005-2007
  - OPA responsible for organizing and funding conservation programs
  - Programs delivered by 3rd parties, including some distributors

- 2008-2010
  - Targets of 1,330 MW and 6,000 GWh savings
  - LDCs the face of conservation and deliver conservation programs as a condition of licence

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
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”).
4.1 CDM Framework (2011-2014)
- Advise on assigning CDM Targets to LDCs
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.
4.1 CDM Framework (2011-2014)

- Assignment of CDM Targets to LDC by OEB
### 4.1 CDM Framework (2011-2014)

**Cost Effectiveness Tests**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Key Question Answered</th>
<th>Summary Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Resource Cost (TRC) Test</td>
<td>How will the total costs of energy and demand in the utility service territory be affected?</td>
<td>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.)</td>
</tr>
<tr>
<td>Societal Cost (SC) Test</td>
<td>Is the utility, state or nation better off as a whole?</td>
<td>Identical to TRC approach, but also includes the cost of “externalities” (e.g., carbon emissions, health costs, etc.)</td>
</tr>
</tbody>
</table>
| 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.

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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>peaksaver PLUS®</td>
<td>Free in-home energy display</td>
</tr>
<tr>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>COUPON EVENT</td>
<td>Coupons for quick savings</td>
</tr>
<tr>
<td></td>
<td>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!</td>
</tr>
<tr>
<td>HEATING AND COOLING INCENTIVE</td>
<td>$650 Heating and cooling rebate</td>
</tr>
<tr>
<td></td>
<td>Install a qualifying ENERGY STAR central heating and cooling system and receive a rebate of up to $650.</td>
</tr>
<tr>
<td>FRIDGE &amp; FREEZER PICKUP</td>
<td>Save up to $125 a year</td>
</tr>
<tr>
<td></td>
<td>Got and old fridge or freezer you don’t need? Call us for a FREE pickup and start saving on your electricity costs.</td>
</tr>
<tr>
<td>NEW HOME CONSTRUCTION</td>
<td>Buying a new home?</td>
</tr>
<tr>
<td></td>
<td>When you are shopping for a new home, make energy efficiency a priority and save on your annual electricity costs.</td>
</tr>
</tbody>
</table>
4.1 CDM Framework (2011-2014)

- **Commercial Conservation Programs**

  - **Audit Funding**
    - 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

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

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

- **Audit Funding**
  - Small Business
  - Lighting
  - High Performance
  - New Construction
  - Existing Building
  - Commissioning
  - Energy Managers
4.1 CDM Framework (2011-2014)

Commercial Conservation Programs

- 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.
4.1 CDM Framework (2011-2014)

- Commercial Conservation Programs

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

**Institutional**

**Industrial**

**Multi-Residential**

FEATURES!

- 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

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

• 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
Energy managers are trained to:

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

**Embedded Energy Manager**
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 Managers with reporting requirements such as:
- Annual CDM plan,
- Quarterly reports
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
International Performance Measurement and Verification Protocol (IPMVP)


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

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

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
## saveONenergy Project Level M&V and QA/QC Requirements

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Criteria</th>
<th>Method</th>
<th>Pre/Post Visit</th>
<th>M and V Plan Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Project</td>
<td>Including only Prescriptive and/or Engineered measures with incentives &gt; $20K</td>
<td>Not applicable</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Large Project</td>
<td>Including “Custom Measures” with incentives &gt; $10K and &lt; $25K</td>
<td>Basic</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Large Custom</td>
<td>Including custom measures &gt; $25K</td>
<td>Enhanced</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Other</td>
<td>Not defined above (i.e. small projects)</td>
<td>Not applicable</td>
<td>Statistical Sampling</td>
<td>No</td>
</tr>
</tbody>
</table>
### 4.1 CDM Framework (2011-2014) - M&V

**saveONenergy Measure Type M&V Requirements**

<table>
<thead>
<tr>
<th>Measure Type</th>
<th>Basic</th>
<th>Enhanced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting Retrofit</td>
<td>LR-B</td>
<td>LR-E</td>
</tr>
<tr>
<td>Equipment Replacement</td>
<td>ER-E</td>
<td></td>
</tr>
<tr>
<td>HVAC Redesign</td>
<td>HVAC-E</td>
<td></td>
</tr>
<tr>
<td>Variable Speed Drives</td>
<td>VSD-B</td>
<td>VSD-E</td>
</tr>
<tr>
<td>BAS</td>
<td>BAS-B</td>
<td>BAS-E</td>
</tr>
<tr>
<td>Lighting Controls</td>
<td>LC-B</td>
<td>LC-E</td>
</tr>
<tr>
<td>Sub-metering</td>
<td></td>
<td>SM-E</td>
</tr>
<tr>
<td>Elevator Retrofit</td>
<td></td>
<td>ELR-E</td>
</tr>
<tr>
<td>Building Envelope</td>
<td>BE-B</td>
<td>BE-E</td>
</tr>
</tbody>
</table>
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
4.1 CDM Framework (2011-2014) - Reporting and evaluation
4.1 CDM Framework (2011-2014) - Reporting and evaluation

OEB Annual reports
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.

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2011-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2012 Total Resource Cost Test</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefit ($ millions)</td>
<td>683</td>
<td>1420</td>
</tr>
<tr>
<td>Cost ($ millions)</td>
<td>461</td>
<td>1187</td>
</tr>
<tr>
<td>Net Benefit ($ millions)</td>
<td>102</td>
<td>238</td>
</tr>
<tr>
<td>Net Benefit Ratio</td>
<td>1.22</td>
<td>1.20</td>
</tr>
<tr>
<td><strong>2012 Program Administrator Cost Test</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefit ($ millions)</td>
<td>506</td>
<td>1452</td>
</tr>
<tr>
<td>Cost ($ millions)</td>
<td>234</td>
<td>711</td>
</tr>
<tr>
<td>Net Benefit ($ millions)</td>
<td>272</td>
<td>741</td>
</tr>
<tr>
<td>Net Benefit Ratio</td>
<td>1.70</td>
<td>2.04</td>
</tr>
<tr>
<td>Levelized Delivery Cost (Demand Response)</td>
<td>9.368 $/MW-Month</td>
<td>12.024 $/MW-Month</td>
</tr>
<tr>
<td>Levelized Delivery Cost (Energy Efficiency)</td>
<td>44 $/MWh (4.4¢/kWh)</td>
<td>37 $/MWh (3.7¢/kWh)</td>
</tr>
</tbody>
</table>
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.