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Canadian Energy Efficiency Program Study

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Canadian Energy Efficiency Program Study

Final report

This document was prepared for The Government of Newfoundland and Labrador's Office of Climate Change, Energy Efficiency and Emissions Trading by IndEco Strategic Consulting Inc and Hollett & Sons Inc.

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Executive Summary

In 2007, the Provincial Government released The 2007 Energy Plan: Focusing Our Energy, which will guide and define the development of energy resources in Newfoundland and Labrador.[1] As set out in the Plan, promoting greater energy efficiency[2] is a key priority of the Government of Newfoundland and Labrador (GNL). In this regard, the government has two broad policy objectives. At the Council of Federation in 2007, the provincial and territorial governments committed to achieve a 20 per cent increase in energy efficiency by 2020. At the New England Governors and Eastern Canadian Premiers' (NEG-ECP) meeting in 2010, all jurisdictions agreed to reduce energy demand by 20 per cent by 2020 from business-as-usual projections. Current projections by the Provincial Government indicate that, in the absence of any additional measures, total energy demand is expected to remain relatively stable to 2020.

To assist in the development of the Energy Efficiency Action Plan (Action Plan), the Office of Climate Change, Energy Efficiency and Emissions Trading (CCEEET) released a request for proposal to provide information related to the development of the Action Plan. This information includes a comprehensive inventory of residential, commercial, institutional, and industrial energy efficiency programs as well as a breakdown of associated expenditures by sector, activity, and source of funding (referred to as Part A of the work). It also includes a more in-depth examination of 9 programs that together offer NL a broad portfolio of programs across the commercial, institutional, industrial, and transportation sectors to address the needs of Newfoundland and Labrador (referred to as Part B of the work).

This report is the final component of IndEco's work. It presents a high level summary and findings regarding our work in Part A and Part B.

[1] The 2007 Energy Plan: Focusing Our Energy, page 59

[2] In this report energy efficiency refers to actions that reduce total energy consumption (often referred to as energy conservation), that reduce energy use per function (or level of service) or both. For the purposes of this report, energy efficiency excludes demand response, which is defined here as actions taken to shift energy consumption from one point in time to another, and which may or may not result in a reduction in total energy consumption.

Introduction

In 2007, the Provincial Government released The 2007 Energy Plan: Focusing Our Energy which will guide and define the development of energy resources in Newfoundland and Labrador.[3] As set out in the Plan, promoting greater energy efficiency[4] is a key priority of the Government of Newfoundland and Labrador (GNL). In this regard, the government has two broad policy objectives. At the Council of Federation in 2007, the provincial and territorial governments committed to achieve a 20 per cent increase in energy efficiency by 2020. At the New England Governors and Eastern Canadian Premiers' (NEG-ECP) meeting in 2010, all jurisdictions agreed to reduce energy demand by 20 per cent by 2020 from business-as-usual projections. Current projections by the Provincial Government indicate that, in the absence of any additional measures, total energy demand is expected to remain relatively stable to 2020.

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This report is the final component of IndEco's work. It presents a high level summary and findings regarding our work in Part A and in Part B. Our work, conducted between February and June 2011, was based on internet research, published materials and detailed telephone interviews with program managers.

In order to guide our work the CCEEET established a project steering committee comprised of:

- Jackie Janes, CCEEET
- Gerald Crane, CCEEET
- Ashley McCarthy, Department of Natural Resources
- Simone Browne, Newfoundland and Labrador Hydro
- Lorne Henderson, Newfoundland Power
- Peter Upshall, Newfoundland Power

[3] The 2007 Energy Plan: Focusing Our Energy, page 59

[4] In this report energy efficiency refers to actions that reduce total energy consumption (often referred to as energy conservation), that reduce energy use per function (or level of service) or both. For the purposes of this report, energy efficiency excludes demand response, which is defined here as actions taken to shift energy consumption from one point in time to another, and which may or may not result in a reduction in total energy consumption.

- Michele Coughlan, Newfoundland Power

The steering committee provided valuable input and insight throughout the project.

Part A overview

The purpose of Part A's work was to provide the following:

- A description of the governance structures related to energy efficiency and conservation in each province;
- A detailed review of energy efficiency and conservation programs in each province; programs included electricity, fuels (oil, propane), and transportation; and
- A review of absolute and per capita energy efficiency and conservation program spending in each province for 2007 to 2010.

This work was accomplished over a period of six months through a combination of telephone interviews, written submissions, and internet research. For each province, IndEco contacted appropriate individuals at provincial utilities, arms-length agencies responsible for the administration of programs, utility regulators, and relevant ministry departments (e.g. Ministry of Energy) to set-up interviews. Table 1 below contains an overview of the contacts made during this portion of the research.[5]

Table 1: Organizations contacted to obtain regulatory and program information

Jurisdiction	Organizations contacted	Websites
British Columbia	Ministry of Energy, Mines & Petroleum Resources	http://www.gov.bc.ca/ener
	BC Hydro	http://www.bchydro.com/
	Fortis BC	http://www.fortisbc.com/
	LiveSmart BC	http://www.livesmartbc.ca/
Alberta	ATCO Electric Ltd.	http://www.atcoelectric.com/
	FortisAlberta Inc	http://www.fortisalberta.com/
	Climate Change Central	http://www.climatechangecentral.com/
Saskatchewan	SaskPower	http://www.saskpower.com/
	Saskatchewan Research Council	http://www.src.sk.ca/index.cfm
Manitoba	Manitoba Hydro	http://www.hydro.mb.ca/

[5] Detailed contact information for individuals at each organization is included in the Part A report.

Jurisdiction	Organizations contacted	Websites
Ontario	Ontario Power Authority (OPA)	http://www.powerauthority.on.ca/
Québec	Hydro Québec	http://www.hydroquebec.com/fr/
	Agence de l'efficacité énergétique	http://www.aee.gouv.qc.ca/
New Brunswick	New Brunswick Power	http://www.nbpower.com/Welcome.aspx?lang=en
	Efficiency New Brunswick	http://www.efficiencynb.ca/home.html
Nova Scotia	Efficiency Nova Scotia	http://www.efficiencyns.ca/
PEI	Office of Energy Efficiency	http://www.gov.pe.ca/oee/
	Maritime Electric Company Ltd	http://www.maritimeelectric.com/
Newfoundland and Labrador	Department of Natural Resources	http://www.nr.gov.nl.ca/nr/
	Office of Climate Change, Energy Efficiency and Emissions Trading	http://www.exec.gov.nl.ca/exec/cceeet/index.html
	NL Board of Commissioners of Public Utilities (PUB)	http://www.pub.nf.ca/
	Newfoundland and Labrador Hydro	http://www.nlh.nl.ca/
	Newfoundland Power	https://secure.newfoundlandpower.com/Default.aspx
Northwest Territories	Arctic Energy Alliance	http://www.aea.nt.ca/
Yukon	Government of Yukon	http://www.gov.yk.ca/

IndEco tailored the interview questions to the different types of interviewees—ministries/government departments, electric utilities, other organizations. When successful in reaching the appropriate contact, IndEco provided a letter of introduction from CCEEET, a

description of the project, the interview questions, and the spending table (if appropriate).[6] Where the interviews were not possible, IndEco made best efforts to collect the information via Consortium for Energy Efficiency (CEE)[7] reports, regulatory filings, and websites.

Energy efficiency and conservation programs

Each province and two of the territories offer energy conservation and efficiency programs. All 10 provinces offer programs for residential, commercial and institutional, and industrial customers, while the two territories are focused on programs for residential customers. Only Saskatchewan and Québec offer programs that target 'other fuels.' British Columbia, Alberta, Saskatchewan, and Québec offer transportation programs.

The programs included in the report are administered and delivered either by a utility (e.g. BC Hydro), an arms-length government agency (e.g. Efficiency Nova Scotia), or a not-for-profit agency set up by provincial government legislation (e.g. Climate Change Central). Ontario has a slightly different model, as the electricity efficiency and conservation programs are developed by the Ontario Power Authority (OPA), a not-for-profit private corporation, established through provincial legislation, but are delivered through contractual relationships between the OPA and the province's regulated local distribution electricity utilities.

Residential programs

The residential programs are generally rebate programs designed to incent customers to replace inefficient end-uses with high efficiency appliances, heating and cooling equipment, and in-home lighting; as well, incentives are available for programmable thermostats and insulation. The rebate process generally requires the customer to mail-in an application and proof of purchase receipts. Through the interviews, it was learned that processing rebates is very time-consuming and if a utility is not willing or able to staff-up to accommodate this, it is best to out-source the rebate processing.

Financing, loan, and grant programs are found in five provinces: Saskatchewan, Manitoba, New Brunswick, PEI, and Newfoundland and Labrador. Saskatchewan provides low-interest loans to a maximum of $15,000 for a period of 5 years. Manitoba provides low-interest loans to a maximum of $7,500 for a period of 5 years for all energy efficiency upgrades or for a period of 15 years of the purchase of a high efficiency natural gas furnace. New Brunswick offers an interest-free loan of up to $10,000 and repayable over a maximum 6-year term, for energy efficiency upgrades in existing homes. PEI offers

[6] IndEco was successful in being able to interview 22 of the 26 potential interviewees. Due to the timing of the research, certain utilities were at their year end or in the midst of regulatory proceedings and were unable to participate.

[7] The CEE is a non-profit public benefits corporation that develops initiatives for its North American members to promote the manufacture and purchase of energy-efficient products and services. More information available from: http://www.cee1.org/. Accessed June 29, 2011.

various loan structures. Newfoundland and Labrador (via Newfoundland Power) offers financing options through the *takeCHARGE Energy Savers* program.

The program marketing approach is residential mass marketing (one to many), supported by aggressive advertising through utility bill inserts; radio, television, and newspaper ads; and partnerships with local big box stores (e.g. Home Depot, Rona, Lowes).

Small commercial programs

The small commercial programs included in this study are primarily retrofit programs that offer either incentives based on the lighting replaced, or free fixtures and installation (up to a maximum dollar amount). The program participants must submit an application, and are subject to an onsite audit to confirm that the work was completed. Some provinces offer free energy audits to small commercial customers to help assess energy usage and uncover opportunities to replace equipment at a low cost or no cost to the participant. For example, the FortisBC *Small Business and Commercial Program* is a comprehensive program that offers incentives for retrofits of lighting, HVAC, water heating, refrigeration equipment, digital controls, motors, and building envelope upgrades; the variety of offerings is suited to the diverse nature of the small commercial sector. The Ontario Power Authority's small business and commercial program includes not only lighting, but also commercial air conditioning service.

The program marketing approach involves more targeted program marketing campaigns, generally promoting lighting retrofit programs as the customer's entry point into energy efficiency upgrades. These programs tend to be more difficult to manage, due to the diversity and volume of small commercial customers.

Large commercial and industrial programs

The large commercial and industrial programs are primarily in British Columbia, Manitoba, Ontario, Québec, and New Brunswick, but are included in the offerings of other provinces, as well. For example, Newfoundland and Labrador Hydro offers the *Industrial Energy Efficiency Program* focused on custom projects; while only targeting a small number of customers, the program has the potential to drive substantive savings over the medium term. The industrial programs tend to be more complex than programs in other sectors. Typical program elements include funding for energy audits and feasibility studies, and incentives for the implementation of equipment upgrades or process changes. Many of the programs also include performance optimization services, technical support, and monitoring and verification services. The energy audits and feasibility studies tend to be funded by the program administrator up to a pre-determined limit, and program participants are responsible for paying the portion of the study not covered by the program. Programs also tend to allow participants to access funds from multiple sources.

Program marketing involves developing a one-to-one relationship between the program participant and program administrator (e.g. utility, agency, etc.). There is a need for this dedicated relationship with the program participants because of the complexity of large commercial and industrial operations— e.g. the extended lifecycle of the assessment and implementation process, the provision of expert support, the management of implementation costs and determination of incentives, the monitoring and verification of energy savings, etc.

Other fuel programs

Other fuel programs are limited; they are offered in two provinces, Saskatchewan and Québec, and in the two territories. These programs are geared to the reduction in the use of other fuels such as fuel oil, propane, wood and wood pellets. The Agence de l'efficacité énergétique offers programs specifically designed to reduce the use of both light grade or heavy oil in the commercial and industrial market sectors. Program spending for each of these programs has increased significantly over the years; the Agence has allocated $27 million and $13 million, respectively, for the programs in 2010.

Transportation programs

The transportation programs included in this study are geared to driver education, gasoline and diesel fuel conservation, and greenhouse gas emission reductions. British Columbia, Alberta, and Québec have heavy-duty fleet transportation programs to assist owners and operators of long-haul transport trucks to reduce the use of fuel and reduce greenhouse gas emissions. Alberta's program, *Trucks of Tomorrow*, offers a rebate for modifications such as hybrid drivetrains, cab heaters/coolers, auxiliary power units, gap fairings, skirts, and end fairings; this program also offers a fleet analysis component. The Ministère des Transports du Québec offers a program with two components to support freight transportation trucking. The *Energy Efficiency in Freight Transportation—Trucking Component* program offers grants to offset capital costs to upgrade heavy-duty fleet transport trucks. This includes onboard generators and electrical backup systems, backup heating and conditioning systems, onboard computers, aerodynamics-enhancing equipment, and skirts for semi-trailers. The second component of this program is a grant to support research and to pilot projects that demonstrate potential for energy efficiency and greenhouse gas emissions reductions.

List of programs

The complete list of programs is included in Appendix A.

Program spending

Program spending was collected for as many programs as possible, and provides an interesting overview of the energy efficiency and

conservation efforts of each province. For the complete set of program spending tables, please see Appendix B. The following is a ranking of absolute provincial program spending in 2010, from highest to lowest:[8]

- Québec, $282.3 million
- British Columbia, $163.3 million
- Manitoba, $32.6 million
- Nova Scotia, $22.7 million
- New Brunswick, $17.3 million
- Saskatchewan, $9.9 million
- Newfoundland and Labrador, $6.2 million[9]
- Alberta, $0.4 million
- Northwest Territories, $0.3 million.

The biggest energy efficiency and conservation program spender is Québec, with a budget nearly twice that for British Columbia; the provincial program spending in these two provinces is significantly higher than in any other provinces. Provincial program spending in Manitoba, Nova Scotia, and New Brunswick is the next highest.

The following is a ranking of per capita provincial program spending in 2010, from highest to lowest:[10]

- British Columbia, $36.04
- Québec, $35.71
- Manitoba, $26.39
- Nova Scotia, $24.10
- New Brunswick, $23.09
- Ontario, $17.67[11]
- Newfoundland and Labrador, $12.22[12]
- Saskatchewan, $9.47
- Northwest Territories, $7.13
- Alberta, $0.10.

The per capita provincial program spending has tended to increase over the 2007-2010 period studied. For example, Québec increased per capita spending from $19.12 to $26.00 to $32.48 to $35.71; Newfoundland and Labrador increased per capita spending from

[8] Program spending information for 2010 was not available for Ontario, Prince Edward Island, or the Yukon.

[9] This total does not include Newfoundland and Labrador Housing Corporation program spending. Note that the total program spending in 2010 by the Department of Natural Resources included payments and grants issued retroactively for program participants of previous years.

[10] Program spending information for 2010 was not available for Ontario, Prince Edward Island, or the Yukon.

[11] $17.67 represents 2009 per capita provincial program spending. 2010 data is not available.

[12] This total does not include Newfoundland and Labrador Housing Corporation program spending. Note that the total program spending in 2010 by the Department of Natural Resources included payments and grants issued retroactively for program participants of previous years.

$1.77 to $2.13 to $7.51 to $12.22.[13] Nova Scotia nearly doubled per capita spending from $12.62 in 2009 to $24.10 in 2010. Those provinces that have decreased per capita spending have done so in insignificant amounts. For example, Manitoba spent $28.84/person in 2009 and $26.39/person on energy efficiency and conservation programs in 2010; British Columbia spent $37.43/person in 2009 and $36.04/person in 2010. The trend across Canada is to increase per capita energy efficiency and conservation program spending each year.

[13] This total does not include Newfoundland and Labrador Housing Corporation program spending. Note that the total program spending in 2010 by the Department of Natural Resources included payments and grants issued retroactively for program participants of previous years.

Part B overview

The purpose of Part B's work was to provide an in-depth analysis of select programs. Based on the programs reviewed in the Part A research report, and the programs recommended by IndEco, the NL project team selected 9 programs of interest—those with particular relevance to NL's energy goals, geography, economy, and customers. IndEco conducted interviews with the 9 program managers. Interview questions covered various aspects of the programs, including detailed program descriptions, eligibility criteria, funding, administration and support, program design features, delivery details, incentives, and monitoring and verification practices. IndEco prepared detailed program profiles with comprehensive descriptions, financial data, and anecdotal information. The following programs were described:

- *Product Incentive Program*, BC Hydro
- *Power Smart Partner Commercial*, BC Hydro
- *Continuous Optimization Program for Commercial Buildings*, BC Hydro
- *Small Business and Commercial Program*, FortisBC
- *Retrofit Program*, Ontario Power Authority
- *Power Smart Partner Industrial*, BC Hydro
- *Process and Systems Program*, Ontario Power Authority
- *Support for the Manufacturing Sector Program*, Agence de l'efficacité énergétique, Quebec
- *Trucks of Tomorrow*, Climate Change Central Alberta.

Of the selected programs, five programs target commercial customers, two programs target industrial customers, one is specifically for the manufacturing sector, and one is a transportation program.

Overview of programs

The following is a high-level overview of the 9 programs included in the Part B research. For each program, the target audience ("for"), program design features ("includes"), project evaluation protocols ("evaluation"), and the total annual program spending ("cost") are outlined. A screen capture from each program's website is also included.

Commercial

Product Incentive Program

Financial incentives for those replacing inefficient technologies.

Product Incentive Program, BC Hydro

- **For:** Customers who spend greater than $200,000 per year on electricity. This class of customers usually does not have a Key Account Manager
- **Includes:** Prescriptive, simple replacements of lighting, HVAC, refrigeration equipment
- **Evaluation:** Sample of projects randomly selected for on-site verifications
- **Cost:** $8.7 million/year

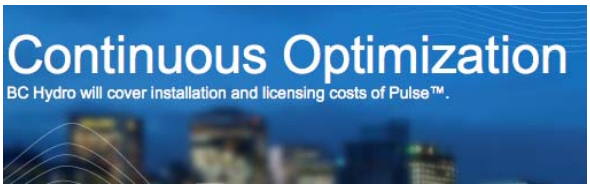
Power Smart Partner Program

If you spend at least $200,000 per year on electricity, this is the program for you.

Power Smart Partner Commercial, BC Hydro

- **For:** Commercial, government and institutional facilities with annual expenditures greater than $200,000 on electricity
- **Includes:** Energy study and training for facility employees; 75% of incremental costs for energy efficient retrofits that save more than 50,000 kWh/year, and/or prescriptive incentives for simple replacements
- **Evaluation:** Simple replacements, 20% on-site verification (larger projects more likely to be verified); larger projects, 40% on-site verification
- **Cost:** $25 million/year[14]

[14] Funding is divided into "business cases." In this case, the business case is 12 months. This funding is allocated for all of the projects initiated during the set business case.



Continuous Optimization Program[15] for Commercial Buildings, BC Hydro

- **For:** Commercial buildings greater than 50,000 ft^2 that have a Building Automation System[16] (BAS)
- **Includes:** Building audit, installation of energy management and information system (EMIS), retrocommissioning of building operations, ongoing support
- **Evaluation:** Monitoring and verification is inherent in EMIS
- **Cost:** Not available[17]

Small Business and Commercial Program, Fortis BC

- **For:** Non-residential customers with a demand less than 40 kW and connected to only one meter
- **Includes:** Energy audit and incentives for any measures with demonstrable electricity savings (e.g. retrofits of lighting, HVAC, refrigeration equipment, digital controls, motors, and building envelope upgrades); prescriptive and custom options available
- **Evaluation:** Ongoing, conducted by program evaluator (FortisBC employee); plus, on-site verifications of randomized sample of projects every 5 years, conducted by external evaluator
- **Cost:** $4 million/year

[15] Also known as "The Real-Time Metering Program" by program participants.

[16] A BAS is a computer system in the building that monitors and controls the lighting and mechanical systems (e. g. heating, cooling, etc.).

[17] Program cost not available. To help gauge size of program, note that it employs 8 full-time staff.

Retrofit Program, Ontario Power Authority

- **For:** Non-residential customers (including multi-family housing and social housing)
- **Includes:** Prescriptive (simple), engineered (complex, uses pre-set calculation worksheets), and custom (most complex) retrofit options
- **Evaluation:** Pre- and post-project on-site verifications of a statistically valid sample size[18]
- **Cost:** Not available

Industrial

Power Smart Partner Industrial, BC Hydro

- **For:** Transmission and largest distribution-connected industrial facilities (use more than 4 GWh/year)
- **Includes:** Incentives for expert energy advice, high-level and detailed audits, project incentives, conservation rates, energy monitoring system, employee education and engagement
- **Evaluation:** Pre- and post-project monitoring
- **Cost:** $29 million/year

[18] Sample size is the number of program participants needed to be "representative" of the all program participants. Sample size can be calculated for specific confidence levels and intervals for the total number of participants in the program. An example of a calculator, Macorr's, is available from: http://www.macorr.com/ss_calculator.htm. Accessed June 29, 2011.

Process and Systems Program, Ontario Power Authority

- **For:** Industrial customers with projects that can save greater than 350 MWh/year
- **Includes:** Incentives for engineering study, retrofits, monitoring and targeting system, access to an energy manager and/or key account manager
- **Evaluation:** Participants must submit measurement and verification plan; program funds 80% of costs to install and make operational the monitoring and targeting system
- **Cost:** Not available

Support for the manufacturing sector

Support for the Manufacturing Sector Program, Agence de l'efficacité énergétique, Quebec

- **For:** Manufacturing facilities that use light fuel oil, propane, and butane for heating and/or manufacturing
- **Includes:** Funding for energy analysis and incentives for retrofits/modifications of equipment
- **Evaluation:** Participants must complete monitoring and verification; costs are eligible under program
- **Cost:** $33.8 million/year

Transportation

Trucks of Tomorrow, Climate Change Central Alberta

- **For:** Private-sector commercial heavy duty vehicles that are privately owned or part of a company's fleet
- **Includes:** Prescriptive incentives for six categories of equipment—hybrid drivetrains, auxiliary power units, cab heaters/coolers, gap fairings, skirts, and end fairings; customer signs up online to reserve funds, then submits proof of purchase to receive incentive
- **Evaluation:** No project evaluations
- **Cost:** $2 million/1.5 year pilot

Program findings

Program design

- Understanding the barriers that exist for customers completing energy efficiency and conservation retrofits is important; consider conducting a market assessment study to understand where there is potential for energy conservation—in market segments, in end uses.
- Develop a program with a prescriptive and custom stream. This design allows simple projects to be implemented quickly, with minimal paperwork, and allows for more complex as well as unique projects to be eligible for the program.
- Consider using an online portal for simple replacement projects. This also minimizes the program's reliance on energy consultants in the area.
- Include travel costs for program players (e.g. program administrators, consultants, etc.) to conduct on-site visits. This will encourage program participation from geographically dispersed or remote customers, as well as capture the attention of businesses and industries that may not be considering energy efficiency in their operations.
- Consider including energy management and information systems (EMIS) in a program. There is a growing interest among businesses and industries to get more information about their energy consumption than just monthly energy bills, meaning there are opportunities for interval metering. If such equipment is considered for inclusion, investigate whether facilities' utility meters will need to be upgraded.

- Have a through understanding of the different benefit-cost tests (i.e. Total Resource Cost test, Utility Cost or Program Administrator Cost test, Rate Impact Measure test, etc.) and how a small change in the test result can have significant impacts on the program and in the market.
- Develop standardized reporting templates for participants to use.

Program marketing

- Divide the target market into segments[19] (e.g. commercial becomes hospitality, long-term care, etc.), and adjust marketing messages and materials for each target market; consider a program design that includes end-use bundles,[20] as in BC Hydro's *Power Smart Partner Industrial Program*.
- Maintain an informative, up-to-date program website; include program information, applications, etc.[21]
- Make the program application and reporting requirements as simple for the customer as possible to help increase participation.
- Conduct one-on-one meetings with the key decision makers of industries and businesses to help drive customer uptake. Following this, word of mouth often helps promote the program.
- Encourage partnerships with consultants, contractors, product vendors, industry associations, etc. These individuals and groups may become a (formal or informal) part of the program sales force.

Program delivery

- Ensure the program manager and delivery team is highly skilled and knowledgeable of energy efficiency and conservation. Consider providing formal training for the staff and program partners (e.g. Certified Energy Management training for key program delivery agents, as is done for the FortisBC *Small Business and Commercial Program*).
- Consider using customer relationship management (CRM) software to track program participation.

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[19] For example, BC Hydro's Product Incentive Program markets to 8 distinct market segments.

[20] 'End-use bundles' are offers for the six most common industrial systems: pumps, compressed air, fans & blowers, lighting, refrigeration, process controls; bundles are different for different systems and customer-types

[21] Use a robust information system for the program to ensure that it does not impose restrictions on desired program modifications.

Program incentives

- Include funding for energy audits and site studies.
- Provide incentives for energy efficient equipment purchase and installation. Incentives could be based on equipment replaced, energy saved from project, etc.
- Provide some form of ongoing support for the customer after the project has been completed (e.g. regular site visits by an energy coach).
- Build energy management capability in the marketplace by providing funding for facilities to hire and train energy managers. This will also help to ensure that energy savings from projects are sustained.
- Provide meter lending for industrial customers.
- Provide funds for employee energy awareness workshops and training, as behavioural changes have a significant impact on the overall energy savings derived from a retrofit project.

Project evaluation

- Conduct pre- and post-project on-site verifications; these visits may be conducted by an internal or external program delivery agent.
- Provide some incentives after project work is completed and verified.
- Use a standardized project evaluation protocol, such as the International Performance Measurement and Verification Protocol (IPMVP).[22]

[22] The IPMVP is owned by the Efficiency Valuation Organization (EVO), the only non-profit organization in the world solely dedicated to creating measurement and verification tools for resource efficiency. These protocols are updated annually and can be accessed online from: http://www.evo-world.org/. Accessed June 21, 2011.

Conclusions

The research conducted in Part A provides an overview of the governance structures and energy efficiency and conservation programs in each Canadian province. The report provides a snapshot of how the relationships between the various program delivery agents and program funders are managed.

The overview of the electricity and other fuels residential, commercial, and industrial programs and transportation programs is comprehensive and shows a range of program structures: small, simple programs such as the Ontario Power Authority's *Small Business Lighting Program* and large, complex programs such as BC Hydro's *Power Smart Partner Industrial Program*. Given the breadth of programs described, NL now has an enhanced picture of the program design options currently employed in Canada, and can use this information as a basis to determine the portfolio of programs for the province's business and industrial customers.

The summary and analysis of provincial program spending, both absolute and per capita, serves as an indicator for each province's commitment to energy efficiency and conservation. The evident trend is increased energy efficiency and conservation program spending each year. It is encouraging to learn that NL is on-track with respect to program spending.

Part B's research provided a more in-depth review of the programs of particular interest to the NL project team. From speaking directly with the program managers, IndEco was able to report on details of each program in an attempt to understand the program's strengths, weaknesses, and applicability to the customers of NL. Program findings for the design, marketing, delivery, and incentives, as well as project evaluation, were discussed.

This detailed look at the programs offers guidance for program design. It is also reassuring to learn that the delivery agents for energy efficiency and conservation programs are operating in an environment of open collaboration, and see program players in other provinces as part of the same team, working toward the same goals. The program managers we interviewed were interested in helping another province develop effective programs. They were willing to share information, best practices, and other references, and to be contacted by the NL project team with any further questions.

The NL project team will consider this body of research as they deliberate on the portfolio of energy efficiency and conservation programs for commercial, institutional, and industrial customers.

Appendix A.Comprehensive list of programs

Table 1 Comprehensive list of programs

Jurisdiction	Organization	Residential program	Commercial programs	Industrial programs	Transportation
British Columbia	Provincial Government				GreenFleets BC
					Idle-Free BC
					BC SCRAP-IT® Program
	LiveSmart BC	Energy Incentive Programs	Small Commercial Program		LiveSmart on the Road
		PST taxation exemption program			
	BC Hydro	Power Smart Appliance Rebate	Product Incentive Program	Power Smart Industrial Program	
		Fridge Buy Back	Power Smart Partner Program		
		Energy Conservation Assistance	Power Smart Express Program		
		Energy Savings Kit Offer	Power Smart Direct Install Program		
		Power Smart New Home Program	Continuous Optimization Program		
			New Construction Program		
	FortisBC	PowerSense Home Improvement Program (HIP)	FortisBC/ LiveSmart BC Lighting Installation Program (FLIP)	PowerSense Industrial Program	
		PowerSense New Home Program	Commercial New Construction		
			Small Business		

Jurisdiction	Organization	Residential program	Commercial programs	Industrial programs	Transportation
			and Commercial		
Alberta	Provincial Government				GreenTRIP program
	Climate Change Central	Partners in Efficiency	Light It Right		Trucks of Tomorrow
		Clothes Washer Rebate			
		Furnace and Boiler Program			
		Home Evaluation Program			
		Insulation Program			
	ATCO Electric	Home Energy Assessment	Energy Assessments for Business		
		Blower Door Assessment			
		Educational Outreach			
Saskatchewan	Provincial Government				2011 Green Rebate program
	SaskPower	The ENERGY STAR® Loan Program	Commercial Lighting Incentive Program		
		Energy Efficient Rebate for New Homes	Commercial HVAC Programs		
		Saskatchewan EnerGuide for Houses	Municipal Ice Rink Program		
		PST Exemption on ENERGY STAR® appliances	Parking Lot Controller Program		
		Light String Exchange	Energy Performance		

Jurisdiction	Organization	Residential program	Commercial programs	Industrial programs	Transportation
			Contracting		
		Halogen Floor Lamp Exchange			
		Mercury Thermostat Recycling			
		Refrigerator Recycling Program			
	Saskatchewan Research Council		Municipal Energy Conservation Program		
			Energy Efficient Lighting Program		
			Energy Efficient Heating Program		
			Demand Side Management (DSM) for Rinks		
Manitoba	Manitoba Hydro	First Nations Program	Commercial Building Envelope Program	Performance Optimization Program	
		Home Comfort & Energy Savings Program (Power Smart Residential Loan)	Commercial Building Optimization Program	Energy Efficiency Screening Studies	
		Home Insulation Program	Commercial Clothes Washer Program	Engineering Studies	
		Power Smart Home Energy Evaluation	Commercial Custom Measures		
		Lower Income Energy Efficiency Program	Commercial HVAC Program		
		New Home Program	Commercial Kitchen		

Jurisdiction	Organization	Residential program	Commercial programs	Industrial programs	Transportation
		(ended February 28, 2011)	Appliances Program		
		Water & Energy Savings	Commercial Lighting Program		
		WISE (Wisdom in Saving Energy)	Commercial Refrigeration Program for Retail Stores and Restaurants		
		Energy Finance Loan	Commercial Network Energy Management Plan		
		Multi-Family Housing Lighting Program	Commercial Building Envelope Program		
		Energy Efficient Lighting Program for Multi-Family Housing	Commercial Building Optimization Program		
			Power Smart Energy Manager Program for Schools (PSEM)		
			Power Smart Shops		
			Recreation Facilities		
			Religious Building Initiative - Low Interest Loan		
			Design Standards		
Ontario	Ontario Power Authority	Heating and Cooling incentive	Small Business Lighting	Process and Systems	
		Home Energy Assessment Tool	Direct Service Space Cooling	Industrial Accelerator	
		Fridge and	Demand		

Jurisdiction	Organization	Residential program	Commercial programs	Industrial programs	Transportation
		Freezer Pickup	Response		
		COUPONS	Retrofit Program		
		New Home Construction Program	High Performance New Construction		
			Audit Funding		
			Social and Assisted Housing		
			Existing Building Commissioning		
	Ministry of Energy	The Ontario Home Energy Savings Program (program is closed)			
Québec	Hydro-Québec	ENERGY WISE Home Diagnostic	Customized Component and Prescriptive Component	Electricity Consumption Analysis	
		Residential Lighting	Efficient Product Installation Program for Small Businesses (SAVEnergy-Pro)	Continuous Measurement and Energy Management	
		Electronic thermostats	Commercial Refrigeration Equipment	Prescriptive Measures	
		RECYC-FRIGO	Innovation Projects – AVENUES	Upgrades	
			Innovation Projects – IDEAS	New Plant, Expansion or addition Production Lines	
				Technology Demonstration	
	Agence de	Éconologis®	Refrigeration	Energy	

Jurisdiction	Organization	Residential program	Commercial programs	Industrial programs	Transportation
	l'efficacité énergétique		Optimization Program (OPTER) - Supermarket Component	Innovation Assistance Program	
		Novoclimat® New home construction	Refrigeration optimization program (OPTER) for owners of hockey arenas and curling rinks		
		Novoclimat® builder/ renovator program	Refrigeration Optimization Program (OPTER)- Agrifood Industry		
		Rénoclimat®	Heavy oil consumption reduction Support for the manufacturing sector		
	Ministère des Transports du Québec				Energy Efficiency in Freight Transportation - Trucking Component (Incentive program) Energy Efficiency in Freight Transportation - Trucking Component (Research program)r
New Brunswick	Efficiency New Brunswick	Existing Homes Energy Efficiency Upgrades Program	Existing Commercial Buildings Retrofit Program	Small and Medium Industrial Program	
		New Homes Program	New Commercial Buildings Incentive Program	Large Industrial Program	

Jurisdiction	Organization	Residential program	Commercial programs	Industrial programs	Transportation
		Existing Multi Unit Residential Building Upgrades Program	Incentive Programs and Energy Management Solutions		
		New Multi Unit Residential Buildings Program Information and Rebates	Energy Management for Municipalities		
Nova Scotia	Efficiency Nova Scotia	Appliance Retirement Program	EnerGuide for Multi-Unit Residential Buildings	Commercial and Industrial (C&I) Custom	
		Low Income Homeowners	Appliance Replacement Program	Commercial and Industrial New Construction	
		EnerGuide for Existing Houses	Powered Right		
		Performance-Plus	Small Business Lighting Solutions		
			Smart Lighting Choices		
			Business Energy Rebates		
Prince Edward Island	Office of Energy Efficiency	PEI Energy Efficiency Loan Program[23]	Commercial Sector and Institutional Buildings Program for Energy Incentives (CSIPEI)		
		PEI Energy Efficiency Loan Program for Low-income households	Business Energy Savings Program		
		PEI Energy Efficiency			

[23] http://www.gov.pe.ca/photos/sites/oee/file/oee_resform05(1).pdf

Jurisdiction	Organization	Residential program	Commercial programs	Industrial programs	Transportation
		Loan Relief Program for Low-income households			
		Home Energy Low-income Program			
		PEI Energy Efficiency Grant Program			
		PEI Energy Efficiency Windows and Doors Grant Program			
		Multi-unit residential program			
Newfoundland and Labrador	Newfoundland Power and Newfoundland Labrador Hydro	Insulation Rebate Program	Commercial Lighting Rebate Program		
		Thermostat Rebate Program			
		ENERGY STAR® Window Rebate Program			
	Newfoundland Labrador Hydro	Pilot Coupon Program (includes appliance rebates)		Industrial Energy Efficiency Program (IEEP)	
	Department of Natural Resources	Newfoundland and Labrador EnerGuide for Houses			
	Newfoundland and Labrador Housing	Residential Energy Efficiency Program			
Northwest Territories	Arctic Energy Alliance	Energy Efficiency			

Jurisdiction	Organization	Residential program	Commercial programs	Industrial programs	Transportation
		Incentive Program			
		Residential Advisory Service			
		Home Energy Evaluations			
		Borrow a Kill-A-Watt Meter			
Yukon	Energy Solutions Centre	Good Energy Rebate Program			

Appendix B. Provincial program spending tables

Table 2 Absolute electricity conservation spending by province

Province	Organization	2007 Absolute spending ($)	2008 Absolute spending ($)	2009 Absolute spending ($)	2010 Absolute spending ($)
British Columbia	LiveSmart BC	$176 550[24]	$22 982 099[25]	$28 933 364[26]	$24 780 061[27]
	BC Hydro[28]	$ 47 313 000[29]	$ 67 554 000[30]	$ 104 807 000[31]	$ 134 792 000[32]
	Fortis BC	Not available	$2,683,000[33]	$ 3 667, 000[34]	$3,712,000[35]
Alberta	ATCO Electric[36]	$ 205 000	$ 264 000	$ 366 000	$ 386 000

[24] Program spending for LiveSmart BC provided by Cory Waters, Manager, Energy Efficiency Programs

[25] Ibid

[26] Ibid

[27] Ibid. The 2010 program spending will be finalized in August 2011.

[28] BC Hydro tracks its spending by its fiscal year which runs from April 1 to March 31.

[29] This program spending is broken down by: program, load displacement expenditures, indirect and portfolio enabling expenditures, public awareness and communication, and information technology. Data source: BC Hydro. "Report on Demand-Side Management Activities for the Twelve Months Ending March 31, 2007" <http://www.bchydro.com/etc/medialib/internet/documents/info/pdf/directive_69_update_report_on_demand_side_management_acti.Par.0001.File.directive_69_update_report_on_demand_side_management_acti.pdf>

[30] This program spending is broken down by: rate structures, program, load displacement expenditures, public awareness and education, community engagement, technology innovation, codes and standards support, information technology, and indirect and portfolio enabling expenditures. Data source: BC Hydro. "Revised Report on Demand-Side Management Activities for F2010" <http://www.bcuc.com/Documents/Proceedings/2010/DOC_26011_B-8-1_BCHydro-Revised-Appendix8.pdf >

[31] Ibid

[32] Ibid

[33] This spending is broken down by: residential energy efficiency (which includes promoting a "conservation culture"), commercial and industrial energy efficiency, and planning and evaluation. Data source: Consortium for Energy Efficiency. The State of the Efficiency Program Industry: 2008 <http://www.cee1.org/files/CanadianElectricbyOrg.pdf>

[34] This spending is broken down by: residential energy efficiency (which includes promoting a "conservation culture"), commercial and industrial energy efficiency, and planning and evaluation. Data source: Consortium for Energy Efficiency. *The State of the Efficiency Program Industry: 2009* <http://www.cee1.org/files/CanadianElectricbyOrg.pdf>

[35] 2010 program spending estimate as provided by FortisBC

[36] ATCO Electric tracks its spending by the calendar year. Data source for all years: Mark Antonuk, ATCO EnergySense

Province	Organization	2007 Absolute spending ($)	2008 Absolute spending ($)	2009 Absolute spending ($)	2010 Absolute spending ($)
Saskatchewan		Not available	Not available	$4 300 000[37]	$9 900 000[38]
Manitoba	Manitoba Hydro	$36 143 820[39]	$37 108 825	$35 178 161	$32 596 307[40]
Ontario	Ontario Power Authority[41]	Not available	Not available	$230 815 975[42]	Not available
Québec	Hydro Québec	$147 000 000[43]	$192 000 000	$ 221 000 000	$223 000 000[44]
	Agence de l'efficacité énergétique[45]	Not available	$9 542 906	$33 297 804	$59 339 169
New Brunswick	Efficiency New Brunswick[46]	Not available	$ 17,776,079[47]	$ 16 211 846[48]	$ 17 339 200[49]

[37] http://www.cee1.org/ee-pe/2010data.php3 Table 14-1; Program expenditures are broken down by residential, low-income, commercial and industrial and evaluation and monitoring

[38] http://www.cee1.org/ee-pe/2010data.php3 Table 14-1; Program budget is broken down by residential, low-income, commercial and industrial and evaluation and monitoring

[39] Manitoba Hydro program spending. Data source for all years Cheryl Pilek, Manitoba Hydro

[40] Manitoba Hydro program spending for 2010 not final numbers. Data source for all years Cheryl Pilek, Manitoba Hydro

[41] The Ontario Power Authority (OPA) has advised that the information on program spending is available in the Consortium for Energy Efficiency's annual reports: *The State of the Efficiency Program Industry* as well as at responses to Pollution Probe Interrogatories #1 and #7 from the OPA's 2011 Revenue Requirement case, EB-2010-0279. Personal communication with Raegan Bond, Manager Conservation Portfolio. IndEco reviewed these references and found the 2009 spending which is included in the table. No other spending information was found in the reports referenced by the OPA representative. A directive from the Minister of Energy to the OPA issued on July 13, 2006 with Subject Title: *Coordination and Funding of LDC activities to deliver Conservation and Demand-Side Management Programs* states that LDCs submitted plans for $163 million worth of electricity conservation and demand side management projects for the period running from year 2005 to year 2007. The directive also states that funding for the LDC activities for years 2007 to year 2010 was not to exceed a total of $400 million

[42] This spending is broken down by: residential energy efficiency, low income energy efficiency, commercial and industrial energy efficiency and load management. Data source: Consortium for Energy Efficiency. *The State of the Efficiency Program Industry: 2009* <http://www.cee1.org/files/CanadianElectricbyOrg.pdf>

[43] Hydro Québec program spending 2007 to 2011 forecast

[44] Hydro Québec 2010 forecasted program spending

[45] Agence de l'efficacité énergétique program spending provide by J. E. Alain Daneau, Directeur général Direction générale des secteurs de l'innovation technologique, des transports et du développement de l'industrie Agence de l'efficacité énergétique; residential programs target electricity, oil and naturual gas energy sources; commercial refrigeration target petroleum and natural gas energy sources

[46] Efficiency New Brunswick tracks its spending according to its fiscal year which runs from April 1 to March 31

[47] This spending is broken down by: residential energy efficiency (which includes promoting a "conservation culture"), commercial and industrial energy efficiency, and planning and evaluation. Data source: Consortium for Energy Efficiency. The State of the Efficiency Program Industry: 2008 <http://www.cee1.org/files/CanadianElectricbyOrg.pdf>

Province	Organization	2007 Absolute spending ($)	2008 Absolute spending ($)	2009 Absolute spending ($)	2010 Absolute spending ($)
Nova Scotia	Nova Scotia Power /Efficiency Nova Scotia[50]	Not available	Not available	$ 11 850 000[51]	$ 22 710 000[52]
Prince Edward Island	Prince Edward Island Office of Energy Efficiency[53]	Not available	Not available	Not available	Not available
Newfoundland and Labrador	Department of Natural Resources[54]	Not available	Not available	$ 326,578	$3,294,083[55]
	Newfoundland Power[56]	$ 898 000	$ 1077 000	$ 2 549 000	$ 3 260 000
	Newfoundland Labrador Hydro[57]	Not available	Not available	$ 167 000	$ 500 000

[48] This program spending includes and is broken down by the following: executive administration, energy efficiency programs, and loans and advances. Source: *Efficiency New Brunswick 2007-2008 Annual Report* < http://0101.nccdn.net/1_5/39c/358/0ae/View-the-2007-2008-ENB-annual-report.pdf >

[49] This program spending includes and is broken down by the following: executive administration, energy efficiency programs and loans and advances. Source: *Efficiency New Brunswick 2008-2009 Annual Report* < http://0101.nccdn.net/1_5/1bd/1b0/340/View-the-2008-2009-ENB-annual-report.pdf >

[50] Efficiency Nova Scotia's tracks its spending by the calendar year

[51] These expenditures actually cover years 2008 and 2009. However, the full portfolio of programs was not to be available until 2009. According to the *DSM Programming Plan 2008-2010 and Framework to 2013* issued Jan 31st 2008, spending in 2008 was to be focused on the initiation of some programs, and program development of all programs. This program spending includes and is broken down by the following: incentives and third party delivery agents, administration and expenses and consulting. Spending data source: Chuck Faulkner, Efficiency Nova Scotia

[52] This program spending includes and is broken down by the following: incentive programs (by program name), education and outreach, development and research and Efficiency Nova Scotia Corporation start-up. Data source: Chuck Faulkner, Efficiency Nova Scotia, March 29, 2011

[53] The Office of Energy Efficiency tracks its spending according to its fiscal year which runs from April 1 to March 31. The Office will not have expenditures on electricity conservation programs until 2011. Data source for all years: Mike Proud, Government of Prince Edward Island Energy Efficiency Office

[54] The Department of Natural Resources tracks its spending according to its fiscal year which runs from April 1 to March 31. This program spending includes costs for: grants, travel subsidies, evaluation, salaries, and administrative costs. Data source for all years: Ashley McCarthy, Government of Newfoundland Department of Natural Resources

[55] This spending includes program spending related to participants of previous years and program grants issued on a retroactive basis

[56] Expenditures are made under the joint takeCHARGE program which is administered by both Newfoundland and Labrador Hydro and Newfoundland Power. Newfoundland Power tracks its spending according to the calendar year. The program costs include and were broken down by: program, general costs defined as those program related costs which cannot be assigned to a single program (such as advertising and retail point-of-purchase materials that include multiple programs), education and outreach, support, planning and CDM capital expenditures. Data source for all years: Lorne Henderson, Newfoundland Power.

Province	Organization	2007 Absolute spending ($)	2008 Absolute spending ($)	2009 Absolute spending ($)	2010 Absolute spending ($)
	Newfoundland Labrador Housing Corporation[58]	Not available	Not available	$ 3 400 000	$ 4 500 000
Northwest Territories	Arctic Energy Alliance[59]	Not available	Not available	$262 700	$312 373
Yukon		Not available	Not available	Not available	Not available

Table 3 Per capita electricity conservation spending by province

Province	2007 Per capita spending ($)	2008Per capita spending (Absolute $/population)	2009 Per capita spending (Absolute $/population)	2010 Per capita spending (Absolute $/population)
British Columbia	$11.02[60]	$21.26	$37.43	$36.04
Alberta	$0.06	$0.07	$0.10	$0.10
Saskatchewan	Not available	Not available	$4.18	$9.47
Manitoba	$30.28	$30.78	$28.84	$26.39
Ontario	Not available	Not available	$17.67	Not available
Québec	$19.12[61]	$26.00	$32.48	$35.71
New Brunswick	Not available	$23.80	$21.65	$23.09
Nova Scotia	Not available	Not available	$12.62	$24.10
Prince Edward Island	Not available	Not available	Not available	Not available
Newfoundland and Labrador	$1.77[62]	$2.13[63]	$12.68	$22.67

[57] Expenditures are made under the joint takeCHARGE program which is administered by both Newfoundland and Labrador Hydro and Newfoundland Power. Newfoundland Labrador Hydro information provided by Simone Browne, Energy Efficiency Manager

[58] Newfoundland Labrador Housing Corporation information provided by Morley Linstead, Manager Home Assistance Programs

[59] Program spending information provided by F MacDonald, Office Manager, Arctic Energy Alliance

[60] Spending for FortisBC not included

[61] Spending for Agence de l'efficacité énergétique not included

[62] Spending for Department of Natural Resources, Newfoundland Labrador Hydro, and Newfoundland Labrador Housing Corporation not included

Province	2007 Per capita spending ($)	2008Per capita spending (Absolute $/population)	2009 Per capita spending (Absolute $/population)	2010 Per capita spending (Absolute $/population)
Northwest Territories	Not available	Not available	$6.01	$7.13
Yukon	Not available	Not available	Not available	Not available

[63] Ibid

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