Q. **Re: NLH Evidence, Section 1, page 1.8, lines 11-12**

"Hydro and NP have jointly developed and implemented a five-year Conservation and Demand Management (CDM) plan and filed an updated plan in 2012."

Please provide copies of the five-year Conservation and Demand Management (CDM) plan and the updated plan filed in 2012, as well as all annual reports and other reports concerning CDM filed with the Board.

A. Please see the following attachments:

Attachment 1 – Hydro and NP Five-Year Energy Conservation Plan 2008-2013;
Attachment 2 – Hydro and NP Five-Year Energy Conservation Plan 2012-2016;
Attachment 3 – Hydro 2011 Conservation and Demand Management Report;
Attachment 4 – Hydro 2012 Conservation and Demand Management Report; and
Attachment 5 – 2008 Conservation and Demand Management (CDM) Potential (Marbek Resource Consultants Ltd.)

A REPORT TO
THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

FIVE-YEAR ENERGY CONSERVATION PLAN: 2008 - 2013

Pursuant to Order No. P.U. 8 (2007)

HYDRO
THE POWER OF COMMITMENT

NEWFOUNDLAND POWER
A FORTIS COMPANY

JUNE 2008

CONTENTS

1.0 EXECUTIVE SUMMARY

The *Five-Year Conservation Plan: 2008-2013* (the Plan) provides an overview of the current conservation marketplace in the Province of Newfoundland and Labrador, and outlines the strategy to be implemented by Newfoundland and Labrador Hydro and Newfoundland Power (the Utilities) for joint conservation activities. The Plan outlines technologies, programs, supporting elements and cost estimates that support a long term goal of development of a conservation culture and sustainable reduction in electricity consumption.

This *Five-Year Conservation Plan: 2008-2013* follows the broad methodological guidance contained in Marbek Resource Consultant Inc.'s January 2008 study of conservation potential[1] (the Potential Study), and considers the current conservation marketplace. The specific programs described in the Plan were selected by the Utilities to deliver energy efficiency savings to customers over the next five years. However, it is expected that program offerings and conservation activities in the province will evolve through 2013. This strategy will remain flexible to address the changing landscape, as both Newfoundland and Labrador Hydro and Newfoundland Power ramp up their collective efforts to realize energy efficiency potential.

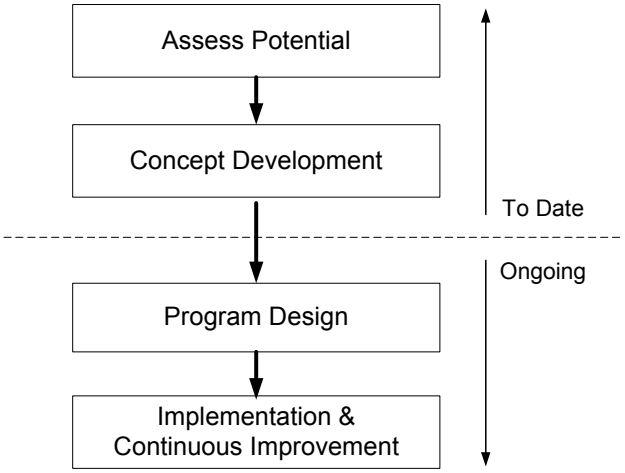
Delivery of these programs is scheduled to commence in 2009. The total estimated energy savings through 2013 under this plan are 79 GWh per year. The total estimated costs through 2013 are $28.7 million.

Figure 1 shows the major steps in program development. [2]

[1] The Potential Study was prepared by Marbek Resource Consultants Inc. jointly for Newfoundland and Labrador Hydro and Newfoundland Power. It was filed with the Board of Commissioners on Public Utilities (the Board) on March 20, 2008.

[2] The program development cycle was illustrated in the Potential Study *Program Evaluation Guidelines*, pp. 3.

Figure 1
CDM PROGRAM DEVELOPMENT: MAJOR STEPS



The Plan marks completion of concept development and the beginning of the program design phase.

2.0 OVERVIEW

2.1 Provincial Context

Public interest in energy conservation has increased materially over the recent past. This development has resulted from a number of factors including rising energy prices and a growing consciousness of the environmental impacts of energy usage. The Government of Newfoundland and Labrador's *2007 Energy Plan* clearly reflected an increased provincial public policy focus on improved overall energy efficiency.

The *2007 Energy Plan* announced the creation of the Energy Conservation and Efficiency Partnership (the ECEP) which will be chaired by the Provincial Department of Natural Resources. Both Utilities will be members of the ECEP.

The ECEP is currently in its formative stages and full membership is not yet fully established. However, the Department of Natural Resources (the Department) has taken the initiative to fund certain energy conservation programs that were delivered by the Utilities and community partners. In 2007, the Department contributed to the *Holiday Light Switch LED*[3] *Campaign* which encouraged electricity consumers to switch to more energy efficient LED Christmas season lighting and brought the support of the Council of Atlantic Premiers to the *SAVE CFL Campaign* which distributed compact fluorescent light bulbs (CFLs) in the Burin and Labrador West areas of the province.

The federal government also has a presence in the current conservation marketplace. The federal Department of Natural Resources' Office of Energy Efficiency publishes a number of consumer publications, and sponsors and participates in a variety of events and programs.[4]

[3] Light Emitting Diode (LED)

[4] The federal Department of Natural Resources (NRCan) Office of Energy Efficiency provides copies of consumer publications for utility circulation to its customers. NRCan programs include *Dollars to $ense* (aimed at energy conservation for small business) and *EcoEnergy Retrofit* (aimed at energy efficiency retrofits of existing homes) and CIPEC (aimed at providing capital assistance for industrial efficiency projects). In this province, federal program participation has been low but will be encouraged through new utility programs.

2.2 Utility Approach

The electricity sector in the province has been part of these broader developments in energy conservation. Consumers of electricity have indicated a heightened interest in understanding how to conserve and an expectation that Utilities will provide them assistance in this regard.[5] The Utilities have renewed their focus on energy efficiency and conservation in response to consumer expectations.[6]

Current utility energy efficiency and conservation efforts are undertaken on a co-operative basis. Both customer information and programming offered by the Utilities are coordinated to provide consistency for customers.[7]

The Plan outlines a joint utility approach to development of provincial conservation and demand management (CDM) activities[8]. The Utilities recognize that providing conservation and efficiency programming is in line with efforts to be responsible stewards of provincial electrical energy resources and is also consistent with provision of least cost reliable electric service.

A network of retail and trade participants in the provincial energy efficiency marketplace is also evolving. The Utilities have developed partnerships with such participants over the past few years. In addition, non-profit organizations with a variety of environmental and social objectives have demonstrated an interest in energy efficiency.[9]

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5 Surveys conducted by both Newfoundland and Labrador Hydro and Newfoundland Power since 2005 have consistently indicated that both Utilities' customers feel conservation is important and expect Utilities to provide information that helps enable customers to conserve electricity.

6 In the early 1990s, an increase in customer conservation programming occurred across North America including in Newfoundland and Labrador. This substantially diminished throughout North America in the later 1990s.

7 Both Utilities, for example, currently offer *Wrap Up For Savings* and co-ordinate informational messaging for customers and tips information on their websites.

8 The programs outlined in the Five-*Year Conservation Plan: 2008-2013* are proposed as joint initiatives which will address the provincial market in its entirety and will be coordinated under a single electricity conservation brand. However, each utility may identify unique opportunities that are appropriate to address their own customers. For example, isolated diesel communities may present opportunities that could be addressed independently by Newfoundland and Labrador Hydro.

9 Amongst such non-profit organizations are *Newfoundland and Labrador Federation of Municipalities, Habitat for Humanity, Atlantic Canada Sustainable Energy Coalition, Torbay Environment and Trails Committee, Seniors 50Plus Federation* and the *Conservation Corps Newfoundland and Labrador.*

The Plan has taken into account current participation in the electricity marketplace. It specifically attempts to complement efforts by others in conservation to improve overall effectiveness.

2.3 Conservation Potential

In January 2008, a comprehensive study of electricity conservation and demand management potential for the province was completed.

The Potential Study estimated the potential for electrical energy and demand savings on a sectoral basis (i.e., for each of the residential, commercial and industrial sectors). It also identified specific technologies available to assist in achieving that potential.

The Potential Study essentially provides a framework, consistent with current North American best practice, within which to assess conservation programming.[10] The findings enabled the Utilities to quickly focus on cost effective technologies for each sector and begin assessment of market characteristics which guide program concept development.

Market based data can also be expected to inform conservation planning and programming over the longer-term. The design, development and implementation of specific programs will yield information which will assist in both iterative revision/replacement of program offerings and broader conservation planning.[11] As forecasts and assumptions change, the potential available for overall conservation can be expected to change.[12]

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[10] The Potential Study includes *Program Evaluation Guidelines* which recommend specific metrics for assessing program cost effectiveness including the Total Resource Cost, Societal Cost Test and the Rate Impact Measure. See: *Program Evaluation Guidelines*, pp. 15 *et seq.*

[11] The use of market research as a tool in the program design and evaluation cycle is described at *Program Evaluation Guidelines*, pp. 3 *et seq.*

[12] During the concept development phase, many of the data inputs to the Potential Study were refined to reflect more recent data. For example, while the Potential Study indicated significant savings potential for Compact Fluorescent Lights in the residential market, recent market research found stronger growth in CFL penetration than had earlier data. This challenged the economics of a CFL rebate program.

Figure 2 shows the provincial energy usage forecast used in the Potential Study (the reference case), and the upper and lower achievable potentials estimated by the Potential Study[13].

Figure 2

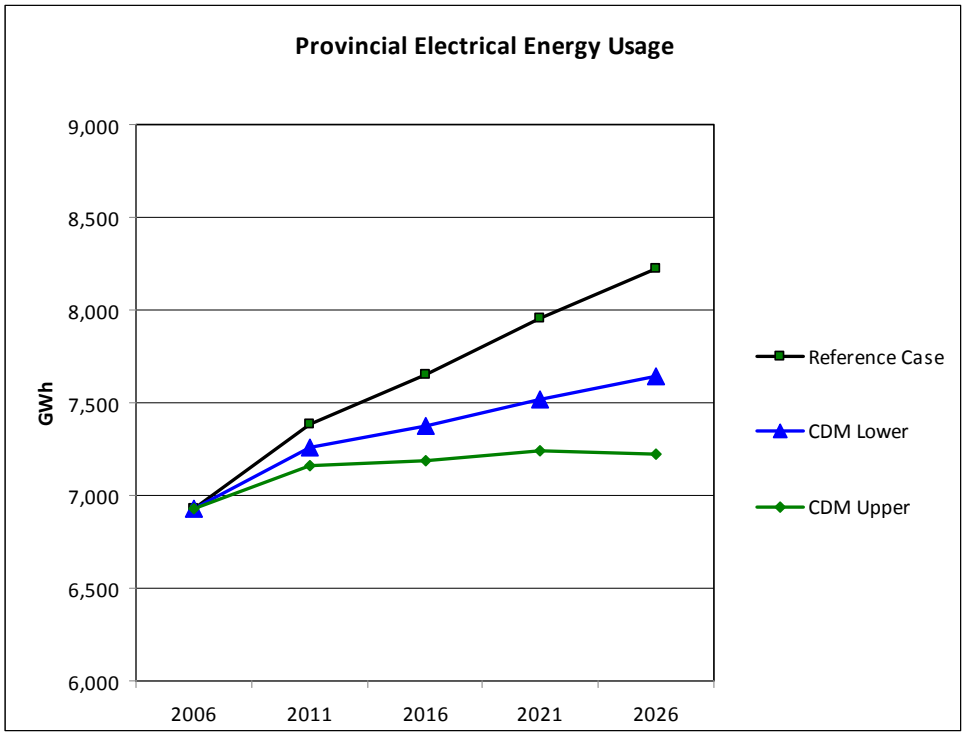

Figure 2 shows that over time, the cumulative effects of implementing cost effective technologies can significantly reduce the forecast growth in electrical usage.

The Potential Study estimated energy savings at five-year intervals. At the end of the first interval, 2011, the Potential Study shows a lower achievable potential savings of approximately 124 GWh. This compares with savings of 79 GWh currently estimated for the specific programs identified in the Plan.[14]

[13] The Potential Study examined two scenarios for conservation programming, with the Lower Achievable being a less aggressive approach and the Upper Achievable being a more aggressive approach. The achievable savings included considerations of market barriers, complementary programs and agencies, as well as other factors.

[14] As additional programs are developed during the planning period, expected savings will increase.

2.4 Other Considerations

The long-term course of conservation programming can be expected to evolve as the estimates of the cost of new electricity supply evolve. This reflects the essential fact that *cost effective* conservation programs will be those that yield benefits in excess of estimated new or future supply options. The supply outlook beyond 2014 for the Island Interconnected System is somewhat clouded by the possible Lower Churchill/Infeed project currently being assessed. If it does proceed, this project will impact the economic evaluation of conservation programming.

The consumer price of electricity could also affect conservation programming economics into the future. Currently, Newfoundland Power is undertaking a comprehensive rate review with a primary focus on economic efficiency in electricity pricing. While the results of this review may ultimately impact conservation programming, no particular assumption has been made regarding that review in the Plan.

3.0 FIVE-YEAR CONSERVATION PLAN: 2008-2013

3.1 The Plan in General

The Plan has been prepared jointly by the Utilities. It is anticipated that it will be updated periodically as program development and implementation capability develops and the conservation marketplace evolves.

The Plan adopts the sector based approach to conservation planning and programming used in the Potential Study. The detailed design of the programs in this plan will follow from the recommendations of the Potential Study and will consider lessons learned from other utilities in CDM program delivery. In addition, the types of programs included are broadly consistent with those currently offered by public utilities in Canada.[15]

The specific program focus of the next five years is *energy* conservation. Current high marginal energy costs (which predominantly reflect fuel costs) on both the Island Interconnected System and isolated systems justify such a focus.[16] However, it should be noted that because of the strong link between energy and demand, the programs launched will also bring about demand reductions.[17]

The principal focus for programming is the near term period 2009-2010. The last three years of the current five-year planning horizon (i.e., 2011-2013) are expected to have materially expanded program offerings to address additional energy conservation technologies. Program development and implementation capabilities will be increased and additional information will be obtained through continued market research and experience from the delivery of initial programs.

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15 Differences from other jurisdictions are largely due to local market factors, and the need for the Utilities to ramp up their delivery capacity and gain expertise before increasing the level of programming offered.

16 Newfoundland and Labrador Hydro's current system planning criteria for the Island Interconnected grid also has a significant energy focus. In other jurisdictions, pressures to build new generation capacity for peak load periods may result in more focus on demand savings or peak reductions.

17 Newfoundland Power's existing Demand Management activities (Curtailable Service Option and Facilities Management) will continue but are excluded from the Plan.

3.2 Program Selection

The development of the specific programs in the Plan has been based on a market assessment for Newfoundland and Labrador. The programs and supporting initiatives outlined address the market barriers and opportunities, providing communication and education initiatives in addition to rebate and incentive programs. The broad program concepts have been defined, which will lead to detailed program design and implementation.[18]

The Potential Study used avoided cost screening[19] to develop the list of economically viable technologies. This cost screen identified a large number of potential technologies, which warrant investigation of associated program delivery costs.

In addition, implementation capability of the Utilities was a primary criterion in program selection. The selected programs build on the current capacities of the Utilities gained through existing and past incentive programs, partnered initiatives and education efforts.

The selected technologies reflect the refinement of the energy conservation potential and economics identified in the Potential Study, through updated local market information and program cost estimates. The primary metric for assessing program cost effectiveness proposed in the Potential Study is the Total Resource Cost (TRC) test.[20] Each program implemented by the Utilities will have a positive TRC result.[21]

Schedule A contains the program descriptions for the Plan.

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[18] Detailed program design will include (i) completion of comprehensive market research and determination of appropriate incentives, (ii) identifying the required market relationships (i.e., service and product supply) for program delivery, (iii) creation of customer information, (iv) development of necessary systems and procedures to support the program, and (v) establishing appropriate parameters for ongoing program monitoring and evaluation.

[19] The screen was based on avoided costs from an earlier study conducted by NERA Economic Consulting, entitled Marginal Costs of Generation and Transmission, completed in May 2006 for Newfoundland and Labrador Hydro.

[20] The TRC test measures the net program benefits against program costs. See: *Program Evaluation Guidelines*, pp. 15 *et seq*.

[21] The TRC results for each program are found on the program profile templates found in Schedule A.

3.3 Specific Programs

The programs selected for implementation in the near term period 2009 - 2010 are as follows:

- Residential Windows
- Residential Thermostats
- Residential Insulation
- Commercial Lighting
- Industrial Customer Custom Projects

Programs for the residential sector are aimed at space heating and include *Energy Star* windows, programmable and high efficiency thermostats, and insulation. For the window and thermostat programs, a relatively high level of market information is available from product retailers, wholesalers and manufacturers currently in the conservation marketplace. For the insulation program, market data is more disaggregated and refining data more challenging. Market information from the existing rebate programs offered by the Utilities has been useful for the thermostat and insulation programs.

Commercial programming is focused on lighting, which the Potential Study identified as the single largest area of opportunity for this sector. Data for the lighting market is also disaggregated, and further research will be required for detailed program design. Utilities in other Canadian jurisdictions have used this type of program as a point of entry to the commercial conservation market.[22]

The approach to the industrial sector responds to the unique nature of industrial facilities, with a program based on custom engineering proposals, as established in other jurisdictions.

Table 1 shows energy reduction estimates associated with the specific programs outlined in the Plan.

[22] Based on information from Hydro Ottawa and Fortis BC.

Table 1
Conservation Programs
Energy Reduction Estimates: 2008-2013
by Sector
(MWh)

	2008[23]	2009	2010	2011	2012	2013
Residential	1,120	5,690	10,950	16,950	23,830	31,520
Commercial	-	590	1,760	2,930	2,930	2,930
Industrial[24]	-	-	-	20,000	45,000	45,000
Total	**1,120**	**6,280**	**12,710**	**39,880**	**71,760**	**79,450**

Estimated energy savings for the residential sector reflect existing programs and program development capability of the Utilities, which have largely focused on this sector. Commercial sector energy savings reflect program growth in a sector that is relatively new to the Utilities. Industrial sector estimates are based on ongoing consultation with transmission level customers.[25]

Table 2 shows cost estimates for the specific programs outlined in the Plan.

Table 2
Conservation Programs
Program Cost Estimates: 2008-2013[26]
by Sector
($000s)

	2008[27]	2009	2010	2011	2012	2013	Total
Residential	330	1,930	1,830	2,180	2,170	2,470	10,910
Commercial	-	290	310	340	-	-	940
Industrial	100	1,470	2,640	4,270	-	-	8,480
Total	**430**	**3,690**	**4,780**	**6,790**	**2,170**	**2,470**	**20,330**

[23] 2008 energy reduction estimates reflect existing programs.
[24] The Potential Study industrial sector savings did not include the customers' self-generation supplied energy. However, these are included here.
[25] Expected energy reductions are consistent with the Potential Study overall. On a sectoral basis, differences with the Potential Study reflect new market information and the current program development capabilities of the Utilities.
[26] Estimates include all costs associated with specific programs, including program research, design, incentives, marketing, and management.
[27] 2008 program cost estimates reflect existing programs and new program development.

Within the planning period, the Utilities will continue to assess applicability of additional technologies outlined in the Conservation Potential Study for local market conditions. For the residential sector, assessment of heating technologies and the market for energy efficient appliances and energy monitoring devices may result in program initiatives. For the commercial sector, an expansion of more customized incentives in the area of lighting will be assessed, and programs implemented where justified. Incentives for other commercial end uses, including HVAC, refrigeration and the building envelope, will also be assessed for program potential. For the industrial sector, programming is expected to be more customized to better achieve potential efficiencies in this small customer group.

3.4 Education, Support and Planning

The successful implementation of a conservation plan over the long-term will require continuing efforts in general customer energy awareness and support. In addition, ongoing development and evaluation of potential programs will be required. These activities, while justified, will not be associated with the implementation of specific programs.[28]

Table 3 shows cost estimates for education, support and planning for the period 2008 to 2013.

[28] For example, informational, promotional, or educational effects aimed at brand awareness (i.e., *Energy Star* appliances) or products (i.e., compact fluorescent lighting) may not be related to a specific utility program but still be valuable to customers.

Table 3

Education, Support and Planning Cost Estimates: 2008-2013 ($000s)							
	2008[29]	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
Education[30]	580	660	750	770	820	900	4,480
Support[31]	150	120	150	180	190	220	1,010
Planning[32]	440	290	630	550	550	410	2,870
Total	**1,170**	**1,070**	**1,530**	**1,500**	**1,560**	**1,530**	**8,360**

The Utilities currently estimate that the aggregate cost associated with these activities will average approximately $1.4 million per year from 2008 through 2013.

3.5 Cost Recovery & Regulatory Approach

Schedule B contains a summary of currently estimated program costs and energy savings associated with the Plan.

The currently estimated costs are material: $1,600,000 in 2008 and $4,760,000 in 2009. They are not fully reflected in the current rates of either Newfoundland and Labrador Hydro or Newfoundland Power.[33]

Each of the specific programs outlined in the Plan will be subject to cost-effectiveness tests *prior* to implementation. The implementation of each is expected to be economically attractive when compared to the forecast cost of energy produced and

[29] 2008 cost estimates reflect existing and new activities in education, support and development.
[30] Education costs are principally costs associated with promoting energy awareness and include advertising, outreach events, and initiatives in partnership with others. Joint branding for electricity conservation will begin with the launch of these new programs.
[31] Support costs are principally costs associated with customer interaction focused on energy efficiency. As these costs support the full CDM portfolio but cannot be connected to specific programs, a portion of them will be included in assessing overall program cost effectiveness.
[32] Planning costs are the costs of program planning, development management and evaluation.
[33] Current rates of Newfoundland and Labrador Hydro and Newfoundland Power are based upon aggregate cost recovery for conservation of approximately $1,044,000 (Newfoundland and Labrador Hydro, $400,000; Newfoundland Power $644,000.)

delivered in the absence of implementation.[34] Accordingly, recovery of the costs of the programs in rates will be justified on a cost-of-service basis.

The estimates associated with the Plan reflect the current state of program development and can be expected to be refined as detailed program design progresses in 2008. To enable development and implementation of the specific programs in 2008 and 2009 will require the matter of cost recovery to be addressed, at least on an interim basis, prior to the end of 2008.[35]

[34] The primary metric for assessing program cost effectiveness proposed in the Potential Study is the Total Resource Cost (TRC) test. The TRC test measures the net program benefits against program costs. See: *Program Evaluation Guidelines*, pp. 15 *et. seq*.

[35] The Utilities are examining regulatory approaches in other jurisdictions and their applicability to this situation. Considerations include determining accounting treatments, cost allocation among ratepayers, communications and reporting mechanisms.

4.0 OUTLOOK

The majority of specific programs outlined in the Plan target the residential sector. To a degree, this is reflective of current program development capability. It is the current outlook of Newfoundland and Labrador Hydro and Newfoundland Power that the program offering will expand during the period to 2013.

During the planning period, the Utilities will undertake a reassessment of the conservation potential. This will assist in ensuring that utility conservation programming remains both responsive to potential in an evolving conservation market and complementary to initiatives undertaken by other participants, including governments. A reassessment of potential with respect to marginal cost updates will also assist in ensuring that programming continues to capture all cost effective technologies to reflect evolving system supply scenarios. Continued involvement in the marketplace will ensure programming continues to reflect the evolving marketplace.

The Utilities intend to work closely with the ECEP to ensure a consistent and coordinated approach is maintained in the delivery of conservation in the provincial marketplace.

Newfoundland and Labrador Hydro and Newfoundland Power expect that an appropriate means of stakeholder participation in conservation planning will develop through the ECEP in the near term.

The ECEP may also provide access to government funding to bridge particular barriers such as those in residential low-income program areas, and facilitate implementation of appropriate standards to support energy conservation.

Residential Windows

Program Description

The objective of this program is to increase the installation of *Energy Star* qualified windows, resulting in savings in space heating energy. The program components include rebates and financing, and a variety of education and marketing tools.

Target Market: Residential

This program targets residential customers, including new construction and replacement of existing windows at end of life. Eligibility is limited to electrically heated homes.

Eligible Measures

Eligible measures in this program are *Energy Star* qualified windows.

Delivery Strategy

Delivery of this program will be integrated with the revised *Wrap Up for Savings* insulation and thermostat programs.

Marketing initiatives will include partnering with retailers and trade allies in the home building and renovation industry, to target both do-it-yourself and professional installers. Communications will incorporate the *Energy Star* brand and related marketing support, as well as cross-promotion of the EcoEnergy Retrofit program from Natural Resources Canada. Tools and tactics will include retail and model home point-of-sale materials, advertising, tradeshows, community outreach and trade ally activities. Rebates and financing will be processed through customer application.

Residential Windows

Market Considerations

Energy Star qualified windows make up approximately 10% to 15% of window sales in the province, and understanding of the product is generally poor among customers and retailers. Initial cost is also a barrier to increased market penetration, due to a 10% to 15% price premium. Eligible windows are widely available. Local manufacturers produce approximately 50% of the provincial window sales, and most manufacturers offer *Energy Star* qualified products.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value will be based on the incremental cost of *Energy Star* qualified windows over the standard type.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	40	420	400	500	510	610	2,480
Estimated Cumulative Energy Savings (MWh)	-	230	570	1,020	1,700	2,610	
Total Resource Cost (TRC)	2.4						

Residential Thermostats

Program Description

The existing thermostat rebate program will be revised based on the CDM Potential Study and market research. The continuing objective of this program is to increase the use of both programmable thermostats, which automatically set back room temperature, and high performance thermostats, which control room temperature very accurately, in order to save space heating energy. The program components include rebates and financing, and a variety of education and marketing tools.

Target Market: Residential

This program targets residential customers, including home retrofit and new construction. Eligibility is limited to electrically heated homes.

Eligible Measures

Eligible measures in this program include both programmable and high performance thermostats (for example, those which control within +/- 0.5C.)

Delivery Strategy

Delivery of this program will be integrated with the new residential windows and revised *Wrap Up for Savings* insulation programs.

Marketing initiatives will include partnering with manufacturers, retailers, electrical contractors, as well as homebuilders and real estate professionals to educate consumers regarding the energy savings and comfort benefits of programmable and high performance thermostats. Communications will incorporate cross-promotion of the EcoEnergy Retrofit program from Natural Resources Canada. Tools and tactics will include retail and model home point-of-sale materials, advertising, tradeshows, community outreach and trade ally activities. Rebates will be processed directly by authorized retailers and through customer-submitted coupons.

Residential Thermostats

Market Considerations

Sales of programmable and high performance thermostat types make up less than 10% of total thermostat sales provincially. Customer awareness of the important role of thermostats in heating system efficiency is low**.** Initial cost is a barrier to increased market penetration, particularly for new home construction where continued use of minimum quality thermostats represents significant lost opportunity. Availability of electronic high performance thermostats is currently limited in most areas, though programmable types are widely available.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value will be based on the incremental cost of the targeted thermostat types over the standard type.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings [1]

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	-	300	220	280	230	270	1,300
Estimated Cumulative Energy Savings (MWh)	-	270	650	1,210	1,910	2,650	
Total Resource Cost 2.4							

[1] Includes the cost of revising the existing program and the resulting energy savings. Excludes the cost and energy savings of existing program.

Residential Insulation

Program Description

The existing *Wrap Up for Savings* program will be revised based on the CDM Potential Study and market research. The continuing objective of this program is to increase the insulation level in basements, crawl spaces, walls and attics, resulting in savings in space heating energy. The program components include rebates and financing, and a variety of education and marketing tools.

Target Market: Residential

This program targets residential customers, including home retrofit and new construction. Eligibility is limited to electrically heated homes.

Eligible Measures

Eligible measures in this program include insulation upgrades to basements, crawl spaces, walls and attics. Rebates for new homes are limited to basement insulation beyond building code compliance. Technical requirements for each upgrade type will be reviewed during program detailed design.

Delivery Strategy

Delivery of this program will be integrated with the new residential windows and revised thermostat programs.

Marketing initiatives will include partnering with retailers and trade allies in the home building and renovation industry, to target both do-it-yourself and professional installers. Communications will incorporate cross-promotion of the EcoEnergy Retrofit program from Natural Resources Canada. Tools and tactics will include retail and model home point-of-sale materials, advertising, tradeshows, community outreach and trade ally activities. Rebates and financing will be processed through customer application.

Residential Insulation

Market Considerations

Older homes and small homes often have inadequate insulation levels. For example, over 45% of homes in the province built before 1950 have uninsulated basements. Most new homes constructed in the province still have no insulation on the concrete portion of basement walls. Initial cost is a barrier to increased market penetration, as is awareness of the impact on space heating energy, and the practical difficulties of renovating an existing living space. Recent experience with the *Wrap Up for Savings* program has shown participation to be responsive to awareness-building marketing activities.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value will be reviewed and will be restructured based on insulating value (R-value) rather than a prescriptive product list as currently offered.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings [1]

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	40	1,210	1,210	1,400	1,430	1,590	6,880
Estimated Cumulative Energy Savings (MWh)	-	4,130	8,670	13,660	19,160	25,200	
Total Resource Cost 2.6							

[1] Includes the cost of revising the existing program and the resulting energy savings. Excludes the cost and energy savings of existing program.

Commercial Lighting

Program Description

The objective of this program is to increase the installation of more efficient lighting technologies in commercial buildings. The program components include rebates on a specific list of qualifying technologies, and a variety of education and marketing tools.

Target Market: Commercial

This program targets retrofit of commercial building lighting, encouraging customers to replace existing lighting equipment.

Eligible Measures

The list of eligible measures in this program is based on the technologies identified as eligible for rebate under existing programs offered by other Canadian utilities (for example Ottawa Hydro and BC Hydro). These include T8 fluorescent electronic ballasts or fixtures, compact fluorescent lights (CFLs), and *Energy Star LED* exit signs.

Delivery Strategy

This program is expected to be operational for three years. Delivery will be integrated with future commercial sector programming, which is expected to include a custom project-based incentive program similar to the industrial custom program.

Marketing initiatives will include partnering with lighting manufacturers, distributors, and electrical contractors who will carry the program to potential customers. The program will create business opportunities for trade allies to sell more efficient lighting products. This approach has proven effective in other jurisdictions and in previous Newfoundland Power experience. Tools and tactics will include trade ally and business association activities, such as workshops for contractors and distributors, retail point-of-sale materials, and advertising in trade publications. Demonstration projects will be selected from early participants. Rebates will be processed through customer application.

Commercial Lighting

Market Considerations

The largest portion of the market opportunity in commercial lighting is with standard T12 fluorescent tube lighting with electromagnetic ballasts. This technology is used in approximately 60% of existing commercial building interior lighting in the province, though new construction is almost exclusively using the more efficient T8 fluorescents with electronic ballasts. Federal regulations will remove the electromagnetic ballast from new sales starting in 2010. However, there is a significant opportunity for replacement of existing T12 installations prior to their normal end of life (average lifespan 17 years). Primary barriers to increased use of the more efficient products include the higher initial capital cost, and lack of understanding of the opportunity for energy and cost savings.

Incentive Strategy

Incentives for this program include rebates for a prescriptive list of eligible technologies. The list will be based on the technologies identified as eligible for rebate under existing programs offered by other Canadian utilities (for example Ottawa Hydro and BC Hydro).

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	-	290	310	340	-	-	940
Estimated Cumulative Energy Savings (MWh)	-	590	1,760	2,930	2,930	2,930	

Total Resource Cost 1.1

Industrial Custom Program

Program Description

The objective of this program is to improve electrical energy efficiency in a variety of industrial processes. The program components include financial incentives based on energy savings, and other supports to enable industrial facilities to identify and implement efficiency and conservation opportunities. This program is a custom program to respond to the unique needs of the industrial market, rather than a prescriptive technology approach.

Target Market: Industrial

This program targets retrofit of industrial process equipment in the transmission level customers served by Newfoundland and Labrador Hydro.

Eligible Measures

Eligibility of projects is based on engineering review and confirmation of estimated energy savings impact. Technologies include, but are not limited to, compressed air, pump systems, process equipment and process controls.

Delivery Strategy

This program will be delivered through a call for proposals to Industrial Customers (IC) for energy saving projects that meet set financial criteria. These proposals will undergo engineering review for approval. Selected projects will be eligible for rebates based on savings and payback period reductions, as well as enabling supports including facility education, energy audits and other customized offerings.

The program will be managed internally with external engineering verification of projects and monitoring and evaluation of energy savings. The utility will take the role of facilitator and consultant in providing methods for ICs to complete project proposals and implement approved projects.

This program model has been used successfully in other jurisdictions. To ensure the cost effectiveness of this model with the unique nature and size of the industrial market in Newfoundland and Labrador, this program will launch as a three-year program using a single call for proposals and full evaluation cycle.

Industrial Custom Program

Market Considerations

This market requires a one-on-one approach to project design and delivery. The program builds on the work already completed by the ICs, and addresses their unique barriers to improved efficiency, which include, but are not limited to, access to capital and human resources.

The lifecycle for each program transaction will be measured in months rather than weeks because of the need for review, contract development, implementation timelines and post-installation monitoring and evaluation. This type of program requires that facilities have financial and business stability to continue operations for a time period appropriate to achieve cost effective savings.

Incentive Strategy

Incentives for this program include rebates based on energy savings, as well as funding assistance for additional enabling mechanisms. Rebate levels, maximum rebate amounts and payment schedules will be determined in the program detailed design phase. Rebates for each approved project will be determined through the call for proposals process, based on the engineering proposal and following a schedule agreed upon by the customer and utility.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, including engineering review and inspection of all projects and assessment of long-term impact on customer processes. Formal program evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	100	1,470	2,640	4,270	-	-	8,480
Estimated Energy Savings (MWh)	-	-	-	20,000	45,000	45,000	
Total Resource Cost 2.9							

Table B1
Conservation Programs
Program Cost Estimates: 2008-2013
by Sector
($000s)

	2008	2009	2010	2011	2012	2013	Total
Residential							
Insulation Program	260	1,210	1,210	1,400	1,430	1,590	7,100
Thermostat Program	30	300	220	280	230	270	1,330
Energy Star Windows Program	40	420	400	500	510	610	2,480
Commercial							
Lighting Rebate Program	-	290	310	340	-	-	940
Industrial							
Custom Retrofit Project Rebate Program	100	1,470	2,640	4,270	-	-	8,480
Total	**430**	**3,690**	**4,780**	**6,790**	**2,170**	**2,470**	**20,330**

Table B2
Conservation Programs
Energy Reduction Estimates: 2008-2013
by Sector
(MWh)

	2008	2009	2010	2011	2012	2013
Residential						
Insulation Program	1,060	5,190	9,730	14,720	20,220	26,260
Thermostat Program	60	270	650	1,210	1,910	2,650
Energy Star Windows Program	-	230	570	1,020	1,700	2,610
Commercial						
Lighting Rebate Program	-	590	1,760	2,930	2,930	2,930
Industrial						
Custom Retrofit Project Rebate Program	-	-	-	20,000	45,000	45,000
Total	**1,120**	**6,280**	**12,710**	**39,880**	**71,760**	**79,450**

FIVE-YEAR ENERGY CONSERVATION PLAN: 2012 – 2016

August 2012

FIVE-YEAR CONSERVATION PLAN: 2012 – 2016

CONTENTS

1.0 EXECUTIVE SUMMARY

Since the launch of the *Five-Year Energy Conservation Plan: 2008*-2013 ("the 2008 Plan") in 2008, Newfoundland and Labrador Hydro ("Hydro") and Newfoundland Power have offered customer energy conservation programs jointly under the takeCHARGE brand. These have included a variety of information and financial supports which help customers manage their energy usage. Energy savings resulting from these programs is forecast to exceed 68.3 GWh by the end of 2012.[1]

The current joint *Five-Year Energy Conservation Plan: 2012-2016* (the "2012 Plan") outlines the approach being taken by Hydro and Newfoundland Power (the "Utilities") to provide further opportunities for their customers to cost-effectively manage their electricity usage. The principles underlying the 2012 Plan are consistent with the 2008 Plan and with the 2008 conservation potential study (the "Potential Study").[2]

The 2012 Plan includes the continuation of the current joint customer energy conservation program portfolio and addition of new programs for the residential and commercial sectors. The proposed programs will promote additional high-efficiency technologies and reach a broader group of customers. The 2012 Plan also addresses customer education, program planning and evaluation processes, as well as the Utilities' costs and cost recovery arrangements. As in the 2008 Plan, the goal of these initiatives is to achieve energy savings through developing a culture of conservation.

[1] The energy savings indicated throughout the *Five-Year Energy Conservation Plan: 2012-2016* represent *gross* energy savings achieved by customers. These savings reflect all technologies installed by participating customers since program implementation. *Net* energy savings would reflect adjustments for: (i) the timing of customer installations giving rise to the energy savings; and (ii) program *free ridership* (an estimate of participants who would have chosen the more efficient product without the program).

[2] The 2008 Potential Study was prepared by Marbek Resource Consultants Inc., jointly for the Utilities. It was filed with the Board on March 20, 2008.

2.0 BACKGROUND

2.1 General

The Utilities jointly developed the 2008 Plan, which was filed with the Board in June 2008. The 2008 Plan provided an overview of the conservation marketplace in Newfoundland and Labrador and outlined a strategy to be implemented by the Utilities to offer joint energy conservation activities.[3]

Since 2008, the Utilities have offered customer energy conservation information and programming on a joint and coordinated basis under the takeCHARGE energy conservation brand.[4] The Utilities' provision of energy conservation programming is responsive to customer expectations, supports efforts to be responsible stewards of electrical energy resources and is consistent with provision of least cost, reliable electricity service.[5]

The focus of the Utilities' conservation initiatives is achievement of energy savings through the development of a culture of conservation.[6] Initiatives address energy savings opportunities for customers in each sector: residential, commercial and industrial.

The types of initiatives undertaken by the Utilities are complementary to the efforts of others in the provincial energy conservation marketplace. The Utilities partnered with

[3] Prior to 2008, the conservation information and programming offered by the Utilities were coordinated to provide consistency for customers. For example, both Utilities offered Wrap Up for Savings residential insulation incentive programs and coordinated the information provided to customers through websites and advertising.

[4] The programs outlined in the 2008 Plan were primarily joint initiatives which addressed the provincial market in its entirety. It was anticipated, however, that each utility might identify unique opportunities that would be appropriate to address their own customers.

[5] Surveys conducted by both the Utilities since 2005 have consistently indicated that customers are taking action toward conservation and expect the Utilities to provide information that enables customers to save electricity.

[6] Newfoundland Power also targets peak demand reductions through demand management activities, including the Curtailable Service Option and facilities management initiatives. These activities are expected to continue, but are not included in the 2012 Plan.

government, trade allies and other local interest groups, and coordinate utility initiatives with these stakeholders.

The customer energy conservation programming undertaken by the Utilities is cost effective, with the value of energy savings exceeding the costs required for program delivery. The primary metric for assessing cost effectiveness of the customer energy conservation programs is the Total Resource Cost ("TRC") test.[7]

2.2 Programs

Based on the 2008 Plan, the Utilities have jointly offered customer energy conservation programs which provide both information and financial incentives to encourage customer installation of energy efficient technologies, such as *ENERGY STAR* windows.[8] In addition, Hydro has offered expanded programming for its customers, such as incentives for commercial customers in its isolated system service territories.

Schedule A summarizes the energy savings and costs for the customer energy conservation programs offered by the Utilities from 2009 through 2011.

[7] The primary measure of the cost effectiveness of the customer energy conservation programs is the Total Resource Cost (TRC) test. The TRC test measures the net program benefits, in terms of utility system avoided costs, against utility and customer costs for the program. This is the most commonly used approach to evaluate utility program cost effectiveness. Complementary approaches also consider benefits and costs from the perspective of the utility only, the participant only and the non-participants.

[8] Once installed, these more energy efficient technologies provide energy savings for the customer throughout the life of the product. For example, an *ENERGY STAR* window has an estimated life of 25 years and will result in energy savings benefits throughout that period.

Residential Programs

Table 1 provides a summary of residential customer energy savings achieved through the Utilities' conservation programs from 2009 through 2012(F).[9]

Table 1
Residential Portfolio Energy Savings
2009 through 2012(F)
(MWh)

	2009	2010	2011	2012(F)	Total
Estimated Annual Energy Savings	2,512	7,064	18,651	29,015	57,242

The takeCHARGE residential programs are expected to result in aggregate energy savings of approximately 57.2 GWh by the end of 2012.[10] These savings are consistent with the forecast savings from the 2008 Plan.[11]

The Utilities' joint residential programs have been bundled for marketing as the takeCHARGE Energy Savers. The primary objectives of these programs have been to reduce space heating energy consumption and thus reduce peak demand. The programs include rebates and financing which are processed mainly through customer applications. Eligibility is limited to electrically-heated homes and is dependent on annual kWh usage. Both new home construction and renovation projects have been eligible for rebates.

Insulation Program

The Insulation Program has resulted in the highest amount of energy savings of all programs in the portfolio. This program provides incentives to upgrade insulation levels in basements and attics. Experience with this program has shown customer participation to be responsive to awareness-building marketing activities. With the

[9] Energy savings reflect *gross* customer energy savings achieved in each year, and includes savings arising from all technologies installed by participants since program implementation.

[10] Since implementation in 2009, there have been over 17,000 participants in the takeCHARGE residential customer programs.

[11] The 2008 Plan included total forecast energy savings from residential customer energy conservation programs of 57.4 GWh from 2009 through 2012 (see 2008 Plan, Table 1, page 11).

anticipated implementation of changes to building standards in December of 2012, it will become mandatory for all new houses to install basement insulation.[12] As a result, reassessment of program guidelines is warranted. Retailers and contractors are important trade allies for this program.

ENERGY STAR Window Program

ENERGY STAR windows improve a home's building envelope and reduce space heating energy consumption. Approximately 50 - 60% of windows sold in the province are now *ENERGY STAR* qualified, compared to approximately 10 - 15% in 2008. Anticipated changes to building standards will mandate that all new homes install more efficient windows.[13] The observed changes in the local market and anticipated changes in building standards indicate reassessment is warranted. This program is promoted in partnership with trade allies, such as window manufacturers, retailers, and home building and renovation contractors.

Thermostat Program

Programmable and high performance electronic thermostats give customers greater control over the temperature in their homes and can allow them to reduce the temperature while they are away. Thermostat replacements allow customers to conserve energy at relatively low cost and effort. Since this program was implemented, market penetration of programmable and high performance electronic thermostats has increased but they continue to represent a small portion of total thermostat sales.[14] The Utilities partner with retailers in delivering this program, including joint promotions and retail sales flyers.

[12] Changes to the National Building Code of Canada, Part 9, are expected to make basement insulation mandatory for new residential construction. The St. John's Energy Reduction Strategy that was implemented in September 2011 requires all new homes in the city to install electronic thermostats, basement insulation and *ENERGY STAR* windows.

[13] Changes to the National Building Code of Canada, Part 9, are expected to make energy efficient windows mandatory for new residential construction. The efficiency standard to be required is equivalent to the current *ENERGY STAR* standard.

[14] Minimum quality thermostats continue to be widely used in new home construction mainly because of their low cost.

Coupon Pilot Program

Hydro offered a coupon-based program from Fall 2010 through Spring 2011 as a pilot for residential customers in targeted communities. This pilot program provided rebates through at-the-cash coupons for small energy efficient technologies, such as compact fluorescent lights ("CFLs"), and through mail in rebates for *ENERGY STAR* appliances, such as clothes washers. This initiative raised awareness of a variety of low cost technologies; strengthened partnerships with retailers; and gave the Utilities experience with a new method of customer engagement.[15]

Isolated Systems Community Program

Launched in 2012, this program provides a variety of energy efficient technologies specifically to Hydro's customers in some isolated system service territories. Technologies, such as CFLs and hot water pipe insulation are being made available to be directly installed, at no cost to participating homes and businesses. In addition, for residential customers, at-the-cash coupons are being offered for a range of small energy efficient technologies, and mail-in incentives are being offered for the purchase of additional energy efficient technologies, such as *ENERGY STAR* appliances.

Block Heater Timers

Launched in 2012, this program provides giveaways and at-the-cash coupons for block heater timers to customers in Hydro's Labrador Interconnected System. While vehicle engine block heaters are used extensively in this area, timers are rarely used. Instead of using electricity throughout the night, block heater timers allow vehicle owners to reduce the amount of time that electricity is used to warm the vehicle engine.

[15] The findings from this pilot program are being considered in the development and delivery of new programming proposed to be offered jointly by the Utilities.

Commercial Programs

Table 2 provides a summary of commercial customer energy savings achieved through the Utilities' conservation programs from 2009 through 2012(F).

Table 2
Commercial Program Energy Savings
2009 through 2012(F)
(MWh)

	2009	2010	2011	2012(F)	Total
Estimated Annual Energy Savings (MWh)	173	890	2,459	3,738	7,260

The takeCHARGE commercial programs will result in estimated aggregate energy savings of approximately 7.3 GWh by the end of 2012.[16] This level of savings is consistent with the forecast savings from the 2008 Plan.[17]

Commercial Lighting Program

The Commercial Lighting Program targets reduced energy use through efficient lighting in commercial buildings, including high performance T8 fluorescent lighting and LED exit signs. Installation of high performance T8 fluorescent lighting technologies has increased since the program was introduced. The incremental cost of high performance T8 lamps has recently increased due to rising manufacturing costs, indicating a reassessment of program incentive levels is warranted. Marketing for this program includes partnering with lighting manufacturers, distributors, electrical contractors and lighting service providers.

Isolated Systems Business Efficiency Program

Launched in 2012, this program is targeted toward commercial customers located in Hydro's isolated system service territories. In this custom program, the incentives are based on the potential energy savings of efficiency improvement projects. This allows

[16] Since implementation in 2009, there have been over 1,600 participants in the takeCHARGE commercial customer programs.

[17] The 2008 Plan included total forecast energy savings from commercial customer energy conservation programs of 8.2 GWh from 2009 through 2012 (see 2008 Plan, Table 1, page 11).

customers to implement energy efficient technologies that are suitable for their specific buildings, equipment and operations. This program provides a next step for commercial customers who become interested in energy efficiency through the Isolated Systems Community Program.

Industrial Programs

Table 3 provides a summary of industrial customer energy savings achieved through Utility customer energy conservation programs from 2009 through 2012(F).

Table 3
Industrial Program Energy Savings
2009 through 2012(F)
(MWh)

	2009	2010	2011	2012(F)	Total
Estimated Annual Energy Savings (MWh)	-	-	165	3,617	3,782

The industrial customer energy savings are forecast to be approximately 3.8 GWh by the end of 2012. These savings are significantly below forecast savings from the 2008 Plan due to much lower than anticipated participation by industrial customers.[18] This reflects both financial and human resource barriers to participation, and Hydro has been working to make the program responsive to these barriers as they arise.

Industrial Energy Efficiency Program

The Industrial Energy Efficiency Program is a custom program that responds to the unique needs of Hydro's transmission level industrial customers. This program provides financial support for engineering feasibility studies of efficiency projects and for project implementation costs. The first projects were submitted for incentive support in 2011.

[18] The 2008 Plan included total forecast energy savings from commercial customer energy conservation programs of 65 GWh from 2009 through 2012 (see 2008 Plan, Table 1, page 11).

2.3 Education & Support

Since 2008, the Utilities have provided conservation related education and support to their customers through a variety of initiatives, including a joint website, outreach activities and partnerships with other organizations in the provincial conservation marketplace.

In late 2008, the Utilities launched the takeCHARGE website, which provides customers with general information about energy efficiency as well as specific programs available to them.

Table 4 provides a summary of takeCHARGE website visits from 2008 through 2011.

Table 4
takeCHARGE Website Visits
Energy Conservation Information

	2008	2009	2010	2011
Website Visits	23,444	49,648	52,013	72,996

Customers' use of the takeCHARGE website to find energy conservation information has increased each year since its launch.

Since 2009, the Utilities have participated in over 400 outreach events province wide, including interactive takeCHARGE information booths displayed at home shows, retailers and trade fairs. These events allow the Utilities to assist customers and increase awareness of energy conservation and the takeCHARGE programs.

The Utilities have developed partnerships with retailers, manufacturers, distributors, contractors and other trade allies across the province. These partners often play an important role in assisting customers with advice on energy conservation and home improvement decisions. The Utilities work with industry associations, such as the Canadian Home Builders Association (CHBA) and the Building Owners and Managers

Association (BOMA), to educate their members. These partnerships also provide the Utilities with market and program delivery insights.

Table 5 shows costs for education and support for the period 2009 to 2012(F).

Table 5
Conservation Education & Support
Costs 2009-2012(F)
($000s)

	2009	2010	2011	2012(F)	Total
Education	666	486	428[19]	684	2,264
Support	236	206	219	240	901
Total	**902**	**692**	**647**	**924**	**3,165**

2.4 Planning & Evaluation

The customer energy conservation program portfolio is routinely evaluated by the Utilities to support planning and continuous improvement of program delivery. Programs are evaluated throughout their lifecycle from the perspective of: (i) energy savings impacts; (ii) market transformation impacts; and (iii) delivery process effectiveness. The results of these evaluations support continuous improvement of the conservation programs and identification of future opportunities.

Customer participation in the energy conservation programs and the resulting energy savings impacts are reviewed annually. This information, along with the Utilities' cost information, is used to evaluate the cost effectiveness of the programs.[20]

Market transformation impacts of the customer energy conservation programs are evaluated primarily through partnerships with trade allies and customer surveying. An annual customer telephone survey is used to assess customers' home energy use and

[19] The decrease in education costs in 2011 primarily reflects reallocation of staff from outreach activities to verification audits of program participants.

[20] The Utilities report to the PUB annually on their conservation activities. This includes economic cost benefit analysis of each program, from the perspective of participants, non participants and total resources.

conservation practices, takeCHARGE brand awareness and program impacts.[21] The Utilities also conduct periodic customer surveys focused on how customers use energy in their homes and businesses.[22]

To evaluate delivery process effectiveness, in-person verification audits are performed on a portion of program participants to gather feedback on the programs from the customer's perspective as well as to ensure compliance with program guidelines. Information collected from all participating customers is also analyzed.[23] Programs are reviewed periodically by a third party evaluator to assess process effectiveness.[24]

Table 6 shows costs for conservation planning for the period 2009 to 2012(F).[25]

Table 6
Conservation Planning
Costs 2009-2012(F)
($000s)

	2009	2010	2011	2012(F)	Total
Planning	401	429	509	491	1,830

Variations in annual conservation planning costs primarily reflect the periodic nature of the Utilities' program planning activities.

[21] In the first quarter 2012, 96% of provincial electricity consumers indicated the primary motivation for trying to cut back on electricity use is to save money or lower their electricity bill. This is an increase from 85% in 2010 and 89% in 2009.

[22] These surveys gather information such as quantity, size and type of electric appliances and equipment, heating source and building envelope characteristics. This type of "end use" survey was last conducted in the province in 2007, and the next one is planned for 2013.

[23] Rebate application forms collect a variety of information, ranging from technical data, such as the model of thermostat, window or lighting product, to the type of heating in the home and its geographic location.

[24] In 2011, the CADMUS Group conducted interviews with program staff and partners and reviewed program documents and data. Some recommendations from this review have already been implemented, and others have been used in planning for program revisions and/or expansion.

[25] Conservation planning costs include cost related to surveys and research, development of the potential study and five-year plan, and general administration.

2.5 Costs & Cost Recovery

Table 7 provides a summary of the customer energy conservation program costs of the Utilities from 2009 through 2012(F).[26]

Table 7
Conservation Program Costs
2009 through 2012(F)
($000s)

	2009	2010	2011	2012(F)	Total
Residential	1,366	2,326	3,473	3,389	10,554
Commercial	80	95	216	235	626
Industrial	57	221	103	388	769
Total	**1,503**	**2,642**	**3,792**	**4,012**	**11,949**

The Utilities' costs related to conservation programs will increase from approximately $1.5 million in 2009 to $4.0 million in 2012. This primarily reflects increased levels of customer participation and rebates related to the joint takeCHARGE program portfolio.[27] Also, in 2012, Hydro's costs related to expanded programming in their isolated diesel systems and in Labrador have increased. The increasing levels of customer participation in the programs have resulted in increasing energy savings. The overall cost effectiveness results of the takeCHARGE programs have been positive and have improved with increasing participation.[28]

The Utilities each bear the costs related to the provision of customer energy conservation programming in their own service territory. Most general conservation and

[26] This cost summary does not include (i) general conservation costs; (i) costs related to programs offered independently by the Utilities prior to June 2009; and (ii) costs related to Newfoundland Power's Demand Management activities (Curtailable Service Option and Facilities Management).

[27] The quantity and timing of customer participation in any program is a matter of individual customer choice, and can be difficult to forecast. For example, customer response to the special insulation rebate offer during Energy Efficiency Week 2011 exceeded the Utilities' expectations. In Newfoundland Power's service territory, 1,475 customers participated and $1.1 million in rebates were provided as a result of this promotion. By comparison, during the full year of 2010, 661 Newfoundland Power customers participated in the insulation program.

[28] The primary measure of the cost effectiveness of the customer energy conservation programs is the Total Resource Cost (TRC) test. The TRC test results for each program are found in Schedule C.

program costs, such as customer rebates and costs related to responding to customer inquiries, are incurred directly by each utility. Costs which are incurred jointly, such as provincial mass media advertising, are split on an 85% / 15% basis between Newfoundland Power and Hydro.[29]

Cost Recovery

Hydro's current customer rates, as approved by the Board in Order No. P.U. 8 (2007), include recovery of approximately $0.4 million in costs related to management and planning of conservation programming. In each year since 2009, Hydro has deferred recovery of direct program costs related to the expansion of customer energy conservation programming under the 2008 Plan.[30]

Newfoundland Power's current customer rates, as approved by the Board in Order No. P.U. 43 (2009), include recovery of approximately $3.3 million in costs related to conservation and demand management.[31] Currently, Newfoundland Power expenses all conservation related costs in the year in which they are incurred.

2.6 National & Provincial Developments

Customer energy conservation programs are offered by electric and gas utilities in many Canadian jurisdictions. In total, Canadian electric utility ratepayer-funded energy conservation and demand management budgets exceeded $1 billion in 2011.[32] This reflects an increase in the level of program activity in recent years.[33] Several provincial

[29] This approach to division of jointly incurred costs reflects the proportion of customers served by each utility.

[30] The deferred recovery of these costs in 2009, 2010, 2011 and 2012 was approved by the Board in Order Nos. P.U. 14 (2009), P.U. 13 (2010), P.U. 4 (2011), and P.U. 3 (2012), respectively.

[31] In 2009, Newfoundland Power deferred recovery of $1.5 million in costs related to the expansion of customer energy conservation programming under the 2008 Plan, as approved by the Board in Order No. P.U. 13 (2009). This amount was amortized for recovery over the remaining 4 years of the 2008 Plan, as approved by the Board in Order No. P.U. 43 (2009).

[32] See *2011 Consortium for Energy Efficiency Annual Industry Report*.

[33] Newfoundland Power conducted a survey of Canadian electric utilities regarding energy conservation programming in preparation of the 2012 Plan. In comparison to a similar survey conducted in 2008, the results indicate an overall increase in expenditures of over 75% among the utilities surveyed.

governments have established targets for energy conservation or peak reduction, including Prince Edward Island, Ontario and British Columbia.[34]

The federal government, through the Department of Natural Resources, continues to offer a number of educational initiatives, publications and programs.[35] However, the federal *EcoEnergy Retrofit* program, which supported energy efficiency retrofits of existing homes, has been discontinued effective June 2012.

The Government of Newfoundland and Labrador also offers a number of consumer awareness initiatives and programs to support energy efficiency. Through the Newfoundland and Labrador Housing Corporation's *Residential Energy Efficiency Program*, the Province continues to offer financial support for low income housing retrofits. Also, the *Green Fund* program provides funding for commercial and institutional projects which improve energy efficiency and reduce greenhouse gas emissions. However, the Province's *EnerGuide* program, which provided additional funding for participants in the federal *EcoEnergy Retrofit* program, has been discontinued along with the federal program.

In 2009, the Province created the Office of Climate Change, Energy Efficiency and Emissions Trading ("CCEEET") to lead policy development on climate change and energy efficiency, promote coordination of these issues across government departments, and engage other stakeholders.[36] The Utilities continue to coordinate with

[34] In the United States, ratepayer funded electric energy efficiency program budgets have increased from $2.7 billion in 2007 to $6.8 billion in 2011. The growth in expenditures and energy savings results has been attributed to a number of state regulatory policy changes supporting these programs, as well as state-mandated energy efficiency targets. See Institute for Electric Efficiency, *Summary of Ratepayer-Funded Electric Efficiency Impacts, Budgets, and Expenditures*, January 2012.

[35] The federal department of Natural Resources (NRCan) continues to publish information for consumers and businesses through the Office of Energy Efficiency, and offer workshops such as the *Dollars to $ense* series for businesses, industry and municipalities.

[36] As follow-up to its *2007 Energy Plan*, the Province through CCEEET released two action plans in 2011 which outline specific goals and commitments over the next five years. *Charting our Course: Climate Change Action Plan 2011* and *Moving Forward: Energy Efficiency Action Plan 2011.*

the Province on electric energy efficiency initiatives, and meet through the Energy Efficiency Working group facilitated by CCEEET.[37]

3.0 PLAN: 2012-2016

3.1 General

The 2012 Plan has been developed jointly by the Utilities and builds on the outcomes of the 2008 Plan.

Energy conservation continues to be the primary objective of initiatives in the 2012 Plan, though all programs will also result in demand reductions.[38] Customer energy conservation programs and education initiatives are focused by sector: residential, commercial, and industrial.

The 2012 Plan is based on market information for Newfoundland and Labrador. It addresses market opportunities and barriers to customer action regarding energy conservation by providing incentive programs, communication and education initiatives, and other customer support activities.

The specific program concepts outlined in the 2012 Plan will lead to detailed program design and implementation.[39]

[37] Under its mandate to strengthen the Province's evidence base for policy development, the CCEEET completed several projects in 2011, including an assessment of methods for modeling energy efficiency program impacts, as well as a review of Canadian commercial/industrial programs aimed at informing local program development.

[38] Current high marginal energy costs on the Island Interconnected System and isolated diesel systems justify a focus on energy. Current marginal energy costs primarily reflect fuel costs. For example, the cost of electricity generated at Holyrood is currently estimated at $0.189/kWh. This is based upon a 630 kWh conversion efficiency and oil price forecast of $118.80/barrel for 2012 as reflected in the Rate Stabilization Plan.

[39] Detailed program design will include (i) completion of comprehensive market research and determination of appropriate incentives, (ii) identifying the required market relationships (i.e., service and product supply) for program delivery, (iii) creation of customer information, (iv) development of necessary systems and procedures to support the program, and (v) establishing appropriate parameters for ongoing program monitoring and evaluation.

The programs proposed are broadly consistent with those offered by utilities in other Canadian jurisdictions, and with the priorities identified in the Potential Study. The 2012 Plan anticipates updating the Potential Study in 2014, including gathering more in-depth data regarding energy end-uses and market opportunities. The Utilities' next iteration of multi-year energy conservation planning will incorporate the findings from this updated study.

3.2 Selection

The 2012 Plan anticipates evolving the existing takeCHARGE programs and introducing new programs. These new programs will promote additional high-efficiency technologies and are intended to reach a broader group of customers, particularly commercial and small industrial customers. The design of the expanded portfolio of programs has been based on the experience of the Utilities and others in the local marketplace, feedback from customers, priorities identified in the Potential Study in 2008, as well as experience shared from other Canadian jurisdictions.

The selected programs have been assessed by the Utilities in terms of engineering, market and economic viability. Engineering viability is assessed in terms of potential for energy and demand savings. Market viability is assessed in terms of potential for growth in customer adoption as well as barriers to further adoption. Economic viability is assessed in terms of net program benefits and costs, primarily using the TRC test.[40] Current uncertainty regarding future electricity supply developments for the Island and related costs has been considered.[41] Program selection has also considered external factors such as government mandated standards and policy.[42]

[40] Use of TRC for economic screening of programs is consistent with the 2008 Potential Study, the 2008 Plan, and current Canadian utility practice.

[41] Economic screening for the 2012 Plan was based on the most recent marginal cost study for the Island Interconnected System (2006) updated by Hydro in February 2012 to reflect changes in fuel costs and other factors. Results of the next marginal cost study will be a primary input to the next iteration of joint utility conservation planning in 2014 – 2015.

[42] For example, the anticipated changes to the *National Building Code of Canada, Part 9*; the City of St. John's *Energy Reduction Strategy*; and the Province's *Moving Forward: Energy Efficiency Action Plan 2011*.

Schedule B contains the program descriptions for the 2012 Plan.

3.3 Programs

The Utilities plan to continue to offer the existing program portfolio, with some revisions, as well as add three new programs.

Table 8 shows, by sector, the portfolio of programs to be offered under the 2012 Plan.

Table 8
Conservation Programs
by Sector

Residential	Commercial	Industrial
Insulation Thermostat *ENERGY STAR* Window Isolated Systems Community Program[43] Small Technologies[44] Heat Recovery Ventilator[44] Block Heater Timer[43]	Lighting Isolated Systems Business Efficiency Program[43] Business Efficiency Program[44]	Industrial Energy Efficiency Program

Residential Programs

Insulation, Thermostat & ENERGY STAR Window Programs

These existing joint incentive programs primarily target space heating energy savings, and will continue to be offered with some revisions.

National Building Code revisions that are expected to be implemented in December 2012 will mandate that all new homes install more energy efficient windows and basement insulation. As a result, these programs will continue to be offered for new

[43] Program offered by Hydro to customers in a portion of their service territory.
[44] New joint program proposed under the 2012 Plan.

and existing homes through 2012, but will be modified in 2013 to exclude new homes.[45] The coming National Building Code revisions are not expected to impact thermostat requirements for new home construction.

Isolated Systems Community Program

This program will continue through 2014, and will be offered to customers in Hydro's isolated system service territories. A combination of directly installed technologies and coupon-based incentives will be offered.

Small Technology Program

This new joint program will promote a variety of smaller technologies, such as CFLs and LED lighting, 'smart' power bars and *ENERGY STAR* televisions, through instant rebate coupons and promotional events across the province.[46] This program will appeal to a broad customer group as these technologies will not involve a major home renovation.[47]

Heat Recovery Ventilator Program

This new joint program will promote installation of higher efficiency heat recovery ventilators ("HRVs").[48] HRVs have been widely used in new home construction in the province since the 1990s, to control humidity and air quality. High efficiency HRVs are available which reduce home heating energy requirements by warming incoming fresh air with recycled heated air.

[45] These programs are expected to exclude minimum building code compliance in new homes.

[46] Eligible measures in this program will vary over time and will be selected based on cost effectiveness, energy saving potential and local market conditions.

[47] Similar programs are offered in several other Canadian jurisdictions, including British Columbia, Ontario, Quebec and Nova Scotia. Design of this program will consider programs in other jurisdictions as well as the Coupon Program pilot and Isolated Systems Community Program.

[48] The efficiency of HRVs is measured in terms of sensible heat recovery efficiency or SRE. The revised National Building Code of Canada, Part 9, is expected to require all new home HRV installations to have an SRE level of at least 60%. The program will promote HRVs with an SRE level of 70% or more. More efficient HRVs offer energy savings primarily through improved retention of indoor heat during the winter season.

Block Heater Timer Program

This program will continue through 2014, and will be offered to customers in Hydro's Labrador Interconnected System. Block heater timers will be promoted through giveaways and at-the-cash coupons for residential vehicle owners.

Commercial Programs

Commercial Lighting Program

For the commercial sector, the existing joint lighting efficiency program will be expanded to promote additional lighting technologies, particularly those suitable for areas with high ceilings, such as warehouses, gymnasiums, arenas and garages.[49]

Isolated Systems Business Efficiency Program

This program will continue through 2014, and will be offered to Hydro's commercial customers located in their isolated system service territories. The program will continue to provide incentives based on the energy savings of customer-proposed projects.

Business Efficiency Program

This new joint program will promote improved energy efficiency in a broad group of commercial customers, from small to very large, across industry segments and equipment types. The program will include financial incentives based on energy savings from customer project proposals, as well as rebates for specific measures on a per unit basis.[50]

[49] Lighting presents the largest single opportunity for electricity savings in the commercial sector. This is consistent with the findings of the 2008 Potential Study and with the experience of other Canadian utilities. Program incentive levels may be adjusted to reflect increased incremental costs of higher efficiency lamps.

[50] Similar programs are offered in several other Canadian jurisdictions, including British Columbia, Ontario, Quebec and Nova Scotia.

Industrial Programs

Industrial Energy Efficiency Program

Through 2014, this program will continue to offer support and custom financial incentives based on energy savings for retrofit of industrial process equipment for Hydro's transmission level industrial customers.

Customer Energy Savings

Table 9 shows forecast customer energy reduction estimates for the programs in the 2012 Plan, by sector, from 2012 through 2016.

Table 9
2012 Plan Energy Reduction Estimates
2012 through 2016
(MWh)

	2012	2013	2014	2015	2016	Total
Residential	29,015	38,616	49,985	64,418	79,077	261,111
Commercial	3,738	6,155	10,258	15,512	21,474	57,137
Industrial	3,617	14,567	24,600	24,600	24,600	91,984
Total	**36,370**	**59,338**	**84,843**	**104,530**	**125,150**	**410,232**

The programs in the 2012 Plan will result in estimated aggregate customer energy savings of approximately 410.2 GWh from 2012 through 2016.

Customer energy savings are forecast to increase through 2016, due to expansion of the program portfolio for both residential and commercial sector customers. Growth in customer energy savings from the existing joint residential programs is expected to be limited by the exclusion of new home construction from insulation and ENERGY STAR window program eligibility. Several of Hydro's program offerings are expected to be concluded during the planning period.[51]

[51] These include the Isolated Systems Community Program, Block Heater Timer Program, Isolated Systems Business Efficiency Program, and Industrial Energy Efficiency Program. Design of alternate programming for the industrial sector is anticipated in the next iteration of the Utilities' program planning in 2014 – 2015.

210 Plan Program Costs

Table 10 shows forecast costs for the programs in the 2012 Plan, by sector, from 2012 through 2016.

Table 10
2012 Plan Program Cost Estimates
2012 through 2016
($000s)

	2012	2013	2014	2015	2016	Total
Residential	3,389	3,452	4,193	4,454	4,331	19,818
Commercial	235	1,013	1,163	1,290	1,376	5,077
Industrial	388	1,111	909	-	-	2,408
Total	**4,012**	**5,576**	**6,264**	**5,744**	**5,707**	**27,303**

The Utilities' costs related to programs in the 2012 Plan are forecast to be approximately $27.3 million over the five-year planning period. Overall forecast cost increases primarily reflect the expansion of the joint customer energy conservation program portfolio.

3.4 Education & Support

The Utilities will continue customer education and support activities which enable the offering of customer energy conservation programs. The Utilities will continue to provide customer support and be responsive to customer expectations. Current educational activities, including customer outreach events, the takeCHARGE website and partnerships with industry stakeholders will also continue.

The Utilities' educational initiatives will be expanded to include building awareness of additional conservation opportunities as well as addressing a broader audience. These initiatives will include providing information regarding conservation measures which are not promoted through incentive programs. Additional focus will also be placed on youth education, to support a broader culture of conservation. While these activities are not directly associated with any particular program, they are necessary for the long-term

success of the customer energy conservation program portfolio.

Table 11 shows forecast costs for education and support for the period 2012 to 2016.

Table 11
Conservation Education & Support
Costs 2012-2016
($000s)

	2012	2013	2014	2015	2016	Total
Education	684	769	870	932	965	4,220
Support	240	244	267	285	297	1,333
Total	**924**	**1,013**	**1,137**	**1,217**	**1,262**	**5,553**

3.5 Planning & Evaluation

The 2012 Plan incorporates research and analysis required for the next iteration of multi-year conservation portfolio planning by the Utilities.

Table 12 shows forecast planning costs included in the 2012 Plan.

Table 12
Conservation Planning
Costs 2012-2016
($000s)

	2012	2013	2014	2015	2016	Total
Planning	491	596	866	551	498	3,003

Variability in annual planning costs reflects the Utilities' multi-year planning cycle for customer energy conservation programs.

Beginning in 2013, the Utilities will conduct customer surveys and audits to gather data regarding electricity end-uses in the residential and commercial sectors. This data will be a key input to the assessment of potential electricity savings opportunities in the

province. An update of the conservation Potential Study is planned for 2013 – 2014.[52] The Utilities anticipate development of the next multi-year plan for customer energy conservation programming in 2014 – 2015.

During the planning period, the program portfolio will continue to be evaluated on similar criteria as current programs, including energy savings, market impacts and delivery process effectiveness. Additional review by third party evaluators is expected, reflecting the expanded program portfolio and delivery methods.[53] Program evaluation findings will be used to refine program design and implementation details on an ongoing basis, as well as support further planning.

3.6 Costs & Cost Recovery

Schedule C provides a summary of forecast energy savings, cost estimates and cost effectiveness analysis results for the programs in the 2012 Plan.[54]

Costs related to the customer energy conservation programs outlined in the 2012 Plan are forecast to increase from $4.0 million in 2012 to $5.7 million in 2016.[55] This increase primarily reflects the addition of new programs. The incremental cost of expanded customer energy conservation programming is not currently reflected in the customer rates of either Hydro or Newfoundland Power.

Cost Recovery

The energy saving technologies installed as a result of the Utilities' programs will provide benefits for an extended period. In order to match the extended nature of these benefits, cost recovery over a number of years would be appropriate. Based on the anticipated duration of energy savings benefits and prior practice of the Board,

[52] An updated marginal cost study is also expected to be a key input to the conservation Potential Study and the next conservation plan in 2014 – 2015.
[53] Evaluation costs are primarily reflected in the costs for each specific program.
[54] Cost forecasts can be expected to be refined as detailed program design progresses in 2012 and 2013.
[55] All customer energy conservation programs outlined in the 2012 Plan are cost effective, and are justified on a cost of service basis.

amortization of program costs over a period of 5 to 10 years appears reasonable.[56] This is consistent with Canadian public utility practice.[57]

The Utilities' annually recurring general conservation costs would continue to be expensed as incurred.[58]

4.0 OUTLOOK

The 2012 Plan represents a significant expansion of customer energy conservation programming for the Utilities. It reflects the considerable potential for cost effective energy savings in the residential and commercial sectors in the province.

The Utilities anticipate a full reassessment of conservation potential during the planning period. Greater certainty regarding supply scenarios and related costs will be an important input to this assessment and to future program evolution.

The program concepts outlined in the 2012 Plan can be expected to evolve through more detailed design and during their operation. The goal of this program adaptation is to further improve both economic benefits and customer understanding, while responding to market conditions.

The Utilities will continue to work with the Province, through CCEEET, including coordinating conservation delivery and policy, as well as building a knowledge base for decision-making.

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[56] In Order No. P.U. 6 (1991), the Board first authorized five-year deferred recovery of Newfoundland Power's demand side management costs. This deferral practice was discontinued as the result of the Board's Order No. P.U. 7 (1996-97).

[57] Currently, the British Columbia Utilities Commission requires utility conservation program costs to be amortized and recovered over 10-year or 15-year periods. Prior to its adoption of International Financial Reporting Standards in 2012, Manitoba Hydro recovered conservation program costs over variable periods of up to 15 years based upon the conservation technologies implemented. Prior to the P.E.I. Office of Energy Efficiency assuming administration of conservation programs in March 2011, Maritime Electric Co. Ltd. amortized conservation cost recovery over a 5-year period.

[58] While general customer energy conservation costs provide benefits to customers in terms of information, knowhow and advice, those benefits are not transparently quantifiable in the same manner as program benefits.

Table A-1
Conservation Programs
Energy Reductions: 2009 – 2012 (F)
by Sector
(MWh)

	2009	2010	2011	2012	Total
Residential					
Insulation Program	1,619	3,880	11,812	15,501	32,812
Thermostat Program	476	1,687	3,064	4,503	9,730
ENERGY STAR Window Program	417	1,433	3,455	5,727	11,032
Coupon Program	-	64	320	320	704
Isolated Systems Community Program	-	-	-	2,640	2,640
Block Heater Timer Program	-	-	-	324	324
Total Residential Portfolio	**2,512**	**7,064**	**18,651**	**29,015**	**57,247**
Commercial					
Lighting Rebate Program	173	890	2,459	3,717	7,239
Isolated Systems Business Efficiency Program	-	-	-	21	21
Total Commercial Portfolio	**173**	**890**	**2,459**	**3,738**	**7,260**
Industrial					
Industrial Energy Efficiency Program	-	-	165	3,617	3,782
Total Portfolio	**2,685**	**7,954**	**21,275**	**36,371**	**68,285**

Table A-2
Conservation Programs
Program Costs: 2009 – 2012 (F)
by Sector
($000s)

	2009	2010	2011	2012	Total
Residential					
Insulation Program	422	818	2,231	764	4,235
Thermostat Program	203	329	175	425	1,132
ENERGY STAR Window Program	741	1,039	932	1,053	3,765
Coupon Program	-	140	135	-	275
Isolated Systems Community Program	-	-	-	1,123	1,123
Block Heater Timer Program	-	-	-	24	24
Total Residential Portfolio	**1,366**	**2,326**	**3,473**	**3,389**	**10,554**
Commercial					
Lighting Rebate Program	80	95	216	156	547
Isolated Systems Business Efficiency Program	-	-	-	79	79
Total Commercial Portfolio	**80**	**95**	**216**	**235**	**626**
Industrial					
Industrial Energy Efficiency Program	57	221	103	388	769
Total Portfolio	**1,503**	**2,642**	**3,792**	**4,012**	**11,949**

Insulation Program

Program Description
The objective of this program is to increase the insulation level in residential basements, crawl spaces and attics. Increasing the insulation R-value in a home will result in space heating energy savings. The program components include rebates and financing, and a variety of education and marketing tools. This program has been offered through takeCHARGE since 2009.
Target Market: Residential
This program targets residential customers. Changes to the National Building Code of Canada that are expected to be implemented in December 2012 will mandate that all new homes install basement insulation. As a result, this program will be offered to new and existing homes through 2012 but will be modified in 2013 to exclude minimum building code compliance in new homes. Eligibility will continue to be limited to electrically-heated homes.
Eligible Measures
Eligible measures in this program include insulation upgrades to basements, crawl spaces and attics. Rebates for new homes are limited to basement insulation beyond building code compliance. Technical requirements will be aligned with National Building Code of Canada.
Delivery Strategy
The delivery strategy for this program remains unchanged. Delivery of this program will continue to be bundled with the *ENERGY STAR* window, thermostat and HRV programs as part of the takeCHARGE residential portfolio. Marketing initiatives include partnering with retailers and trade allies in the home building and renovation industry, and target both do-it-yourself and professional installers. Tools and tactics will include retail and model home point-of-sale materials, advertising, website, tradeshows, community outreach and trade ally activities. Rebates and financing will be processed through customer application.

Insulation Program

Market Considerations

Barriers to increased market penetration include initial cost, awareness of the impact on space heating energy, and the practical difficulties of renovating an existing living space. Experience with the existing program has shown participation to be responsive to awareness-building marketing activities. With the implementation of the new building standards, market penetration of basement insulation in new homes is expected to increase.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value is unchanged at two cents per R-value per square foot of insulation added to basement walls or ceilings, and one cent per square foot of insulation added to the attic. A time limit will be implemented for incentive redemption.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness and a representative sample of installations will be inspected. Formal evaluations will be conducted every two years during operation.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	764	692	623	706	665	3,451
Estimated Cumulative Energy Savings (MWh)	15,501	18,477	21,252	24,182	27,256	106,668
Total Resource Cost						**2.9**

Thermostat Program

Program Description

The objective of this program is to encourage installation of programmable and high performance electronic thermostats in homes. Programmable and high performance electronic thermostats allow customers to better control the temperature of their homes and to set back the temperature during the night or while away. The program components consist of rebates, financing options, and a variety of education and marketing tools. This program has been offered through takeCHARGE since 2009.

Target Market: Residential

This program targets residential customers, including home retrofit and new home construction. Eligibility will continue to be limited to electrically-heated homes.

Eligible Measures

Eligible measures in this program include both programmable and high performance electronic thermostats (those which control within +/- 0.5^{o}C.)

Delivery Strategy

The delivery strategy for this program remains unchanged. Delivery of this program will continue to be bundled with the insulation, windows and HRV programs as part of the takeCHARGE residential portfolio.

Marketing initiatives include partnering with retailers, electrical contractors, homebuilders and real estate professionals, to educate consumers regarding the energy savings and comfort benefits of programmable and high performance thermostats. Tools and tactics include retail and model home point-of-sale materials, website, tradeshows, community outreach and trade ally activities. Rebates will be processed through customer-submitted coupons.

Thermostat Program

Market Considerations

Market penetration of programmable and high performance electronic thermostats has increased in the past 2 years, but continues to represent a small portion of the overall sales volume. Minimum quality thermostats continue to be widely used in new home construction. The St. John's Energy Reduction Strategy that was implemented in September 2011 requires all new homes in the city to have electronic thermostats installed. This is expected to create increased participation in the program for customers residing in the city and may have some spillover effects. Thermostat requirements are not expected to be affected by National Building Code changes.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value is $5 per electronic thermostat and $10 per programmable thermostat. This continues to reflect incremental cost of the more efficient options. A time limit will be implemented for incentive redemption.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, and a representative sample of installations will be inspected. Formal evaluations will be conducted every two years during program operation.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	425	468	396	488	428	2,205
Estimated Cumulative Energy Savings (MWh)	4,503	6,413	8,014	9,972	11,642	40,545
Total Resource Cost						**3.0**

ENERGY STAR Window Program

Program Description

The objective of this program is to increase the installation of *ENERGY STAR* windows instead of standard windows. *ENERGY STAR* windows improve the efficiency of the home's building envelope and provide savings in space heating energy. The program components consist of rebates, financing options, and a variety of education and marketing tools. This program has been offered through takeCHARGE since 2009.

Target Market: Residential

This program targets residential customers. Changes to the National Building Code that are expected to be implemented in December 2012 will mandate that all new homes install more energy efficient windows. As a result, this program will be offered to new and existing homes through 2012 but will be modified in 2013 to exclude new homes. Eligibility will continue to be limited to electrically-heated homes.

Eligible Measures

Eligible measures in this program are *ENERGY STAR* qualified windows.

Delivery Strategy

The delivery strategy for this program remains unchanged. Delivery of this program will continue to be bundled with the insulation, thermostat and HRV programs part of the takeCHARGE residential portfolio.

Marketing initiatives will continue to include partnering with retailers and trade allies in the home building and renovation industry, and will target both do-it-yourself and professional installers. Communications will incorporate the *ENERGY STAR* brand and related marketing support. Tools and tactics will include retail and model home point-of-sale materials, advertising, website, tradeshows, community outreach and trade ally activities. Rebates and financing will be processed primarily through customer application.

ENERGY STAR Window Program

Market Considerations

ENERGY STAR qualified windows currently comprise approximately 50% - 60% of window sales in the province, compared to 10% - 15% in 2008. With the implementation of National Building Code changes in 2013, market penetration is expected to increase in new homes. Understanding of the product is improving among customers and retailers. Eligible windows are widely available.

Incentive Strategy

Incentives for this program include rebates and financing. A rebate of $2 per square foot of window installed will be offered. This rebate level will be assessed to ensure it continues to reflect incremental cost of the more efficient option. A time limit will be implemented for incentive redemption.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, market penetration and a representative sample of installations will be inspected. Formal evaluations will be conducted every two years during program operation.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	1,053	889	640	723	684	3,990
Estimated Cumulative Energy Savings (MWh)	5,727	7,435	8,479	9,579	10,734	41,952
Total Resource Cost						**2.4**

Isolated Systems Community Program

Program Description

The objective of this program is to provide a portfolio of technologies and opportunities to save energy that will move the residential and commercial isolated system customers along an energy efficiency continuum during 2012-2014.

Target Market

This program targets both residential and commercial customers in Hydro's isolated systems. This includes Isolated Diesel systems on the Island and in Labrador and the L'Anse aux Loup system. Eligibility for specific components of the program will be determined on a per customer basis and may be limited by primary heating source.

Eligible Measures

Measures will be wide ranging, from smaller items such as CFLs, showerheads and hot water pipe insulation, to high efficiency appliances, and cross promotions for the existing takeCHARGE Energy Savers Rebate programs.

Delivery Strategy

Hydro has engaged Summerhill Group to deliver this program, using a number of delivery strategies to engage residential and commercial customers. These include direct install efforts, whereby the customer receives the technology in their home or business at no cost. During the direct install visit, customers also receive information on energy usage and efficiency options. Mail-in rebates are provided for eligible purchases, such as appliances. Local retailers are engaged to provide additional coupons and price reductions on other products as well as exchange events for products such as LED holiday lighting. The existing takeCHARGE programs are being promoted to increase participation in those programs within the isolated systems.

A small group of residential customers will participate in a domestic drain water heat recovery system pilot, using this technology and providing data and feedback to Hydro. While a common and tested technology in other jurisdictions, their install rates remain very low in this jurisdiction.

Isolated Systems Community Program

Market Considerations

Availability and awareness of energy efficient technologies continues to be an issue in rural communities and often technologies available are at a higher price than in urban markets. This program will address the barriers of availability and as the avoided costs in isolated markets are higher than the Island Interconnected system, programming can be more aggressive. The customer base has been primarily non-electric heat, but electric heat load has been growing. There is a heavy electric hot water heating penetration and opportunities exist in plug load and behavior based areas.

Commercial customers tend to be smaller businesses and as such find it challenging to find the time and resources to address energy consumption issues and this program will provide the one on one interactions needed to assist these customers.

Incentive Strategy

The technologies used in the direct install component of the program will be installed at no cost to participating homes and businesses. Additional incentives will be dependent on the technology and the resulting savings

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, and a representative sample of direct installs will be surveyed for confirmation of continued installation and use.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	1,123	908	426	-	-	2,457
Estimated Cumulative Energy Savings (MWh)	2,640	4,524	5,337	5,337	5,337	23,175
Total Resource Cost						**3.3**

Small Technologies Program

Program Description

The objective of this new program is to increase the efficiency levels in homes and increase energy efficiency awareness by offering instant rebate coupons on a list of energy efficient technologies. There will also be promotional events to raise awareness of the technologies and to engage the public.

Target Market: Residential

The small technology program will be marketed toward residential customers province wide. All customers will be eligible to participate regardless of age of home or heat source.

Eligible Measures

Eligible measures in this program will vary over time and will be selected based on cost effectiveness, energy saving potential and market conditions.

Delivery Strategy

Partnerships will be made with both chain and independent retailers to offer instant rebates to customers on a number of energy efficient products. The intent is to update the list each year, encouraging customers to purchase more products over time.

Coupon campaigns will be offered each year. These campaigns will include the delivery of public engagement events held at retailers. These events will consist of exchanges and giveaways that will promote the technologies offered through the coupons.

Small Technologies Program

Market Considerations

The technologies included in the program do not involve a major renovation. This program will allow the Utilities to reach customers that may not have been able to participate in the other incentive programs.

Incentive Strategy

Incentives for this program include instant rebates that will vary by year and campaign. The rebate value will be different for each technology offered, and will reflect incremental cost of the more efficient options.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness. Exit interviews will be conducted during selected retail events. Formal evaluations will be conducted after the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	-	118	1,810	2,203	2,236	6,368
Estimated Cumulative Energy Savings (MWh)	-	-	3,994	11,625	19,447	35,067
Total Resource Cost						**1.1**

HRV Program

Program Description

The objective of this new program is to increase the installation of higher efficiency HRVs (those with a sensible heat recovery efficiency, or SRE, level of 70% or more). In 2013, the National Building Code is expected to require all new home HRV installations to have an SRE level of at least 60%. The program components include rebates and financing, and a variety of education and marketing tools.

Target Market: Residential

This program targets all residential customers regardless of heat source or age of home. Eligibility is available to all homes that install or replace an HRV.

Eligible Measures

Eligible measures in this program include all HRV models that have an SRE of 70% or more.

Delivery Strategy

Delivery of this program will be bundled with the insulation, window and thermostat programs as part of the takeCHARGE residential portfolio.

Marketing initiatives include partnering with retailers and trade allies in the home building and renovation industry, particularly certified HRV installers. Tools and tactics will include retail and model home point-of-sale materials, advertising, website, tradeshows, community outreach and trade ally activities. Rebates and financing will be processed through customer application.

HRV Program

Market Considerations

The market includes new construction and existing HRV replacement. HRVs are widely used in new home construction in the province. Early HRV installations of the 1990s are at or near the end of their useful life, so many of these will require replacement in the planning period. Initial cost is a barrier to increased market penetration, as is awareness of the benefits of selecting more efficient HRVs.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value is estimated to be $100 for qualifying HRV units. This will reflect incremental cost of the more efficient options.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness and a representative sample of installations will be inspected. Formal evaluations will be conducted after the first year of implementation, and every two years during operation.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	-	331	270	364	318	1,283
Estimated Cumulative Energy Savings (MWh)	-	475	1,180	1,993	2,931	6,578
Total Resource Cost						**1.5**

Block Heater Timers Program

Program Description

This program encourages the use of block heater timers by residential vehicle owners in the Labrador West and Central regions. Vehicle owners regularly plug in their block heaters overnight but 3 hours is enough for the safe operation of the vehicle to warm the coolant and the engine. The timers are available through giveaway and incented through at cash retail coupons.

Target Market: Residential

The program targets residential vehicle owners in the Labrador West and Central regions that do not currently use timers for their block heaters. It is estimated there is a potential market of nearly 10,000 residential vehicles in the region.

Eligible Measures

Eligible timers are 120 volt heavy duty outdoor timers with either manual or digital programming options. Timers provided through Hydro's giveaways are pre-programmed for a 3 hour operation whereas those available at retailers may be pre-programmed or require set up.

Delivery Strategy

The Block Heater Timer Program will run during the winter months with active promotions and giveaways to highlight the technology. The program will be launched with giveaway events happening at partner retailers in both Labrador West and Central and follow with the introduction of the $10 at cash rebate on pre-approved models of timers. Marketing and promotions include print and radio and efforts are made to engage local employers and find champions to be advocates of the product.

The launch event giveaway provides a limited number of pre-programmed timers to customers. These customers are required to participate in survey research to determine their attitudes towards and use of the timers for future verification of savings and to adjust marketing and promotional efforts.

Hydro will also explore partnerships with other groups and businesses in the region regarding further promotions and awareness of the product.

Block Heater Timers Program

Market Considerations

Initial research indicates that while block heaters are used extensively, timers are rarely used. It is common perception that a block heaters need to be plugged in overnight, rather than for limited time before start up. As well, due to lack of demand, retailers do not regularly carry the product and efforts need to be made with partner retailers to ensure on-going access to the timers. The average retail price for an eligible timer is approximately $23. Promotions and delivery strategies address both the customer perception and retail access components.

Incentive Strategy

The program provides giveaway of the technology initially to create awareness of the product and a $10 at cash rebate is provided through partner retailers, covering more than 40% of the cost of the product.

Program Monitoring & Evaluation

Contact information is collected for those redeeming at cash rebates and participating in the giveaways. Phone surveys will be conducted to validate usage and attitudes towards the product. The program will also be monitored for participation level and cost effectiveness.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	24	45	26	-	-	95
Estimated Cumulative Energy Savings (MWh)	324	972	1,410	1,410	1,410	5,526
Total Resource Cost						**6.0**

Lighting Program

Program Description

The objective of this program is to reduce energy use through more efficient lighting technologies in commercial buildings. The program components include rebates on a specific list of qualifying technologies, and a variety of education and marketing tools. This program has been offered through takeCHARGE since 2009.

Target Market: Commercial

This program targets the owners of commercial buildings, encouraging these customers to install more efficient lighting equipment in new construction and retrofit of existing buildings.

Eligible Measures

The eligible measures for this program have included high performance T8 lamps and ballasts, and LED exit signs. Beginning in 2013, additional measures will be eligible, including T8 and T5 fluorescent fixtures used in areas with high ceilings, such as warehouses, gymnasiums, arenas and garages.

Delivery Strategy

Delivery will be integrated with other takeCHARGE commercial sector programming. Marketing for this program will include partnering with lighting manufacturers, distributors, electrical contractors and lighting service providers as key market influencers and allies. The program will create business opportunities for trade allies to sell more efficient lighting products.

The program will also target commercial property owners through direct marketing and through industry associations such as the Building Owners and Managers Association.

Tools and tactics will include trade ally and business association activities, such as workshops for distributors, contractors and building operators, retail point-of-sale materials, website and advertising in trade publications. Demonstration projects will be selected from program participants. Rebates will be processed both through distributor point-of-sale and through customer application, depending on the lighting measure.

Lighting Program

Market Considerations

Use of high performance T8 fluorescent lighting has increased since the program was introduced. Approximately 60% of fluorescent ballasts sold annually are now high performance T8, rather than less efficient T12 or standard T8. However, less than 25% of fluorescent lamps are a high performance type. Some high efficiency technologies, such as T5 fluorescent high bay lighting, are now widely used in new commercial construction, but are used less frequently in existing buildings.

High performance fluorescent lighting systems use 25% to 40% less energy than standard fluorescent systems. LED technologies, such as LED exit signs, use 80-90% less energy than fixtures with incandescent lamps. The eligible technologies are widely available through existing channels. The primary market barriers include higher initial cost and lack of understanding of appropriate lighting technologies and savings potential.

Incentive Strategy

Program incentives reduce the cost differential for higher efficiency products and also provide a sales incentive to participating lighting distributors to sell high performance T8 lighting, ballasts and lamps to their customers. The incentives offered are $2.25 for lamps and $4.25 for ballasts. The incentive for exit signs is $21.00 per unit. The incentive for T8 and T5 fluorescent fixtures is estimated to be $60 per unit for replacement of 400 watt and 250 watt metal halide fixtures in high bay (and medium bay) applications. Pricing of some eligible measures has increased materially in the past 12 to 18 months. This largely reflects international supply dynamics. As a result, incentive levels will be reviewed annually to ensure consistency with incremental costs.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness and a representative sample of installations will be inspected. Formal evaluations will be conducted every two years during operation.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	156	462	446	460	466	1,989
Estimated Cumulative Energy Savings (MWh)	3,717	5,171	6,620	8,143	9,734	33,385
Total Resource Cost						**3.4**

Isolated Systems Business Efficiency Program

Program Description

The objective of the program is to improve electrical energy efficiency across a variety of end uses. The program components include financial incentives based on energy savings, and other supports to assist in opportunity identification and evaluation. This program provides a custom approach that will allow larger commercial customers to explore a wide range of technologies suitable to their own operations, as well as an engineered track that allows for smaller customers to assess opportunities for common end uses.

Target Market

Non-residential customers in Hydro's isolated diesel and L'Anse au Loup systems are eligible.

Eligible Measures

Eligibility of the measure is based on engineering analysis of the savings. Technologies would include, but not be limited to, lighting, HVAC, compressed air and others.

Delivery Strategy

For the engineered track, customers are able to utilize spreadsheets to assess their savings and potential rebates for common end uses, including:

- Commercial lighting – Interior, High bay or Directional
- Unitary A/C equipment (i.e. roof top units)
- Variable speed drives for fans or pumps
- Compressed air

The engineered track allows customers' progress to be incented based on their actual savings and baselines, unlike the traditional prescriptive incentive. The custom track involves a walkthrough audit and feasibility analysis to determine savings and eligible incentive. This allows for a wide range of eligible technologies and projects.

The program is managed internally with some external engineering verification of projects. The Utility facilitates customers through the appropriate processes to evaluate and implement approved projects. This model has been used successfully in other jurisdictions.

Isolated Systems Business Efficiency Program

Market Considerations

Barriers to efficiency in the commercial market include financial and human resource concerns. Incentives will assist in making energy efficiency upgrades more accessible. Human resource concerns are around awareness and knowledge of the technology options as well as time to develop the business case for retrofit projects.

The isolated systems have additional challenges with access to product and access to specific technical skill sets in the evaluation of projects and technology. Hydro's program staff will assist in addressing those gaps.

Incentive Strategy

Incentives will include rebates based on energy savings, as well as funding assistance for feasibility and engineering analysis of opportunities. Rebate levels and available engineering assistance will vary based on forecasted savings and scale of the project.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, and include site visits, engineering reviews and other methods of verifying savings.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	79	145	118	-	-	342
Estimated Cumulative Energy Savings (MWh)	21	166	435	435	435	1,491
Total Resource Cost						**1.2**

Business Efficiency Program

Program Description

The objective of this program is to improve electrical energy efficiency in a variety of commercial facilities and equipment types. The program components include financial incentives based on energy savings, and other financial and educational supports to enable commercial facility owners to identify and implement energy efficiency projects.

Target Market: Commercial

This program targets existing commercial facilities that can save energy by installing more efficient equipment and systems. The program will include a custom projects approach which will appeal primarily to large commercial customers with annual energy consumption of 1,000,000 kWhs or greater. The program will also include rebates for specific measures on a per unit basis, which will appeal to small to medium commercial customers as well.

Eligible Measures

Custom projects' eligibility will be based on engineering review and verification of estimated energy savings impacts. Specific measures eligible for per unit rebates will include HVAC equipment, refrigeration, motors and variable speed drives. It is expected that the initial list of eligible technologies will be expanded as the program matures based on program experience and market opportunities.

Delivery Strategy

For this program, the utility will manage the delivery and take the role of facilitator and consultant, supporting commercial customers to complete project proposals and implement approved projects. The program will utilize external engineering consultants for evaluation of larger project proposals and for monitoring and verification of energy savings.

The program will target equipment suppliers, service providers and consultants as key market influencers and allies in the promotion of energy efficient equipment. Rebates which reduce the cost of efficiency upgrade projects also provide a sales opportunity for these trade allies. Direct marketing to commercial facility owners and to industry associations will support the sales efforts of equipment and service providers.

Business Efficiency Program

Market Considerations

The custom project approach requires one-on-one support for project design and delivery at larger commercial facilities. The lifecycle for each custom project will be measured in months rather than weeks due to project planning and implementation timelines as well as post-installation verification and evaluation. This type of program requires that facilities have business and financial stability to continue operations for a time period appropriate to achieve cost effective savings.

Rebates for specific measures will appeal to a broad range of customers, providing a simpler approach for program participation.

Incentive Strategy

Incentives for this program include rebates based on $0.10 per kWh of energy savings in the first year of implementation. Financial support will also be available for facility energy audits and feasibility studies, if required, based on 50% cost sharing. Guidelines for maximum incentive per project and for scheduling incentive payments for custom projects will be determined in the program detailed design phase. A list of rebates will be developed to reflect incremental cost for specific measures on a per unit basis or based on energy use and hours of operation (for example, lighting controls or thermostats).

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality and cost effectiveness, including engineering review and inspection of all custom projects and assessment of long-term impact on customer processes. Formal program evaluations will be conducted within the first year of implementation and every two years during operation.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	-	406	599	830	910	2,746
Estimated Cumulative Energy Savings (MWh)	-	684	2,736	6,042	9,975	19,437
Total Resource Cost						**1.4**

Industrial Energy Efficiency Program

Program Description

The objective of this program is to improve electrical energy efficiency in a variety of industrial processes. The program components include financial incentives based on energy savings, and other supports to enable industrial facilities to identify and implement efficiency and conservation opportunities. This program is a custom program to respond to the unique needs of the industrial market, rather than a prescriptive technology approach.

Target Market: Industrial

This program targets new and existing industrial process equipment in the transmission level customers served by Newfoundland and Labrador Hydro.

Eligible Measures

Eligibility of projects is based on engineering review and confirmation of estimated energy savings impact. Technologies include, but are not limited to, compressed air, pump systems, process equipment and process controls.

Delivery Strategy

The program is managed internally with external engineering verification of projects and monitoring and evaluation of energy savings. The utility takes the role of facilitator and consultant in providing methods for industrial customers to complete project proposals and implement approved projects.

This program model has been used successfully in other jurisdictions. To ensure the cost effectiveness of this model with the unique nature and size of the industrial market in Newfoundland and Labrador, this program was launched as a three-year program in 2009. With the first project applications being submitted in 2011, the pilot has been revised to close to new applications in 2013.

Industrial Energy Efficiency Program

Market Considerations

This market requires a one-on-one approach to project design and delivery. The program builds on the work already completed by the industrial customers, and addresses their unique barriers to improved efficiency, which include, but are not limited to, access to capital and human resources.

The lifecycle for each program transaction will be measured in months rather than weeks because of the need for review, contract development, implementation timelines and post-installation monitoring and evaluation. This type of program requires that facilities have financial and business stability to continue operations for a time period appropriate to achieve cost effective savings.

Incentive Strategy

Incentives for this program include rebates based on energy savings, as well as funding assistance for additional enabling mechanisms.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, including engineering review and inspection of all projects and assessment of long-term impact on customer processes. Formal program evaluations will be conducted every two years during program operation.

Estimated Costs & Energy Savings

	2012	2013	2014	2015	2016	Total
Estimated Costs ($000s)	388	1,111	909	-	-	2,408
Estimated Cumulative Energy Savings (MWh)	3,617	14,567	24,600	24,600	24,600	91,984
Total Resource Cost						**3.3**

Table C-1
Conservation Programs
Energy Reduction Estimates: 2012 – 2016
by Sector
(MWh)

	2009-2011	2012	2013	2014	2015	2016	Total
Residential							
Insulation Program	17,311	15,501	18,477	21,252	24,182	27,256	123,979
Thermostat Program	5,227	4,503	6,413	8,014	9,972	11,642	45,772
ENERGY STAR Window Program	5,305	5,727	7,435	8,479	9,579	10,734	47,258
Coupon Program	384	320	320	320	320	320	1,984
Isolated Systems Community Program	-	2,640	4,524	5,337	5,337	5,337	23,175
Small Technology Program	-	-	-	3,994	11,625	19,447	35,067
HRV Program	-	-	475	1,180	1,993	2,931	6,578
Block Heater Timer Program	-	324	972	1,410	1,410	1,410	5,526
Total Residential Portfolio	**28,227**	**29,015**	**38,616**	**49,985**	**64,418**	**79,077**	**289,338**
Commercial							
Lighting Rebate Program	3,522	3,717	5,306	7,087	9,035	11,064	39,731
Isolated Systems Business Efficiency Program	-	21	166	435	435	435	1,491
Business Efficiency Program	-	-	684	2,736	6,042	9,975	19,437
Total Commerical Portfolio	**3,522**	**3,738**	**6,155**	**10,258**	**15,512**	**21,474**	**57,137**
Industrial							
Industrial Energy Efficiency Program	165	3,617	14,567	24,600	24,600	24,600	92,149
Total Portfolio	**31,914**	**36,371**	**59,388**	**84,843**	**104,529**	**125,150**	**442,146**

Table C-2
Conservation Programs
Program Cost Estimates: 2012 – 2016
by Sector
($000s)

	2009-2011	2012	2013	2014	2015	2016	Total
Residential							
Insulation Program	3,471	764	692	623	706	665	6,922
Thermostat Program	707	425	468	396	488	428	2,912
ENERGY STAR Window Program	2,712	1,053	889	640	723	684	6,702
Isolated Systems Community Program	-	1,123	908	426	-	-	2,457
Small Technology Program	-	-	118	1,810	2,173	2,236	6,338
HRV Program	-	-	331	270	364	318	1,283
Block Heater Timer Program	-	24	45	26	-	-	95
Total Residential Portfolio	**7,165**	**3,389**	**3,452**	**4,193**	**4,454**	**4,331**	**26,983**
Commercial							
Lighting Rebate Program	391	156	462	446	460	466	2,380
Isolated Systems Business Efficiency Program	-	79	145	118	-	-	342
Business Efficiency Program	-	-	406	599	830	910	2,746
Total Commercial Portfolio	**391**	**235**	**1,013**	**1,163**	**1,290**	**1,376**	**5,268**
Industrial							
Industrial Energy Efficiency Program	381	388	1,111	909	-	-	2,789
Total Programs Portfolio	**7,937**	**4,012**	**5,576**	**6,264**	**5,744**	**5,707**	**35,240**

Table C-3
Conservation Programs
Total Resource Cost Test Results
by Sector

	TRC Results
Residential	
Insulation Program	2.9
Thermostat Program	3.0
ENERGY STAR Window Program	2.4
Isolated Systems Community Program	3.3
Small Technology Program	1.1
HRV Program	1.5
Block Heater Timer Program	6.0
Commercial	
Lighting Program	3.4
Isolated Systems Business Efficiency Program	1.2
Business Efficiency Program	1.4
Industrial	
Industrial Energy Efficiency Program	3.3

A REPORT TO
THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

2011 Conservation and Demand Management Report

NEWFOUNDLAND AND LABRADOR HYDRO

May 2012

newfoundland labrador hydro
a nalcor energy company

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1 Introduction

This report provides an overview of Newfoundland and Labrador Hydro's (Hydro) activities undertaken in 2011 on Conservation and Demand Management (CDM). The report also provides some information on the future outlook and provides an estimate of the value of CDM from a utility perspective.

While the focus is on CDM information and programs directed at customers, Hydro also places efforts on improving the energy efficiency of its own facilities and there were further successes in that program in 2011.

This report describes the provincial approach towards the CDM initiatives, but focuses on the costs and initiatives for Hydro's portion of program implementation.

2 Provincial Context

Energy conservation initiatives were a topic of discussion during Hydro's 2006 General Rate Application (GRA) and a CDM Potential Study was completed in 2008. From that, a five-year strategic plan was completed which outlined proposed energy conservation initiatives to be implemented jointly by Newfoundland Power and Hydro.

The focus was, and is, on energy savings through the development of a culture of conservation. The activities in the Plan include rebate programs for each sector – residential, commercial and industrial – and supporting activities for awareness, education and community engagement to stimulate attitude change and behaviours. The program concepts from the Five-Year Plan and Hydro's 2010 Coupon Pilot Program are included in Appendix A - CDM Program Concepts.

Through Order No. P.U. 14 (2009), the Board of Commissioners of Public Utilities (Board) approved the definition and establishment of a Conservation Deferral Account. A definition for this deferral account was submitted to the Board on April 22, 2009 and is attached as Appendix B to this report.

The takeCHARGE brand was launched in 2008 as a joint utility effort and the first rebate programs were launched through takeCHARGE in 2009. Those same programs continue to be offered. Hydro expanded these program offerings in 2010-2011 with a coupon pilot program, designed to assess the interest from residential customers in lower cost technologies as a way to conserve electricity. This program required significant retailer partnership and coordination and grew from including ten retailers at launch to 17 participating retailers at close of the pilot. The lessons learned from the pilot program are now informing the development of lower cost technology options in the updated Five-Year Utility CDM Plan.

As well as utility-driven CDM programs, Hydro also worked with the Provincial Department of Natural Resources to deliver community based programming, targeting the coastal communities in Labrador. Phase I of the pilot was held in 2009 and the Phase II pilot occurred in 2010. These programs allowed Hydro to work with a community wide approach in isolated areas and provide education, resources and promotions of other programs and offerings to interested residential and commercial customers. The lessons learned from these programs have resulted in the development of a broader Isolated Systems Energy Efficiency Program.

Also working with the Provincial Climate Change, Energy Efficiency and Emissions Trading Secretariat (CCEEET), Hydro was engaged in two research projects: a survey of other provincial jurisdictions for commercial and industrial sector CDM programs to inform policy and program development, and work to provide assessments of energy modeling methodologies for greenhouse gas (GHG) reductions and efficiency program impacts.

3 2008-2013 Five-Year Plan Activities

In 2011, Hydro and Newfoundland Power began developing a new provincial Five-Year Plan to include an expansion of programs for both residential and commercial customers. The Plan is expected to be submitted to the Board in 2012.

The utilities have made gains in CDM program design and implementation, as well as in customer and market engagement since the launch of takeCHARGE in 2009. They also recognize the complexity of the barriers and behaviours in each of their service areas. In particular there has been a significant difference in the uptake of programs between the urban and rural markets which has led to targeted marketing and promotions in rural areas to build participation and awareness.

In moving forward with the updated Five-Year Plan, the utilities are examining a wide range of joint delivery components and strategies for addressing the differences in the rural and urban markets, measurement and evaluation processes and other issues. Each utility has taken the responsibility for addressing the unique aspects of their customers. Hydro informed the Board of an expansion of programming targeting the isolated and diesel systems in 2012 through the 2012 Conservation Cost Deferral and Program Expansion Report, filed December 22, 2011.

The Energy Savers Rebate programs offered through the takeCHARGE program launched in June 2009 were offered through 2011. These programs have produced energy savings and continue to prompt consumers to consider energy efficiency in their purchases. These programs target the highest end uses for the residential and commercial markets of heating and lighting, respectively. These programs are:

- Residential Windows;
- Residential Thermostats;
- Residential Insulation; and
- Commercial Lighting.

The Industrial Energy Efficiency Program (IEEP) is offered to transmission level Industrial Customers and in 2011 the first projects were submitted for incentive support. This program provides financial support for engineering feasibility studies of efficiency projects and for project implementation costs.

In addition to these provincial rebate programs, Hydro also offered a coupon-based energy efficiency program delivered through the takeCHARGE program to Hydro customers. This pilot program was launched in 2010 and closed in April 2011. This program provided in-store coupons for eight energy efficiency products including lighting fixtures, bulbs and hot water tank wraps. It also provided mail-in rebates for Energy Star rated refrigerators and dishwashers. The program was the first retailer based coupon program offered through takeCHARGE and lessons from the pilot will influence future program expansion plans.

Working with Industrial Customers on the IEEP has provided Hydro with a stronger understanding of some of the barriers to energy efficiency with this, and related sectors. Using these lessons, Hydro proposed a similar custom approach in its portfolio expansion to reach general service customers in isolated systems. In addition, Hydro outlined a larger community based efficiency program for the isolated systems providing resources and tools for both residential and commercial customers.

Table 1 and Table 2 below describe Hydro's total CDM expenses and energy savings from 2009 to 2011 across all of Hydro's systems including the Labrador Interconnected System. This report will provide further detail and breakdown of those costs that will be recovered through the deferral account and the associated energy reductions.

Table 1: Hydro CDM Portfolio Costs ($000)

	2009	2010	2011
Windows	44	48	140
Insulation	40	60	80
Thermostats	13	19	31
Coupon Program	0	140	135
Commercial Lighting	13	12	59
Industrial	57	221	103
Total	**123**	**452**	**408**

Table 2: Hydro Annual Energy Savings (MWh)

	2009	2010	2011
Windows	12	27	61
Insulation	31	84	407
Thermostats	6	25	27
Coupon Program	0	64	256
Commercial Lighting	3	10	227
Industrial	0	0	165
Total Existing	**52**	**210**	**1,143**

There are two components of the costs associated with the conservation and efficiency function. Direct program costs are charged to the Deferral Account, and costs associated with general energy efficiency awareness and education, strategic planning and program development are also incurred. These costs remain relatively stable regardless of the number of rebate programs currently offered in the portfolio.

These costs are outlined in Table 3 below. While these costs were in line with expectations for education and support, there was an increase in planning costs related to the planning and development of program concepts for the Isolated Systems Community Program and a Provincial Coupon Program.

Table 3: Hydro's Support Costs ($000)

	2009	2010	2011
Education	262	106	212
Support	53	48	43
Planning	176	180	304
Total	**491**	**334**	**559**

4 2011 Program Highlights

takeCHARGE is a joint utility approach to provincial CDM programming that allows for economies of scale to be achieved in areas such as marketing and outreach. The technologies selected for rebate programs address large energy use opportunities and have been verified as cost effective through standard utility economic screening. In addition, a range of education efforts around general energy efficiency messaging have also been implemented to develop a culture of conservation.

The utilities continue to receive positive response to the existing programs that address a wide provincial customer base. There have, however, been opportunities identified that address different needs within each utility's own distinct customer base. For example, rural Hydro customers respond positively to community engagement efforts as demonstrated by the Coupon Program events and lighting technology exchanges held by Hydro and the Coastal Labrador Pilot Program. The Coastal Labrador Energy Efficiency Pilot Program Phase II was implemented in 2011 and was an initiative funded by the Department of Natural Resources to provide energy efficiency technologies and education to residences and businesses in four isolated diesel communities. This program was not a utility-based ratepayer program, but was instead fully funded by the Province.

The technologies selected for joint utility rebates through provincial takeCHARGE programs have been those that address high energy end uses, such as residential heating and commercial lighting. In addition, technologies that have smaller end use profiles, such as lighting and hot water conservation products have been encouraged through Hydro's Coupon Pilot Program to promote a wider range of opportunities to conserve and provide assistance to customers in gaining access and awareness of lower cost options.

During 2011, takeCHARGE promotions continued to through mass market media, as well as through increasing its presence in social media with an active Facebook page and website. Using engagement techniques such as contests to facilitate discussions on energy efficiency, customers were able to learn about ways to conserve energy and takeCHARGE programs. There was an increase in retailer partnership on joint promotions in 2011. Hydro worked with retailers to jointly promote sales on rebated technologies and connect with in-store sales. For example, Hydro worked with select retailers to develop flyers and promotional materials to promote a programmable thermostat sale and highlight the takeCHARGE rebate available for these items as well.

5 Sector Highlights

In the residential sector, there was growth in all programs. The Insulation Program had the most significant increase, with four times the uptake of the previous year. This increase was largely due to a targeted promotion in the fall that provided an increased incentive for insulation upgrades in eligible homes. This promotion was marketed through print, web and direct in-store promotions and the results demonstrate it was a customer participation success. Since that event, Hydro has been able to engage in new joint sales and promotions with retailers on other products, namely thermostats, and retailers have expressed interest in further partnership opportunities for promoting efficient products. This is a positive result of the insulation promotion as retailers are a key stakeholder in moving forward energy efficiency programs.

A coupon program was launched in the fall of 2010[1] and ended in spring 2011. This initiative brought a wider range of technologies to the attention of homeowners; increased awareness and interest in energy efficiency; and allowed for the utilities to explore a new method of customer engagement. The program had the additional benefit of further educating and engaging retailers and retail staff on energy efficiency, providing more support to customers looking to conserve. Since the inception of this program, Hydro has seen an increase in the interest of retailers in working with the company on energy efficiency education and products.

The commercial sector saw growth in 2011 as well, due primarily to an increase in the number of participating lighting distributors and the inclusion of eligible lighting systems in new commercial construction in Hydro's service area. Hydro worked with the provincial Department of Transportation and Works to ensure new schools installed eligible efficient lighting.

In 2011, three projects were approved under the Industrial Energy Efficiency Program. These are the first capital retrofits to be incented through the program. One project began generating savings before the end of 2011 and the other two have in-service dates in 2012. Working with Industrial Customers on large projects involving engineering analysis and capital planning requires dedicated resources and individual coaching and support when compared to the residential sector and the commercial lighting program. There remains a need for continued one-on-one facilitation of the process to enable Industrial Customers to manage their daily operational priorities while examining energy efficiency and developing efficiency plans.

Moving forward, Hydro will continue to address the high cost of electricity generation in diesel communities, building on the interest level of home and business through the Coastal Labrador Community Projects. Two program concepts have been developed addressing that specific market. These programs provide direct installation of a wide range of energy

[1] The Hydro Coupon program design was filed in October 2010.

conserving technologies to homeowners and customer support to address the unique needs of the businesses in these small communities.

Future expansions of programming for the residential and commercial sectors are in the development for the new Five-Year Plan. Options for the residential sector include widening the offerings to smaller technologies, such as those addressed in the Coupon Program. In the commercial sector, possible expansions include additional lighting technologies and a potential custom approach, modelled on the IEEP.

Hydro will also continue to work with Newfoundland Power and other partners to study emerging opportunities for CDM programming and develop appropriate strategies for advancing a conservation culture in the Province. As previously discussed, further expansions through takeCHARGE, in partnership with Newfoundland Power, are in development for submission to the Board in 2012 which will expand offerings to the broader residential and commercial sectors.

6 Regulated Program Energy Savings and Program Costs

Table 4 below illustrates the energy savings from Hydro customers in relation to programming associated with the annual regulated deferral request. In 2010, Hydro focused on promoting the Windows Rebate Program, resulting in a strong increase in participation in 2010 but a reduced level of participation in 2011 as promotions then focused on the Insulation Program. These promotions resulted in a very strong customer participation in the Insulation Program. The Coupon Program savings follow the delivery timelines of the program. Launched in October 2010 and running until May 2011, there was a buildup of participation as customers became aware of the program and of the benefits of the new technologies being rebated. The first retrofit project funded through the Industrial Energy Efficiency Program was installed in 2011, resulting in the first measurable savings attributable to that program.

Table 4: Energy Savings from Deferral Account Activity (MWh)

	2009	2010	2011
Windows	31	50	38
Insulation	12	16	229
Thermostats	6	15	16
Coupon Program	0	47	166
Commercial Lighting	3	0	92
Industrial	0	0	165
Total Existing	**52**	**128**	**706**

The costs associated with the delivery of the CDM program portfolio include direct costs for advertising, salaries, rebates and other expenses associated with a specific rebate program. These costs vary depending on the uptake of the program and the number of programs offered. Table 5 below provides a program level breakdown.

Table 5: Program Costs from Deferral Account Activity ($000)

	2009	2010	2011
Windows	44	41	69
Insulation	40	53	116
Thermostats	13	18	25
Coupon Program	0	113	123
Commercial Lighting	13	0	43
Industrial	57	190	98
Total Existing	**167**	**415**	**474**

7 Program Participation and Savings

The following provides the breakdown of rebate transactions and savings for each of the programs in the Five-Year Plan and the Coupon Pilot Program. These numbers reflect costs and savings associated with activity associated with the Deferral Account.

The estimated energy savings represent savings from participants in that year. These savings will occur each year for the life of the measures installed.

Table 6: Life to Date Program Participation

Program	Number of Rebates			
	2009	2010	2011	Life to Date
Energy Star Window Rebate Program	11	19	41	71
Insulation Rebate Program	14	24	104	142
Thermostat Rebate Program	4	28	32	64
Coupon Pilot Program	-	N/A	N/A	N/A
Commercial Lighting Rebate Program	0	0	6,996	6,996
Industrial Energy Efficiency Program	0	0	1	1

Table 7: Life to Date Energy Savings

Program	Estimated Energy Savings MWh/Yr			
	2009	2010	2011	Life to Date
Energy Star Window Rebate Program	31	50	38	119
Insulation Rebate Program	12	16	229	257
Thermostat Rebate Program	6	15	16	37
Coupon Pilot Program	0	47	166	213
Commercial Lighting Rebate Program	0	0	92	92
Industrial Energy Efficiency Program	0	0	165	165

8 Life to Date Value of Program Energy Savings

The value of energy and demand savings has been estimated from a utility perspective based on overall cost reductions associated with the Deferral Account Activity. The value of savings includes Holyrood fuel savings and impacts on transmission and distribution costs including losses. Estimated energy and demand savings are not based on assumption of timing of installation of the measure during the year, and allow for reductions due to free ridership which is the portion of the incentives issued to customers that we assume would have installed the measure even without the incentive.

Table 8: Life to Date Value of Energy Savings ($)

Program	2009	2010	2011	Life to Date
Energy Star Window Rebate Program	191	997	3,402	4,590
Insulation Rebate Program	1,163	6,484	21,250	28,897
Thermostat Rebate Program	60	894	2,881	3,835
Coupon Pilot Program	0	4,712	26,608	31,320
Commercial Lighting Rebate Program	0	0	6,723	6,723
Industrial Energy Efficiency Program	0	0	1,019	1,019

Appendix A

CDM Program Concepts

Residential Windows

Program Description

The objective of this program is to increase the installation of *Energy Star* qualified windows, resulting in savings in space heating energy. The program components include rebates and financing, and a variety of education and marketing tools.

Target Market: Residential

This program targets residential customers, including new construction and replacement of existing windows at end of life. Eligibility is limited to electrically heated homes.

Eligible Measures

Eligible measures in this program are *Energy Star* qualified windows.

Delivery Strategy

Delivery of this program will be integrated with the revised *Wrap Up for Savings* insulation and thermostat programs.

Marketing initiatives will include partnering with retailers and trade allies in the home building and renovation industry, to target both do-it-yourself and professional installers. Communications will incorporate the *Energy Star* brand and related marketing support, as well as cross-promotion of the EcoEnergy Retrofit program from Natural Resources Canada. Tools and tactics will include retail and model home point-of-sale materials, advertising, tradeshows, community outreach and trade ally activities. Rebates and financing will be processed through customer application.

Residential Windows

Market Considerations

Energy Star qualified windows make up approximately 10% to 15% of window sales in the province, and understanding of the product is generally poor among customers and retailers. Initial cost is also a barrier to increased market penetration, due to a 10% to 15% price premium. Eligible windows are widely available. Local manufacturers produce approximately 50% of the provincial window sales, and most manufacturers offer *Energy Star* qualified products.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value will be based on the incremental cost of *Energy Star* qualified windows over the standard type.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	40	420	400	500	510	610	2,480
Estimated Cumulative Energy Savings (MWh)	-	230	570	1,020	1,700	2,610	
Total Resource Cost (TRC)	2.4						

Residential Thermostats

Program Description

The existing thermostat rebate program will be revised based on the CDM Potential Study and market research. The continuing objective of this program is to increase the use of both programmable thermostats, which automatically set back room temperature, and high performance thermostats, which control room temperature very accurately, in order to save space heating energy. The program components include rebates and financing, and a variety of education and marketing tools.

Target Market: Residential

This program targets residential customers, including home retrofit and new construction. Eligibility is limited to electrically heated homes.

Eligible Measures

Eligible measures in this program include both programmable and high performance thermostats (for example, those which control within +/- 0.5C.)

Delivery Strategy

Delivery of this program will be integrated with the new residential windows and revised *Wrap Up for Savings* insulation programs.

Marketing initiatives will include partnering with manufacturers, retailers, electrical contractors, as well as homebuilders and real estate professionals to educate consumers regarding the energy savings and comfort benefits of programmable and high performance thermostats. Communications will incorporate cross-promotion of the EcoEnergy Retrofit program from Natural Resources Canada. Tools and tactics will include retail and model home point-of-sale materials, advertising, tradeshows, community outreach and trade ally activities. Rebates will be processed directly by authorized retailers and through customer-submitted coupons.

Residential Thermostats

Market Considerations

Sales of programmable and high performance thermostat types make up less than 10% of total thermostat sales provincially. Customer awareness of the important role of thermostats in heating system efficiency is low**.** Initial cost is a barrier to increased market penetration, particularly for new home construction where continued use of minimum quality thermostats represents significant lost opportunity. Availability of electronic high performance thermostats is currently limited in most areas, though programmable types are widely available.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value will be based on the incremental cost of the targeted thermostat types over the standard type.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings [1]

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	-	300	220	280	230	270	1,300
Estimated Cumulative Energy Savings (MWh)	-	270	650	1,210	1,910	2,650	
Total Resource Cost 2.4							

[1] Includes the cost of revising the existing program and the resulting energy savings. Excludes the cost and energy savings of existing program.

Residential Insulation

Program Description

The existing *Wrap Up for Savings* program will be revised based on the CDM Potential Study and market research. The continuing objective of this program is to increase the insulation level in basements, crawl spaces, walls and attics, resulting in savings in space heating energy. The program components include rebates and financing, and a variety of education and marketing tools.

Target Market: Residential

This program targets residential customers, including home retrofit and new construction. Eligibility is limited to electrically heated homes.

Eligible Measures

Eligible measures in this program include insulation upgrades to basements, crawl spaces, walls and attics. Rebates for new homes are limited to basement insulation beyond building code compliance. Technical requirements for each upgrade type will be reviewed during program detailed design.

Delivery Strategy

Delivery of this program will be integrated with the new residential windows and revised thermostat programs.

Marketing initiatives will include partnering with retailers and trade allies in the home building and renovation industry, to target both do-it-yourself and professional installers. Communications will incorporate cross-promotion of the EcoEnergy Retrofit program from Natural Resources Canada. Tools and tactics will include retail and model home point-of-sale materials, advertising, tradeshows, community outreach and trade ally activities. Rebates and financing will be processed through customer application.

Residential Insulation

Market Considerations

Older homes and small homes often have inadequate insulation levels. For example, over 45% of homes in the province built before 1950 have uninsulated basements. Most new homes constructed in the province still have no insulation on the concrete portion of basement walls. Initial cost is a barrier to increased market penetration, as is awareness of the impact on space heating energy, and the practical difficulties of renovating an existing living space. Recent experience with the *Wrap Up for Savings* program has shown participation to be responsive to awareness-building marketing activities.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value will be reviewed and will be restructured based on insulating value (R-value) rather than a prescriptive product list as currently offered.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings [1]

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	40	1,210	1,210	1,400	1,430	1,590	6,880
Estimated Cumulative Energy Savings (MWh)	-	4,130	8,670	13,660	19,160	25,200	
Total Resource Cost 2.6							

[1] Includes the cost of revising the existing program and the resulting energy savings. Excludes the cost and energy savings of existing program.

Commercial Lighting

Program Description

The objective of this program is to increase the installation of more efficient lighting technologies in commercial buildings. The program components include rebates on a specific list of qualifying technologies, and a variety of education and marketing tools.

Target Market: Commercial

This program targets retrofit of commercial building lighting, encouraging customers to replace existing lighting equipment.

Eligible Measures

The list of eligible measures in this program is based on the technologies identified as eligible for rebate under existing programs offered by other Canadian utilities (for example Ottawa Hydro and BC Hydro). These include T8 fluorescent electronic ballasts or fixtures, compact fluorescent lights (CFLs), and *Energy Star LED* exit signs.

Delivery Strategy

This program is expected to be operational for three years. Delivery will be integrated with future commercial sector programming, which is expected to include a custom project-based incentive program similar to the industrial custom program.

Marketing initiatives will include partnering with lighting manufacturers, distributors, and electrical contractors who will carry the program to potential customers. The program will create business opportunities for trade allies to sell more efficient lighting products. This approach has proven effective in other jurisdictions and in previous Newfoundland Power experience. Tools and tactics will include trade ally and business association activities, such as workshops for contractors and distributors, retail point-of-sale materials, and advertising in trade publications. Demonstration projects will be selected from early participants. Rebates will be processed through customer application.

Commercial Lighting

Market Considerations

The largest portion of the market opportunity in commercial lighting is with standard T12 fluorescent tube lighting with electromagnetic ballasts. This technology is used in approximately 60% of existing commercial building interior lighting in the province, though new construction is almost exclusively using the more efficient T8 fluorescents with electronic ballasts. Federal regulations will remove the electromagnetic ballast from new sales starting in 2010. However, there is a significant opportunity for replacement of existing T12 installations prior to their normal end of life (average lifespan 17 years). Primary barriers to increased use of the more efficient products include the higher initial capital cost, and lack of understanding of the opportunity for energy and cost savings.

Incentive Strategy

Incentives for this program include rebates for a prescriptive list of eligible technologies. The list will be based on the technologies identified as eligible for rebate under existing programs offered by other Canadian utilities (for example Ottawa Hydro and BC Hydro).

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	-	290	310	340	-	-	940
Estimated Cumulative Energy Savings (MWh)	-	590	1,760	2,930	2,930	2,930	
Total Resource Cost 1.1							

Industrial Custom Program

Program Description

The objective of this program is to improve electrical energy efficiency in a variety of industrial processes. The program components include financial incentives based on energy savings, and other supports to enable industrial facilities to identify and implement efficiency and conservation opportunities. This program is a custom program to respond to the unique needs of the industrial market, rather than a prescriptive technology approach.

Target Market: Industrial

This program targets retrofit of industrial process equipment in the transmission level customers served by Newfoundland and Labrador Hydro.

Eligible Measures

Eligibility of projects is based on engineering review and confirmation of estimated energy savings impact. Technologies include, but are not limited to, compressed air, pump systems, process equipment and process controls.

Delivery Strategy

This program will be delivered through a call for proposals to Industrial Customers (IC) for energy saving projects that meet set financial criteria. These proposals will undergo engineering review for approval. Selected projects will be eligible for rebates based on savings and payback period reductions, as well as enabling supports including facility education, energy audits and other customized offerings.

The program will be managed internally with external engineering verification of projects and monitoring and evaluation of energy savings. The utility will take the role of facilitator and consultant in providing methods for ICs to complete project proposals and implement approved projects.

This program model has been used successfully in other jurisdictions. To ensure the cost effectiveness of this model with the unique nature and size of the industrial market in Newfoundland and Labrador, this program will launch as a three-year program using a single call for proposals and full evaluation cycle.

Industrial Custom Program

Market Considerations

This market requires a one-on-one approach to project design and delivery. The program builds on the work already completed by the ICs, and addresses their unique barriers to improved efficiency, which include, but are not limited to, access to capital and human resources.

The lifecycle for each program transaction will be measured in months rather than weeks because of the need for review, contract development, implementation timelines and post-installation monitoring and evaluation. This type of program requires that facilities have financial and business stability to continue operations for a time period appropriate to achieve cost effective savings.

Incentive Strategy

Incentives for this program include rebates based on energy savings, as well as funding assistance for additional enabling mechanisms. Rebate levels, maximum rebate amounts and payment schedules will be determined in the program detailed design phase. Rebates for each approved project will be determined through the call for proposals process, based on the engineering proposal and following a schedule agreed upon by the customer and utility.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, including engineering review and inspection of all projects and assessment of long-term impact on customer processes. Formal program evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	100	1,470	2,640	4,270	-	-	8,480
Estimated Energy Savings (MWh)	-	-	-	20,000	45,000	45,000	
Total Resource Cost 2.9							

Residential Coupon Based Energy Efficiency Program

Program Description

This project is a coupon based energy efficiency program targeting Hydro's 31,000 residential customers located across the province in 220 communities. The program provides both at-the-cash coupon promotion for smaller efficiency technologies and mail in rebates for larger Energy Star appliances. This range allows customers to engage in energy efficiency with a wide range of purchase decisions. The program also provides necessary supports, awareness and mechanisms to allow small community retailers to participate and promote their products. All partners are supported by a local program representatives working in the field.

Target Market: Residential

This program targeted residential customers across a range of technology purchases.

Eligible Measures

Eligible measures include smaller items such as CFLs and LED holiday lights, but also some larger items such as Energy Star lighting fixtures, hot water tank wraps and Energy Star clothes washers. The program includes measures with savings resulting from primarily plug load and water heating savings.

Delivery Strategy

At launch the program has ten partner retailers. Local retailers in targeted communities were approached to procure products and offer the coupons for the duration of the program. The rebates on the ENERGY STAR® qualified dishwasher and refrigerator were made available more widely to the entire Hydro customer base through promotions online, info available through the call centre and bill inserts.

Residential Coupon Based Energy Efficiency Program

Market Considerations

This project was designed to:

- Deliver a new, accessible, TRC positive instant coupon-based energy efficiency program in Hydro communities and gain knowledge on the challenges of using this type of approach in communities of different sizes.
- Generate knowledge of energy conservation measures and awareness of the takeCHARGE program offerings.
- Establish new partnerships in the retail sector and engage them in an ongoing wider product offering program and gain a better understanding of Hydro's customer base on the interest in smaller energy efficiency technologies.
- Increase the market penetration of energy saving products and overall energy efficiency awareness.

Incentive Strategy

Incentives for this program include at-the-cash coupons which reduced the cost of the efficient products for the customer at purchase and two additional ENERGY STAR® appliance products with a mail-in rebate similar to the traditional takeCHARGE Energy Savers Rebate programs.

Program Monitoring & Evaluation

Evaluation components include examining the participation, the administration processes, and attitudes of the partners. These included:

- Coupon uptake: number of coupons distributed and number of coupons redeemed;
- Event participation: number of participants; and
- Retailer and participant experiences: number of participants who learned more about energy conservation, takeCHARGE and energy saving products based on interactions with the program.

Estimated Costs & Energy Savings

Costs ($000s)	$240,000-$265,000
Energy Savings (MWh)	473
TRC	2.05

Appendix B

Definition of Deferral Account

Newfoundland and Labrador Hydro
April 22, 2009

Conservation and Demand Management (CDM) Cost Deferral Account
Proposed Definition

The account shall be charged with the costs incurred in implementing the CDM Program Portfolio. The costs will include such items as detailed program development, promotional materials, advertising, pre and post customer installation checks, application and incentive processing, incentives, trade ally training, employee training, and program evaluation costs associated with programs in the CDM Program Portfolio.

The account will exclude any expenditure properly chargeable to plant accounts. The account shall also exclude conservation expenditures that are general in nature, such as costs associated with providing energy conservation awareness, responding to customer inquiries, planning, research and general supervision that are not associated with a specific program in the CDM Program Portfolio.

The account will exclude any expenditure related to programs or incentives that are fully recoverable from other parties, including government. Where a program or initiative is partially funded by other parties, the amount funded will be used to reduce the appropriate expenditures.

Costs associated with Labrador Interconnected customers will be tracked separately from costs associated with the other customers, as programs for the latter are based upon a cost structure which is significantly different from the Labrador Interconnected System and future disposition may be treated separately.

Transfers to, and from, the proposed account will be tax effected.

The disposition of any balance in this account will be subject to a future Order of the Board.

A REPORT TO
THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

2012 Conservation and Demand Management Report

NEWFOUNDLAND AND LABRADOR HYDRO

March 2013

newfoundland labrador hydro
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1 Introduction

This report provides an overview of Newfoundland and Labrador Hydro's (Hydro) activities undertaken in 2012 on Conservation and Demand Management (CDM). The report also provides some information on the future outlook and provides an estimate of the value of CDM from a utility perspective.

While the focus is on CDM information and programs directed at customers, Hydro also places efforts on improving the energy efficiency of its own facilities and there were further successes in that program in 2012.

This report describes the provincial approach towards the CDM initiatives, but focuses on the costs and initiatives for Hydro's portion of program implementation. 2012 was a very active year for Hydro, with significant program expansions in both residential and commercial sectors, targeting the isolated diesel systems. In addition to large scale programming, a smaller program promoting block heater timers was launched for customers in the Labrador Interconnected System. The Five Year Energy Conservation Plan: 2012-2016 (the Plan) was filed with the Board in 2012 and outlines further program expansions for 2013 and 2014 for both commercial and residential customers.

2 Provincial Context

Energy conservation initiatives were a topic of discussion during Hydro's 2006 General Rate Application (GRA). Since that time, a CDM Potential study was completed in 2008. From that, a five-year strategic plan was completed which outlined proposed energy conservation initiatives to be implemented jointly by Newfoundland Power and Hydro.

The focus of the Plan was and is on energy savings through the development of a culture of conservation. The activities in the Plan include rebate programs for each sector – residential, commercial and industrial – and supporting activities for awareness, education and community engagement to stimulate attitude change. Since that Plan, Hydro has also offered programs directly to their customers: the Coupon Pilot Program in 2010-2011, the Isolated Systems[1] Community Energy Efficiency Program, Isolated Systems Business Efficiency Program (ISBEP)[2] and a Block Heater Timer program, all launched in 2012. An overview of the programs offered during 2012 is included in Appendix A: CDM Programs and includes current programs offered both through a joint utility partnership or directly targeting Hydro's customers.

Through Order No. P.U. 14 (2009), the Board approved the definition and establishment of a Conservation Deferral Account. A definition for this deferral account was submitted to the Board on April 22, 2009 and is attached as Appendix B to this report.

The takeCHARGE brand was launched in 2008 as a joint utility effort and the first rebate programs were launched through takeCHARGE in 2009. Those same programs continue to be offered.

Hydro continues to have a positive working relationship with the Provincial Climate Change, Energy Efficiency and Emissions Trading Secretariat (CCEEET). In 2012, the takeCHARGE team provided support and feedback on the development of the energy efficiency portion of the Turn Back the Tide[3] website and social media activities regarding climate change and energy efficiency.

[1] These programs target isolated diesel systems as well as the L'anse au Loup System covering the south coast of Labrador.
[2] Board Order No. P.U. 3(2012) approved the deferral of 2012 costs related to the Conservation program.
[3] The Government of Newfoundland and Labrador's "Turn Back the Tide" campaign is being delivered by the Office of Climate Change, Energy Efficiency and Emissions Trading, and is a public awareness campaign on climate change and energy efficiency. The website address is www.turnbackthetide.ca.

3 Five Year Plan Activities

The Five Year Energy Conservation Plan: 2012-2016 was filed with the Board in 2012 and outlines further program expansions for 2013 and 2014 for both commercial and residential customers and provides for an evaluation and assessment of next steps for the industrial sector. In addition to the joint utility programs offered provincially, there are three programs offered by Hydro that directly target their customers in isolated and Labrador Interconnected systems. These are also offered through the takeCHARGE brand to maintain consistency for all utility offered energy conservation programs.

The takeCHARGE Energy Savers Rebate programs launched in June 2009 were offered through 2012. These programs have delivered energy savings and continue to prompt consumers to consider energy efficiency in their purchases. These programs target the highest end uses for the residential and commercial markets of heating and lighting, respectively. These programs are:

- Residential Windows;
- Residential Thermostats;
- Residential Insulation; and
- Commercial Lighting.

The Industrial Energy Efficiency Program (IEEP) launched in 2010 with the first project cash incentives approved in 2011 and additional projects completed in 2012. This program provides financial support for engineering feasibility studies of efficiency opportunities and capital projects.

In addition to these provincial rebate programs, Hydro launched programs for both residential and commercial customers. The Isolated System Energy Efficiency Program provided for direct install of a kit of technologies in a participating customer's home. The kit included items for water savings, draft proofing, lighting and other measures. Homeowners received education on energy efficiency and information on the existing takeCHARGE rebate programs. There were community events, social media promotions and exchanges held to promote the program and energy efficiency awareness. More than 85%[4] of homes received a direct install visit in the communities targeted in 2012.

In addition to the residential component of the program, commercial customers also received a direct install with lighting, draft sealing and water conservation measures. As well as the direct install visit, customers were made aware of the newly launched Isolated Systems Business Efficiency Program (ISBEP) that provides a custom approach towards finding energy efficiency solutions for the business community. Similar to the

[4] Final report from Summerhill Group indicates an 87.6% install rate for 2012.

IEEP, the program provides assessment of the opportunities at the customers' site and provides an incentive for capital work based on the predicted energy savings.

A smaller program was launched in the Labrador Interconnected System to promote and provide incentives for Block Heater Timers. Timers are rarely used in this region, although the penetration of block heaters is very high. This program was launched in partnership with corporate partners Iron Ore Company of Canada (IOC) and Cliffs (Wabush Mines) to provide giveaways, promotions and retail coupons on this technology. Our corporate partners are increasing the incentive amount and providing additional promotions and outreach for the program to customers in the Labrador West area.

Table 1: Hydro CDM Portfolio Costs and Table 2: Hydro Annual Energy Savings, describe Hydro's total CDM expenses and energy savings from 2009 to 2012 across all of Hydro's systems including the Labrador Interconnected System. This report will provide further detail and breakdown of those costs that will be recovered through the deferral account and the associated energy reductions.

Table 1: Hydro CDM Portfolio Costs ($000)

	2009	**2010**	**2011**[5]	**2012**
Windows	44	48	80	117
Insulation	40	60	140	126
Thermostats	13	19	31	47
Coupon Program	-	140	135	-
Commercial Lighting	13	12	59	20
Industrial	57	221	103	173
Block Heater Timer				31
Isolated Systems Community				858
ISBEP				93
Heat Recovery Ventilator				-
Business Efficiency Program				-
Small Technologies				-
Total Portfolio	**167**	**500**	**548**	**1,465**

[5] In the 2011 Conservation and Demand Management Report, the costs for Windows and Insulation were reversed in the 2011 column. This table provides a correction of that error.

Table 2: Hydro Annual Energy Savings (MWh)

	2009	2010	2011	2012
Windows	12	27	61	136
Insulation	31	84	407	383
Thermostats	6	25	27	43
Coupon Program	-	64	256	-
Commercial Lighting	3	10	227	95
Industrial	0	0	165	3,172
Block Heater Timer				0
Isolated Systems Community				1,673
ISBEP				3
Heat Recovery Ventilator				-
Business Efficiency Program				-
Small Technologies				-
Total	**52**	**210**	**1,143**	**5,505**

There are two components of the costs associated with the conservation and efficiency function. In addition to direct program costs which are charged to the Deferral Account, there are costs associated with general energy efficiency awareness and education, strategic planning and program development. These costs remain relatively stable regardless of the number of rebate programs currently offered in the portfolio.

These costs are outlined in Table 3: Hydro Support Costs, below.

Table 3: Hydro Support Costs 2009-2013 ($000)

	2009	2010	2011	2012
Education	262	106	212	200
Support	53	48	43	53
Planning	176	180	304	127
Total	**491**	**334**	**559**	**380**

4 2012 Program Highlights

takeCHARGE is a joint utility effort to provincial CDM programming that allows for economies of scale to be achieved in areas such as marketing and outreach efforts. The technologies selected for rebate programs address large energy use opportunities and have been verified as cost effective through standard utility economic screening. In addition, a range of education efforts around general energy efficiency messaging have also been implemented to develop a culture of conservation.

Participation continues to increase in Hydro's service area. Retailers continue to be key partners in reaching customers, and a pilot project undertaken in 2011-2012 with retailers to promote Energy Star Window purchases and rebate submission demonstrated this role. Select retailers completed applications on behalf of customers and received a small financial incentive for every eligible rebate submitted. This effort was both to increase the sales for Energy Star Windows but also to reduce the barriers of the application process for the customer. Hydro rebate participation numbers are typically low, so it is challenging to determine the exact impact of such an initiative, but it does seem to have had an impact. The lessons learned from this report will be used to determine further opportunities for retailer engagement on a provincial scale.

In the residential sector, there was growth in both the windows and thermostat programs. The decrease from 2011 savings in the insulation program is a result of the very strong activity around an aggressive insulation promotion and increased rebate that was held in 2011 that was not repeated in 2012.

Participation in the commercial lighting program has been a challenge in 2012 due to an increase in the cost of the more efficient lighting that is eligible for incentive. While the price has levelled out and even returned to previous cost levels, the local lighting suppliers are not yet following suit. The utilities continue to work with distributors to gain insight into the impacts this is having on the market.

Industrial Customer participation continues to be a challenge as customers focus on their own operation and processing, and energy efficiency does not appear to be a primary driver for resource allocation. There is still a great need for strong, hands-on support to enable customers to manage their daily operational priorities while examining energy efficiency and developing efficiency plans.

During 2012, takeCHARGE promotions continued through mass market media approaches, as well as through an increasing presence in social media with an active Facebook page and website. Using contests and engagement in discussions on energy efficiency, customers were able to learn about ways to conserve as well as hear about takeCHARGE programs. Social media continues to be an effective way to engage customers in discussing ways to conserve energy and the customer engagement has directed people to the website for additional detailed rebate program information.

5 Sector Highlights

In the residential sector, outreach and non-traditional promotions and awareness building continue to demonstrate strong results in reaching a diverse market. For example, the takeCHARGE program has been represented through community events, product exchanges and giveaways to reach customers in a variety of ways. The Isolated Systems Energy Efficiency Program in isolated communities provided events and open community dialogue, opportunities to participate in lighting exchanges as well as providing coupons for small technologies such as lighting at local retailers and the opportunity to have a number of items installed free of charge in the customer's home. The Program is administered by Summerhill Group on behalf of Hydro and through Summerhill, local people were hired and trained to deliver the program. The very high participation rate of more than 85% of homes is in large part due to the program having a local presence and engaging people on a personal level with regards to energy decisions at home.

The commercial market requires additional understanding and support of a different nature. In the summer of 2012, the ISBEP was launched, providing rebates and technical assistance for commercial customers in the isolated diesel communities and L'Anse au Loup area. This custom approach is similar to the IEEP and Hydro technical staff work with customers one on one to address their energy efficiency needs. Hydro had already learned from the IEEP that business customers require technical support in identifying the opportunities but also significant support in moving the project forward while they manage immediate business concerns.

In 2012, the IEEP had successes with continued participation in capital retrofits with one Industrial Customer on the Island Interconnected System. Additional projects were discussed and explored with other customers but were not completed. The challenges of keeping sustained interest in efficiency projects with competing business concerns has resulted in continued low numbers of projects and savings, despite the identification of cost effective projects.

Hydro will also continue to work with Newfoundland Power and other partners to determine emerging opportunities for CDM programming and develop appropriate strategies for developing a conservation culture in the province. The 2012 activities included filing the updated Plan, commencing discussions with CCEEET on changing codes in both commercial and residential sectors and new program launches for both sectors.

6 Regulated Program Energy Savings and Program Costs

Table 4 below illustrates the energy savings from Hydro customers in relation to programming associated with the annual regulated deferral request. In 2012, there was growth on the windows and thermostat programs and an increase in uptake on insulation. The commercial lighting challenges with market prices of the eligible technologies are reflected in this year's savings. The strong successes in the IEEP and the Isolated System Community Energy Efficiency Program reflect efforts to offer a program model that responds to the needs of the customers being targeted. Strong facilitation and support was provided for the IEEP participants and one-on-one community level participation opportunities provided through the Isolated System Community Energy Efficiency Program. A small energy savings in 2012 resulted from the completion of the first project through the ISBEP program.

Table 4: Energy Savings from Deferral Account Activity (MWh)

	2009	2010[6]	2011	2012
Windows	12	16	38	50
Insulation	31	63	229	126
Thermostats	6	15	16	28
Coupon Program	0	47	166	-
Commercial Lighting	3	0	92	25
Industrial	0	0	165	3,172
Block Heater Timer				0
Isolated Systems Community				1,673
ISBEP				3
Heat Recovery Ventilator				-
Business Efficiency Program				-
Small Technologies				-
Total	**52**	**141**	**706**	**5,077**

The costs associated with the delivery of the CDM program portfolio include direct costs for advertising, salaries, rebates and other expenses directly associated with a specific rebate program. These costs vary depending on the uptake of the program and the number of programs offered. Table 5: Program Costs from Deferral Account Activity provides a program level breakdown.

[6] In the 2011 Conservation and Demand Management Report, the energy savings for Windows and Insulation were reversed in the 2009 and 2010 columns. This table provides a correction of that error. Review of the savings information for 2010 showed that the Insulation savings reported (50 MWh/yr) were actual savings assumed from time of rebate submission and had not been annualized. This correction has been made, to ensure consistency with other programs and resulted in an increase in the savings to 63 MWh/yr.

Table 5: Program Costs from Deferral Account Activity ($000)

	2009	2010	2011[7]	2012
Windows	44	41	69	102
Insulation	40	53	116	108
Thermostats	13	18	25	43
Coupon Program	-	113	123	-
Commercial Lighting	13	-	43	10
Industrial	57	190	98	170
Block Heater Timer				-
Isolated Systems Community				858
ISBEP				93
Heat Recovery Ventilator				-
Business Efficiency Program				-
Small Technologies				-
Total Portfolio	**167**	**415**	**474**	**1,384**

[7] In the 2011 Conservation and Demand Management Report, the costs for Windows and Insulation were reversed in the 2011 column.

7 Program Participation and Savings

The following provides the breakdown of rebate transactions and savings for each of the programs in the Five Year Plan and the Coupon Pilot Program. These numbers reflect costs and savings associated with activity recorded in the Deferral Account.

The estimated energy savings represent savings from participants in that year. These savings will occur each year for the life of the measures installed.

Table 6: Life to Date Program Participation

	Number of Rebates				
Program	**2009**	**2010**	**2011**	**2012**	**Life to Date**
Energy Star Window Rebate Program	11	19	41	61	132
Insulation Rebate Program	14	24	104	50	192
Thermostat Rebate Program	4	28	32	45	109
Coupon Pilot Program	-	N/A	N/A	N/A	0
Commercial Lighting Rebate Program[8]	0	0	6,996	1,321	8,317
Industrial Energy Efficiency Program	0	0	1	1	2
Block Heater Timer				0	0
Isolated System Community				N/A	0
ISBEP				1	1
Heat Recovery Ventilator				-	0
Business Efficiency Program				-	0
Small Technologies				-	0

[8] For the Commercial Lighting Program, rebates can range from 10 efficient bulbs to hundreds of bulbs, and ballasts. For that reason, the numbers listed in this table are numbers of technologies rebated, rather than the actual number of rebates.

Table 7: Life to Date Energy Savings

	Estimated Energy Savings MWh/yr				
Program	**2009**	**2010**[9]	**2011**	**2012**	**Life to Date**
Energy Star Window Rebate Program	12	16	38	50	116
Insulation Rebate Program	31	63	229	126	449
Thermostat Rebate Program	6	15	16	28	65
Coupon Pilot Program	0	47	166	0	213
Commercial Lighting Rebate Program	0	0	92	25	117
Industrial Energy Efficiency Program	0	0	165	3,172	3,337
Block Heater Timer				0	0
Isolated System Community				1,673	1,673
ISBEP				3	3
Heat Recovery Ventilator					0
Business Efficiency Program					0
Small Technologies					0

[9] In the 2011 Conservation and Demand Management Report, the energy savings for Windows and Insulation were reversed in the 2009 and 2010 columns.

8 Life to Date Value of Program Energy Savings

The value of energy and demand savings has been estimated from a utility perspective based on overall cost reductions associated with the program costs recorded in the Deferral Account. It includes Holyrood fuel savings and impacts on transmission and distribution costs including losses. No losses are included for the Industrial Energy Efficiency Program as they are transmission level customers. Estimated energy and demand savings are based on when the customer completed installation of energy saving measures during the year, and allow for reductions due to free ridership. This estimate is less than that based on savings accrued to participants on an annual basis, as presented elsewhere in this report. The value of energy savings changes each year due primarily to the change in avoided fuel prices and an update from using 2009 dollars to 2012 dollars.

Table 8: Life to Date Value of Energy Savings ($)

	Estimated Energy Savings MWh/yr				
Program	**2009**	**2010**	**2011**	**2012**	**Life to Date**
Energy Star Window Rebate Program	233	1,197	4,084	10,477	15,991
Insulation Rebate Program	1,078	6,037	25,469	57,650	90,234
Thermostat Rebate Program	61	893	2,879	6,635	10,468
Coupon Pilot Program	-	4,712	26,608	54,307	85,627
Commercial Lighting Rebate Program	-	-	7,972	21,582	29,554
Industrial Energy Efficiency Program	-	-	961	291,564	292,525
Block Heater Timer	-	-	-	0	0
Isolated System Community	-	-	-	167,906	167,906
ISBEP	-	-	-	221	221
Heat Recovery Ventilator	-	-	-	-	-
Business Efficiency Program	-	-	-	-	-
Small Technologies	-	-	-	-	-

Appendix A

CDM Program Concepts

Residential Windows

Program Description

The objective of this program is to increase the installation of *Energy Star* qualified windows, resulting in savings in space heating energy. The program components include rebates and financing, and a variety of education and marketing tools.

Target Market: Residential

This program targets residential customers, including new construction and replacement of existing windows at end of life. Eligibility is limited to electrically heated homes.

Eligible Measures

Eligible measures in this program are *Energy Star* qualified windows.

Delivery Strategy

Delivery of this program will be integrated with the revised *Wrap Up for Savings* insulation and thermostat programs.

Marketing initiatives will include partnering with retailers and trade allies in the home building and renovation industry, to target both do-it-yourself and professional installers. Communications will incorporate the *Energy Star* brand and related marketing support, as well as cross-promotion of the EcoEnergy Retrofit program from Natural Resources Canada. Tools and tactics will include retail and model home point-of-sale materials, advertising, tradeshows, community outreach and trade ally activities. Rebates and financing will be processed through customer application.

Residential Windows

Market Considerations

Energy Star qualified windows make up approximately 10% to 15% of window sales in the province, and understanding of the product is generally poor among customers and retailers. Initial cost is also a barrier to increased market penetration, due to a 10% to 15% price premium. Eligible windows are widely available. Local manufacturers produce approximately 50% of the provincial window sales, and most manufacturers offer *Energy Star* qualified products.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value will be based on the incremental cost of *Energy Star* qualified windows over the standard type.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	40	420	400	500	510	610	2,480
Estimated Cumulative Energy Savings (MWh)	-	230	570	1,020	1,700	2,610	
Total Resource Cost (TRC)	2.4						

Residential Thermostats

Program Description

The existing thermostat rebate program will be revised based on the CDM Potential Study and market research. The continuing objective of this program is to increase the use of both programmable thermostats, which automatically set back room temperature, and high performance thermostats, which control room temperature very accurately, in order to save space heating energy. The program components include rebates and financing, and a variety of education and marketing tools.

Target Market: Residential

This program targets residential customers, including home retrofit and new construction. Eligibility is limited to electrically heated homes.

Eligible Measures

Eligible measures in this program include both programmable and high performance thermostats (for example, those which control within +/- 0.5C.)

Delivery Strategy

Delivery of this program will be integrated with the new residential windows and revised *Wrap Up for Savings* insulation programs.

Marketing initiatives will include partnering with manufacturers, retailers, electrical contractors, as well as homebuilders and real estate professionals to educate consumers regarding the energy savings and comfort benefits of programmable and high performance thermostats. Communications will incorporate cross-promotion of the EcoEnergy Retrofit program from Natural Resources Canada. Tools and tactics will include retail and model home point-of-sale materials, advertising, tradeshows, community outreach and trade ally activities. Rebates will be processed directly by authorized retailers and through customer-submitted coupons.

Residential Thermostats

Market Considerations

Sales of programmable and high performance thermostat types make up less than 10% of total thermostat sales provincially. Customer awareness of the important role of thermostats in heating system efficiency is low**.** Initial cost is a barrier to increased market penetration, particularly for new home construction where continued use of minimum quality thermostats represents significant lost opportunity. Availability of electronic high performance thermostats is currently limited in most areas, though programmable types are widely available.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value will be based on the incremental cost of the targeted thermostat types over the standard type.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings [1]

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	-	300	220	280	230	270	1,300
Estimated Cumulative Energy Savings (MWh)	-	270	650	1,210	1,910	2,650	
Total Resource Cost 2.4							

[1] Includes the cost of revising the existing program and the resulting energy savings. Excludes the cost and energy savings of existing program.

Residential Insulation

Program Description

The existing *Wrap Up for Savings* program will be revised based on the CDM Potential Study and market research. The continuing objective of this program is to increase the insulation level in basements, crawl spaces, walls and attics, resulting in savings in space heating energy. The program components include rebates and financing, and a variety of education and marketing tools.

Target Market: Residential

This program targets residential customers, including home retrofit and new construction. Eligibility is limited to electrically heated homes.

Eligible Measures

Eligible measures in this program include insulation upgrades to basements, crawl spaces, walls and attics. Rebates for new homes are limited to basement insulation beyond building code compliance. Technical requirements for each upgrade type will be reviewed during program detailed design.

Delivery Strategy

Delivery of this program will be integrated with the new residential windows and revised thermostat programs.

Marketing initiatives will include partnering with retailers and trade allies in the home building and renovation industry, to target both do-it-yourself and professional installers. Communications will incorporate cross-promotion of the EcoEnergy Retrofit program from Natural Resources Canada. Tools and tactics will include retail and model home point-of-sale materials, advertising, tradeshows, community outreach and trade ally activities. Rebates and financing will be processed through customer application.

Residential Insulation

Market Considerations

Older homes and small homes often have inadequate insulation levels. For example, over 45% of homes in the province built before 1950 have uninsulated basements. Most new homes constructed in the province still have no insulation on the concrete portion of basement walls. Initial cost is a barrier to increased market penetration, as is awareness of the impact on space heating energy, and the practical difficulties of renovating an existing living space. Recent experience with the *Wrap Up for Savings* program has shown participation to be responsive to awareness-building marketing activities.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value will be reviewed and will be restructured based on insulating value (R-value) rather than a prescriptive product list as currently offered.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings [1]

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	40	1,210	1,210	1,400	1,430	1,590	6,880
Estimated Cumulative Energy Savings (MWh)	-	4,130	8,670	13,660	19,160	25,200	
Total Resource Cost 2.6							

[1] Includes the cost of revising the existing program and the resulting energy savings. Excludes the cost and energy savings of existing program.

Commercial Lighting

Program Description

The objective of this program is to increase the installation of more efficient lighting technologies in commercial buildings. The program components include rebates on a specific list of qualifying technologies, and a variety of education and marketing tools.

Target Market: Commercial

This program targets retrofit of commercial building lighting, encouraging customers to replace existing lighting equipment.

Eligible Measures

The list of eligible measures in this program is based on the technologies identified as eligible for rebate under existing programs offered by other Canadian utilities (for example Ottawa Hydro and BC Hydro). These include T8 fluorescent electronic ballasts or fixtures, compact fluorescent lights (CFLs), and *Energy Star LED* exit signs.

Delivery Strategy

This program is expected to be operational for three years. Delivery will be integrated with future commercial sector programming, which is expected to include a custom project-based incentive program similar to the industrial custom program.

Marketing initiatives will include partnering with lighting manufacturers, distributors, and electrical contractors who will carry the program to potential customers. The program will create business opportunities for trade allies to sell more efficient lighting products. This approach has proven effective in other jurisdictions and in previous Newfoundland Power experience. Tools and tactics will include trade ally and business association activities, such as workshops for contractors and distributors, retail point-of-sale materials, and advertising in trade publications. Demonstration projects will be selected from early participants. Rebates will be processed through customer application.

Commercial Lighting

Market Considerations

The largest portion of the market opportunity in commercial lighting is with standard T12 fluorescent tube lighting with electromagnetic ballasts. This technology is used in approximately 60% of existing commercial building interior lighting in the province, though new construction is almost exclusively using the more efficient T8 fluorescents with electronic ballasts. Federal regulations will remove the electromagnetic ballast from new sales starting in 2010. However, there is a significant opportunity for replacement of existing T12 installations prior to their normal end of life (average lifespan 17 years). Primary barriers to increased use of the more efficient products include the higher initial capital cost, and lack of understanding of the opportunity for energy and cost savings.

Incentive Strategy

Incentives for this program include rebates for a prescriptive list of eligible technologies. The list will be based on the technologies identified as eligible for rebate under existing programs offered by other Canadian utilities (for example Ottawa Hydro and BC Hydro).

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness and a representative sample of installations will be inspected. Formal evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	-	290	310	340	-	-	940
Estimated Cumulative Energy Savings (MWh)	-	590	1,760	2,930	2,930	2,930	
Total Resource Cost 1.1							

Industrial Custom Program

Program Description

The objective of this program is to improve electrical energy efficiency in a variety of industrial processes. The program components include financial incentives based on energy savings, and other supports to enable industrial facilities to identify and implement efficiency and conservation opportunities. This program is a custom program to respond to the unique needs of the industrial market, rather than a prescriptive technology approach.

Target Market: Industrial

This program targets retrofit of industrial process equipment in the transmission level customers served by Newfoundland and Labrador Hydro.

Eligible Measures

Eligibility of projects is based on engineering review and confirmation of estimated energy savings impact. Technologies include, but are not limited to, compressed air, pump systems, process equipment and process controls.

Delivery Strategy

This program will be delivered through a call for proposals to Industrial Customers (IC) for energy saving projects that meet set financial criteria. These proposals will undergo engineering review for approval. Selected projects will be eligible for rebates based on savings and payback period reductions, as well as enabling supports including facility education, energy audits and other customized offerings.

The program will be managed internally with external engineering verification of projects and monitoring and evaluation of energy savings. The utility will take the role of facilitator and consultant in providing methods for ICs to complete project proposals and implement approved projects.

This program model has been used successfully in other jurisdictions. To ensure the cost effectiveness of this model with the unique nature and size of the industrial market in Newfoundland and Labrador, this program will launch as a three-year program using a single call for proposals and full evaluation cycle.

Industrial Custom Program

Market Considerations

This market requires a one-on-one approach to project design and delivery. The program builds on the work already completed by the ICs, and addresses their unique barriers to improved efficiency, which include, but are not limited to, access to capital and human resources.

The lifecycle for each program transaction will be measured in months rather than weeks because of the need for review, contract development, implementation timelines and post-installation monitoring and evaluation. This type of program requires that facilities have financial and business stability to continue operations for a time period appropriate to achieve cost effective savings.

Incentive Strategy

Incentives for this program include rebates based on energy savings, as well as funding assistance for additional enabling mechanisms. Rebate levels, maximum rebate amounts and payment schedules will be determined in the program detailed design phase. Rebates for each approved project will be determined through the call for proposals process, based on the engineering proposal and following a schedule agreed upon by the customer and utility.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness, including engineering review and inspection of all projects and assessment of long-term impact on customer processes. Formal program evaluations will be conducted within the first year of implementation, and biannually during operation.

Estimated Costs & Energy Savings

	2008	2009	2010	2011	2012	2013	Total
Estimated Costs ($000s)	100	1,470	2,640	4,270	-	-	8,480
Estimated Energy Savings (MWh)	-	-	-	20,000	45,000	45,000	
Total Resource Cost 2.9							

Residential Coupon Based Energy Efficiency Program

Program Description

This project is a coupon based energy efficiency program targeting Hydro's 31,000 residential customers located across the province in 220 communities. The program provides both at-the-cash coupon promotion for smaller efficiency technologies and mail in rebates for larger Energy Star appliances. This range allows customers to engage in energy efficiency with a wide range of purchase decisions. The program also provides necessary supports, awareness and mechanisms to allow small community retailers to participate and promote their products. All partners are supported by a local program representatives working in the field.

Target Market: Residential

This program targeted residential customers across a range of technology purchases.

Eligible Measures

Eligible measures include smaller items such as CFLs and LED holiday lights, but also some larger items such as Energy Star lighting fixtures, hot water tank wraps and Energy Star clothes washers. The program includes measures with savings resulting from primarily plug load and water heating savings.

Delivery Strategy

At launch the program has ten partner retailers. Local retailers in targeted communities were approached to procure products and offer the coupons for the duration of the program. The rebates on the ENERGY STAR® qualified dishwasher and refrigerator were made available more widely to the entire Hydro customer base through promotions online, info available through the call centre and bill inserts.

Residential Coupon Based Energy Efficiency Program

Market Considerations

This project was designed to:

- Deliver a new, accessible, TRC positive instant coupon-based energy efficiency program in Hydro communities and gain knowledge on the challenges of using this type of approach in communities of different sizes.
- Generate knowledge of energy conservation measures and awareness of the takeCHARGE program offerings.
- Establish new partnerships in the retail sector and engage them in an ongoing wider product offering program and gain a better understanding of Hydro's customer base on the interest in smaller energy efficiency technologies.
- Increase the market penetration of energy saving products and overall energy efficiency awareness.

Incentive Strategy

Incentives for this program include at-the-cash coupons which reduced the cost of the efficient products for the customer at purchase and two additional ENERGY STAR® appliance products with a mail-in rebate similar to the traditional takeCHARGE Energy Savers Rebate programs.

Program Monitoring & Evaluation

Evaluation components include examining the participation, the administration processes, and attitudes of the partners. These included:

- Coupon uptake: number of coupons distributed and number of coupons redeemed;
- Event participation: number of participants; and
- Retailer and participant experiences: number of participants who learned more about energy conservation, takeCHARGE and energy saving products based on interactions with the program.

Estimated Costs & Energy Savings

Costs ($000s)	$240,000-$265,000
Energy Savings (MWh)	473
TRC	2.05

Appendix B

Definition of Deferral Account

Newfoundland and Labrador Hydro
April 22, 2009

Conservation and Demand Management (CDM) Cost Deferral Account
Definition

The account shall be charged with the costs incurred in implementing the CDM Program Portfolio. The costs will include such items as detailed program development, promotional materials, advertising, pre and post customer installation checks, application and incentive processing, incentives, trade ally training, employee training, and program evaluation costs associated with programs in the CDM Program Portfolio.

The account will exclude any expenditure properly chargeable to plant accounts. The account shall also exclude conservation expenditures that are general in nature, such as costs associated with providing energy conservation awareness, responding to customer inquiries, planning, research and general supervision that are not associated with a specific program in the CDM Program Portfolio.

The account will exclude any expenditure related to programs or incentives that are fully recoverable from other parties, including government. Where a program or initiative is partially funded by other parties, the amount funded will be used to reduce the appropriate expenditures.

Costs associated with Labrador Interconnected customers will be tracked separately from costs associated with the other customers, as programs for the latter are based upon a cost structure which is significantly different from the Labrador Interconnected System and future disposition may be treated separately.

Transfers to, and from, the proposed account will be tax effected.

The disposition of any balance in this account will be subject to a future Order of the Board.

CONSERVATION AND DEMAND MANAGEMENT (CDM) POTENTIAL

NEWFOUNDLAND and LABRADOR

Residential, Commercial and Industrial Sectors

–Summary Report–

Prepared for:

Newfoundland & Labrador Hydro and Newfoundland Power

Prepared by:

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January 31, 2008

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1. INTRODUCTION

1.1 BACKGROUND AND OBJECTIVES

Newfoundland and Labrador Hydro and Newfoundland Power (collectively the Utilities) have partnered to produce this study, recognizing the role that each has in energy conservation and least cost electric utility planning within the province. Increasing electricity costs and the expectations of a growing number of their customers and stakeholders have contributed to the increased focus on conservation and demand management (CDM) and resulted in a number of recent initiatives and projects targeting energy savings in the province. This study is the next step in the Utilities efforts to develop a comprehensive plan for CDM in Newfoundland and Labrador. The Utilities envision electricity conservation and demand management (CDM) to be a valuable component in meeting the province's future electricity requirements.

This study will also be a significant component in the further implementation of the Province's recently released Energy Plan. The Energy Plan establishes a long-term vision for how the province's energy resources will be developed and utilized to benefit the people of the province today as well as for future generations. Electricity conservation and demand management (CDM) are an important component of the provincial Energy Plan as are the conservation and demand management components for the other energy resources of the province.

This report meets, in part, the requirements of the Public Utilities Board Order PU 8 2007 requiring NLH to file this study and a five-year plan for implementation of CDM programs in 2008.

The objective of this study is to identify the potential contribution of specific CDM technologies and measures in the Residential, Commercial and Industrial sectors and to assess their economic costs and benefits. The Newfoundland and Labrador economy is expected to grow over the next 20 years, with an associated increase in energy consumption. The benefits of increased penetration of energy efficiency technologies include reduced energy costs for individuals and businesses, as well as environmental benefits through reduced pollution and greenhouse gas emissions.

The outputs from this study will assist the Utilities CDM planners and others to develop specific CDM programs for implementation and to optimize the contribution of CDM technologies and measures to the province's overall energy future.

1.2 STUDY SCOPE

The scope of this study is summarized below.

- **Sector Coverage:** This study addresses the Residential, Commercial[1] and Industrial sectors. Consistent with the study's agreed upon scope, the Industrial sector is treated at a higher level than the Residential and Commercial sectors.

[1] The Commercial sector analysis includes street lighting.

- **Geographical Coverage**: The study addresses the customers of both utilities. Due to differences in cost and rate structures, the Utilities' customers are organized into two service regions, which in this report are referred to as: the Island and Isolated, and the Labrador Interconnected. For the purposes of this study, the isolated diesel system customers were combined with those in the Island service region due to their relatively small size and electricity usage.

- **Study Period**: This study covers a 20-year period. The Base Year is the calendar year 2006, with milestone periods at five-year increments: 2011, 2016, 2021 and 2026. The Base Year of 2006 was selected as it was the most recent calendar year for which complete customer data were available.

- **Technologies:** The study addresses conservation and demand management (CDM) measures. CDM refers to a broad range of potential measures; however, for the purposes of this study, it was agreed that the primary focus is on energy-efficiency measures. This includes measures that reduce electricity use as well as the associated electric demand. The study also provides a high-level treatment of selected demand management measures, such as direct control of space heating loads.[2]

1.3 MAJOR ANALYTIC STEPS

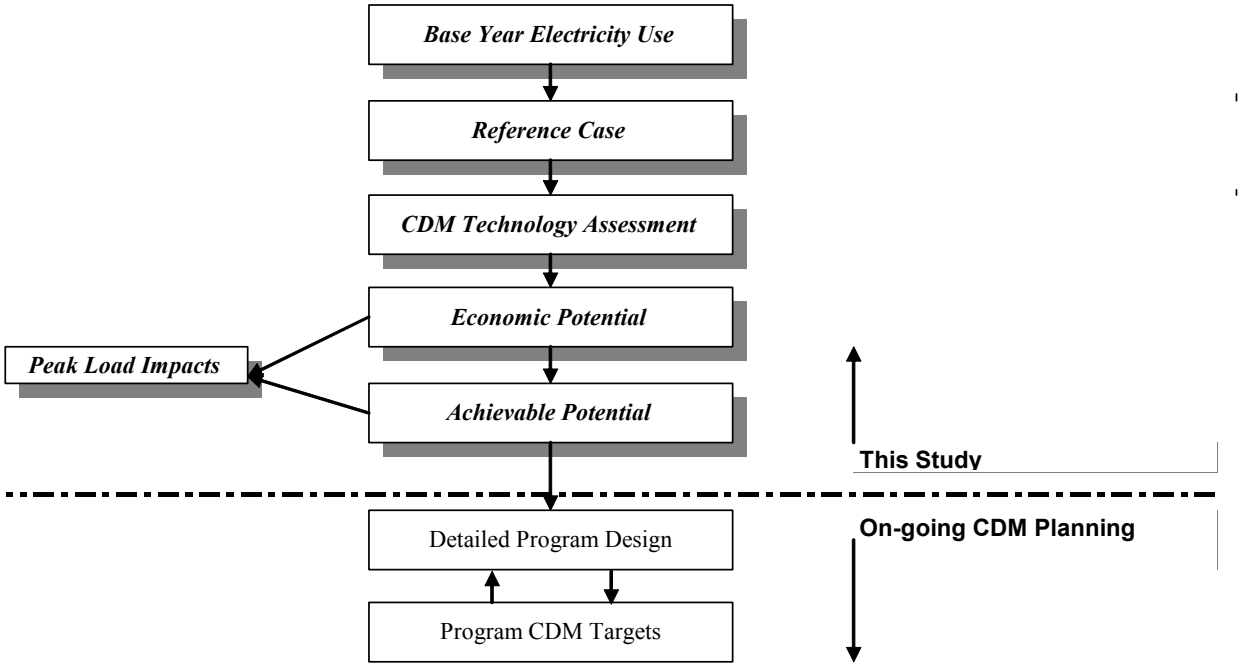
The major steps involved in the analysis are shown in Exhibit 1.1 and are discussed in greater detail in Section 1 of the individual sector reports. As illustrated in Exhibit 1.1, the results of this study, and in particular the estimation of Achievable Potential,[3] support the Utilities on-going work.

It should, however, be emphasized that the estimation of Achievable Potential is not synonymous with either the setting of specific targets or with program design. Both of these activities require additional market-specific investigation and planning.

[2] The information provided is based on the detailed analysis that Marbek is currently undertaking in other jurisdictions.

[3] The proportion of savings identified that could be achieved within the study period assuming specific customer, program and market conditions. Additional details are provided in the individual sector reports.

Exhibit 1.1: Study Approach - Major Analytical Steps



The analysis conducted within each of the three sectors followed a similar set of steps, as outlined below.

Step 1: Develop Base Year Calibration Using Actual Utilities Sales Data

The Base Year (2006) is the starting point for the analysis. It provides a detailed description of "where" and "how" electricity is currently used, based on actual electricity sales.

The consultants compiled the best available data and used sector-specific macro models to estimate electricity use; they then compared the results to the Utilities actual billing data to verify their accuracy.

Step 2: Develop Reference Case

The Reference Case uses the same sector-specific macro models to estimate the expected level of electricity consumption that would occur over the study period with no new (post-2006) Utilities' CDM initiatives. The Reference Case includes projected increases in electricity consumption based on expected rates of population and economic growth, using the growth rates included in the NLH 2006 load forecast.[4] The Reference Case also makes an estimate for some "natural" conservation, that is, conservation that occurs without Utilities' CDM programs. The Reference Case provides the point of comparison for the calculation of Economic and Achievable electricity saving potentials.

[4] Newfoundland & Labrador Hydro Long Term Planning (PLF) Review Forecast, Summer/Fall 2006.

Step 3: Assess CDM Technologies

The consultants researched a wide range of commercially available CDM technologies and practices that can enable the Utilities' customers to use electricity more efficiently. In each case, the consultants assessed how much electricity the CDM measures could save together with the expected cost, including purchase (capital), operating and maintenance costs.

For each CDM measure the consultants calculated a value for the cost per year per kilowatt-hour of saved electricity, referred to as the Cost of Conserved Energy (CCE). The CCE is calculated as the annualized incremental cost (including operating and maintenance) of the measure divided by the annual kilowatt-hour savings achieved, excluding any administrative or program costs to achieve full use of the measure. This approach allowed the consultants to compare a standardized cost for new technologies and measures with the cost of new electricity supply, or other electricity conserving measures, and to determine whether or not to include the CDM measure in the Economic Potential Forecast.

Step 4: Estimate Economic Electricity Savings Potential

To forecast the potential electricity savings that are defined as economic, the consultants used the sector-specific macro models to calculate the level of electricity consumption that would occur if the Utilities' customers installed all "cost-effective" technologies. "Cost effective" for the purposes of this study means that the CCE is less than or equal to the estimated cost of new electricity supply.

NLH determined that the avoided costs of new electricity supply to be used for this analysis are $0.0980/kWh for the Island and Isolated service region and $0.0432/kWh for the Labrador Interconnected service region. These avoided costs represent a future in which the Lower Churchill project is not built and there is no DC link from Labrador to the Island[5].

The Economic Potential Forecast incorporates all the CDM measures reviewed that have a CCE equal to or less than the avoided costs noted above. This forecast does not yet incorporate consideration of the many practical considerations that affect a customer's willingness to implement the CDM measures. Rather, it provides a valuable interim step towards determining the Achievable Potential (see Step 5).

NLH is currently studying the Lower Churchill/DC Link project. However, a decision on whether to proceed is not expected until 2009 and, even if the project proceeds, the earliest completion date would be in late 2014. This means that, regardless of the decision, the avoided cost values shown above will be in effect until the approximate mid point of the study period.

If the project does proceed, the avoided costs presented above are expected to change. To provide insight into the potential impacts of the Lower Churchill/DC Link project on this study, the consultants undertook a high-level financial sensitivity analysis.

[5] The avoided costs draw on the results of the earlier study conducted by NERA Economic Consulting, which is entitled: Newfoundland and Labrador Hydro. *Marginal Costs of Generation and Transmission*. May 2006. The avoided costs used in this study include generation, transmission and distribution.

Step 5: Estimate Achievable Electricity Savings Potential

The Achievable Potential is the proportion of the savings identified in the Economic Potential Forecast that could be achieved within the study period. Achievable Potential recognizes that it is difficult to induce customers to purchase and install all the electrical efficiency technologies that meet the criteria defined by the Economic Potential forecast. The results are, therefore, presented within an "upper" and "lower" range.[6]

The Upper Achievable Potential assumes a very aggressive program approach and a very supportive context, e.g., healthy economy, very strong public commitment to climate change mitigation, etc. However, the Upper Achievable Potential scenario also recognizes that there are limits to the scope of influence of any electric utility. It recognizes that some markets or submarkets may be so price sensitive or constrained by market barriers beyond the influence of CDM programs that they will only fully act if forced to by legal or other legislative means. It also recognizes that there are practical constraints related to the pace that existing inefficient equipment can be replaced by new, more efficient models or that existing building stock can be retrofitted to new energy performance levels

For the purposes of this study, the Upper Achievable Potential can, informally, be described as: "*Economic Potential less those customers that "can't" or "won't" participate."*

The Lower Achievable Potential assumes that existing CDM programs and the scope of technologies addressed are expanded, but at a more modest level than in the Upper Achievable Potential. Market interest and customer commitment to energy efficiency and sustainable environmental practices remain approximately as current. Similarly, federal, provincial and municipal government energy-efficiency and GHG mitigation efforts remain similar to the present

It is important to note that the Upper and Lower Achievable numbers are intended to bracket savings which could be expected to be attainable given the assumptions and scope of the study. As noted previously, Achievable Potential, although complementary, is not synonymous with the actual CDM targets that are established as part of the more detailed CDM program design process (which is beyond the scope of this current study).

Step 6: Estimate Peak Load Impacts of Electricity Savings

The electricity (electric energy) savings (GWh) calculated in the preceding steps were converted to peak load (electric demand) savings (MW)[7]. The study defined the Newfoundland and Labrador system peak period as:

> *The morning period from 7 am to noon and the evening period from 4 to 8 pm on the four coldest days during the December to March period; this is a total of 36 hours per year.*

[6] The Achievable Potential savings assume program start-up in 2007. Consequently, electricity savings in the first milestone year of 2011 will need to be adjusted to reflect actual program initiation dates. This step will occur during the detailed program design phase, which will follow this study.

[7] Peak load savings were modelled using Applied Energy Group's Cross-Sector Load Shape Library Model (LOADLIB).

The conversion of electricity savings to hourly demand drew on a library of specific sub sector and end use electricity use load shapes. Using the load shape data, the following steps were applied:

- Annual electricity savings for each combination of sub sector and end use were disaggregated *by month*
- Monthly electricity savings were then further disaggregated *by day type* (weekday, weekend day and peak day)
- Finally, each day type was disaggregated *by hour*.

1.4 CAVEATS

The reader should use the results presented in this report as best available estimates; major assumptions, information sources and caveats are noted throughout each of the main sector reports. Specific areas are noted below.

1.4.1 Data Quality and Assumptions

As in any study of this type, the results presented are based on a large number of important assumptions. Assumptions such as those related to the current penetration of energy-efficient technologies, the rate of future growth in the province's building stock and customer willingness to implement new CDM measures are particularly influential.

Wherever possible, the assumptions used in this study are consistent with those used by the Utilities and are based on best available information, which in many cases includes the professional judgment of the consultant team, Utilities personnel and local experts. The reader should use the results presented in this report as best available estimates; major assumptions, information sources and caveats are noted throughout the individual sector reports.

1.4.2 Interactive Effects

A systems approach was used to model the energy impacts of the CDM measures presented in the Economic and Achievable Potential phases of the study. In the absence of a systems approach, an accurate assessment of the total contribution of the energy-efficient upgrades would not be possible.

One of the reasons that this approach is necessary is to ensure that the interactive effects are appropriately considered. For example, in the Residential sector, the electricity savings from more efficient appliances and lighting result in reduced waste heat. During the space heating season, this appliance and lighting waste heat contributes to the building's internal heat gains, which lower the amount of heat that must be provided by the space heating system.

The magnitude of the interactive effects can be significant. Based on selected building energy use simulations, a 100 kWh savings in appliance or lighting electricity use could result in an increased space heating load of 50 kWh to 70 kWh in this jurisdiction, depending on housing dwelling type and geographical location. This is higher than the

ratio of approximately 0.5 that is typical of other jurisdictions and is related largely to the length of the heating season, rather than its severity.

Newfoundland and Labrador experience more months in which heating is required than most other jurisdictions in Canada. Nonetheless, given that some fraction of the heat energy from lighting and other end uses escapes to the outside, the simulation may somewhat overstate the interaction. A ratio of 0.6 has been incorporated into the model to account for this uncertainty.

1.4.3 Program Design and Implementation Costs

The study results presented in this Summary Report and in the individual sector reports do not yet include expenditures related to program design and implementation. These costs are considered at the detailed program design phase, which will be completed following this study[8].

1.5 STUDY ORGANIZATION AND REPORTS

The study was organized and conducted by sector using a common methodology, as outlined above. The results for each sector are presented in three individual reports that are entitled:

- *Conservation and Demand Management Potential (2006 to 2026), Newfoundland and Labrador, Residential Sector*
- *Conservation and Demand Management Potential (2006 to 2026), Newfoundland and Labrador, Commercial Sector*
- *Conservation and Demand Management Potential (2006 to 2026), Newfoundland and Labrador, Industrial Sector*

The results of the individual sector reports are combined into this Summary Report. Finally, the study also prepared a brief CDM program evaluation report, which is presented under separate cover and is entitled:

- *Conservation and Demand Management Potential (2006 to 2026), Newfoundland and Labrador, Program Evaluation Guidelines*.

1.5.1 Summary Report Outline

This report presents a summary of the study results and is organized as follows:

- Section 2 presents the combined electricity and peak load savings for the three sectors.

[8] Addition of these costs may negatively impact the economic attractiveness of some measures currently included in the Achievable Potential estimates.

- Sections 3, 4 and 5 present a summary of the electricity and peak load savings for, respectively, the Residential, Commercial and Industrial sectors.

- Section 6 presents conclusions and next steps.

2. SUMMARY OF STUDY FINDINGS

The study findings confirm the existence of significant potential cost-effective opportunities for CDM in Newfoundland and Labrador's Residential, Commercial and Industrial sectors.

2.1 ELECTRICITY SAVINGS POTENTIAL

Exhibits 2.1 and 2.2 summarize the total combined electricity savings for the Residential, Commercial and Industrial sectors that have been identified in each of the individual sector reports for, respectively, the Island and Isolated and the Labrador Interconnected service regions.[9]

Highlights of the results for the Island and Isolated service region are shown in Exhibit 2.1. They include:

- In the Reference Case, total electricity consumption for the Island and Isolated service region increases from approximately 6,468 GWh/yr. in 2006 to about 7,685 GWh/yr. by 2026, an increase of about 19%

- In the Upper Achievable Potential scenario, electricity savings for the Island and Isolated service region are about 211 GWh/yr. in 2011 and increase to about 951 GWh/yr. by 2026. The electricity savings of 951 GWh/yr. in 2026 means that total electricity consumption would increase to about 6,737 GWh/yr., a decrease of about 12% relative to the Reference Case

- In the Lower Achievable Potential scenario, electricity savings for the Island and Isolated service region are about 117 GWh/yr. in 2011 and increase to about 556 GWh/yr. by 2026. The electricity savings of 556 GWh/yr. in 2026 means that total electricity consumption would increase to about 7,129 GWh/yr., a decrease of about 7% relative to the Reference Case.

Exhibit 2.1: Achievable Electricity Savings Potential for the Island and Isolated Service Region

Milestone Year	Reference Case	Achievable Savings (GWh/yr.)		Achievable Savings As % of Reference Case	
		Upper	*Lower*	*Upper*	*Lower*
2006	6,468	-	-	-	-
2011	6,888	211	117	3.1	1.7
2016	7,139	437	261	6.1	3.7
2021	7,427	679	414	9.1	5.6
2026	7,685	951	556	12.4	7.2

[9] Analysis for the two service regions was combined for the Industrial sector. Industrial reference electricity use and savings are included in Exhibit 2.1 only and refer exclusively to purchased electricity.

Highlights of the results for the Labrador Interconnected service region are shown in Exhibit 2.2. They include:

- In the Reference Case, total electricity consumption for the Labrador Interconnected service region increases from approximately 465 GWh/yr. in 2006 to about 540 GWh/yr. by 2026, an increase of about 16%

- In the Upper Achievable Potential scenario, electricity savings for the Labrador Interconnected service region are about 12 GWh/yr. in 2011 and increase to about 51 GWh/yr. by 2026. The electricity savings of 51 GWh/yr. in 2026 means that total electricity consumption for the Labrador Interconnected service region would increase to about 489 GWh/yr., a decrease of about 9% relative to the Reference Case

- In the Lower Achievable Potential scenario, electricity savings for the Labrador Interconnected service region are about 8 GWh/yr. in 2011 and increase to about 31 GWh/yr. by 2026. The electricity savings of 31 GWh/yr. in 2026 means that total electricity consumption for the Labrador Interconnected service region would increase to about 509 GWh/yr., a decrease of about 6% relative to the Reference Case.

Exhibit 2.2: Achievable Electricity Savings Potential for the Labrador Interconnected Service Region

Milestone Year	Reference Case	Achievable Savings (GWh/yr.)		Achievable Savings As % of Reference Case	
		Upper	*Lower*	*Upper*	*Lower*
2006	465	-	-	-	-
2011	499	12	8	2.4	1.6
2016	512	24	16	4.7	3.1
2021	525	37	23	7.0	4.4
2026	540	51	31	9.4	5.7

2.2 PEAK LOAD SAVINGS

The electricity savings noted above also result in a reduction in peak load requirements (MW), which can be of particular value to the Utilities during periods of high electricity demand[10].

The resulting peak load savings are presented in Exhibit 2.3.[11] As illustrated, the total peak load savings were estimated to be 154 MW and 89 MW by 2026 in, respectively, the Upper and Lower scenarios. In each case, the reductions are an average value over the peak period and are defined relative to the Reference Case.

[10] See Section 1.3 for peak period definition.

[11] Peak load impact was analyzed for the residential and commercial sectors only. Exhibit 2.3 presents the combined results for these two sectors.

Exhibit 2.3: Total Achievable Peak Load Savings Potential

Service Region	Milestone Year	Peak Load Savings (MW)	
		Upper Achievable	Lower Achievable
Island and Isolated	2011	27	14
	2016	60	36
	2021	99	61
	2026	144	83
Labrador Interconnected	2011	1.4	0.9
	2016	3.8	2.4
	2021	6.4	3.8
	2026	9.7	5.5

3. RESIDENTIAL SECTOR

The Residential sector includes single-family homes, attached dwellings and apartments as well as a small number of isolated and other dwellings.

3.1 APPROACH

The detailed end-use analysis of electrical efficiency opportunities in the Residential sector employed two linked modelling platforms: **HOT2000,** a commercially supported residential building energy-use simulation software, and **RSEEM** (Residential Sector Energy End-use Model), a Marbek in-house spreadsheet-based macro model. Peak load savings were modelled using Applied Energy Group's Cross-Sector Load Shape Library Model (LOADLIB).

The major steps in the general approach to the study are outlined in Section 1.3 above (*Major Analytic Steps*). Specific procedures for the Residential sector were as follows:

- **Modelling of Base Year –** The consultants used the Utilities' customer data to break down the Residential sector by four factors:

  - Type of dwelling (single detached, attached, apartment, etc.)
  - Heating category (electric or non-electric heat)
  - The age of the building (new versus existing)
  - Service region.

  To estimate the electricity used for space heating, the consultants factored in building characteristics such as insulation levels, floor space and airtightness using a variety of data sources, including the Energuide for Houses database, Utilities' billing data, local climate data and discussions with local contractors. They also used the results of Utilities' customer surveys that provided data on type of heating system, number and age of household appliances, renovation activity, etc. Based on the available data sources, the consultants calculated an average electricity use by end use for each dwelling type. The consultant's models produced a close match with actual Utilities' sales data.

- **Reference case calculations –** For the Residential sector, the consultants developed profiles of new buildings for each type of dwelling. They estimated the growth in building stock using the same data as that contained in the Utilities' most recent load forecast and estimated the amount of electricity used by both the existing building stock and the projected new buildings and appliances. As with the Base Year calibration, the consultants' projection closely matches the Utilities own 2006 forecast of future electricity requirements.

- **Assessment of CDM measures** –To estimate the economic and achievable electricity savings potentials, the consultants assessed a wide range of commercially available CDM measures and technologies such as:

  - Improved lighting systems
  - Thermal upgrades to the walls, roofs and windows of existing buildings
  - More efficient space heating equipment and controls
  - Measures to reduce hot water usage

- Improved designs for new buildings
- Reduced standby losses in computers and electronic equipment
- More efficient household appliances and other plug-in equipment.

3.2 ELECTRICITY SAVINGS

In, respectively, the Upper and Lower Achievable Potential scenarios, Residential Sector electricity savings are estimated to be between 439 and 236 GWh/yr. by 2026 in the Island and Isolated service region.[12]

A summary of the levels of annual electricity consumption contained in each of the forecasts addressed by the study is presented in Exhibits 3.1 and 3.2, by milestone year, and discussed briefly in the paragraphs below.

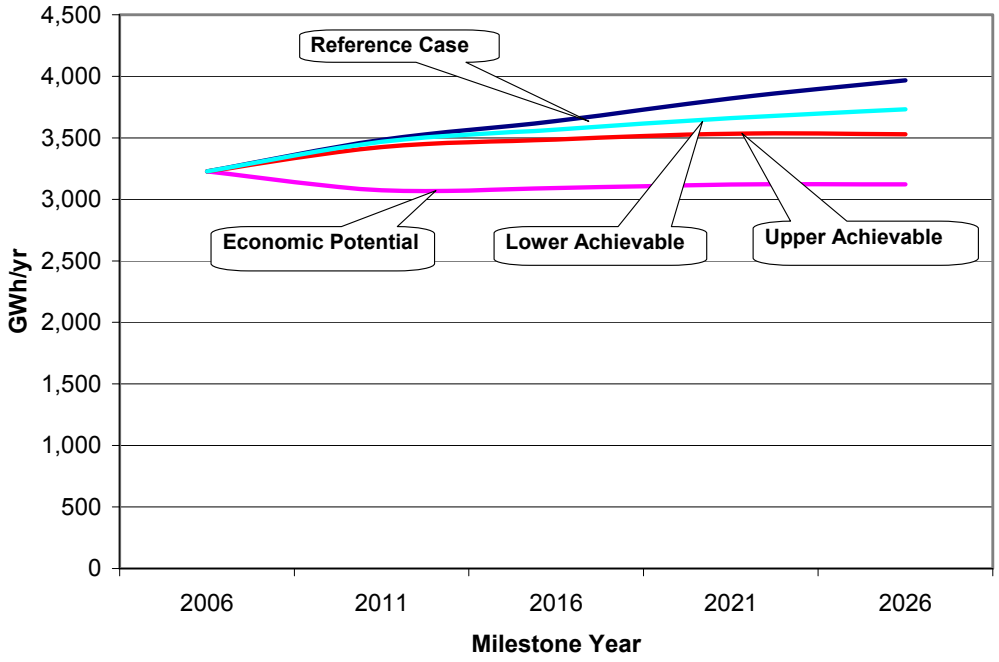
Exhibit 3.1: Summary of Forecast Results for the Island and Isolated Service Region – Annual Electricity Consumption, Residential Sector (GWh/yr.)

Annual Consumption (GWh/yr.)				Potential Annual Savings (GWh/yr.)	
Milestone Year	Reference Case	Achievable		Achievable	
		Upper	Lower	Upper	Lower
2006	3,228				
2011	3,483	3,425	3,468	58	16
2016	3,637	3,486	3,568	151	69
2021	3,821	3,533	3,660	288	161
2026	3,968	3,529	3,732	439	236

**Results are measured at the customer's point-of-use and do not include line losses.*

[12] The comparable results in 2026 for the Labrador Interconnected service region are between 24 and 12 GWh/yr. in, respectively, the Upper and Lower achievable scenarios. Additional details are provided in the Residential sector report and accompanying appendices.

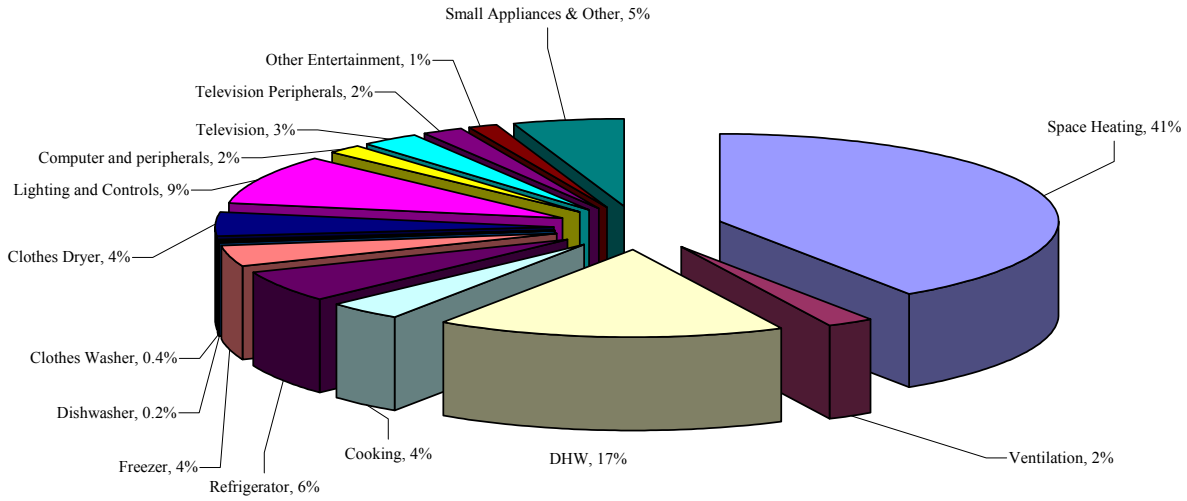
Exhibit 3.2: Graphic of Forecast Results for the Island and Isolated Service Region – Annual Electricity Consumption, Residential Sector (GWh/yr.)



Base Year Electricity Use

In the Base Year of 2006, the Residential sector in the Island and Isolated service region consumed about 3,228 GWh. Exhibit 3.3 shows that space heating accounts for about 41% of total residential electricity use.[13] Domestic hot water (DHW) accounts for about 17% of the total electricity use, followed by kitchen appliances (14%) and lighting (9%). Household electronics (i.e., computers and peripherals, televisions and television peripherals) account for about 8% of electricity use.

Exhibit 3.3: Base Year Electricity Use by End Use in the Island and Isolated Service Region, Residential Sector[14]



[13] Values are for all residential dwellings. Space heating share is much higher in electrically heated homes.

[14] Values may not add to 100% due to rounding.

The overwhelming majority of residential electricity use in the Island and Isolated service region occurs in single detached dwellings (81%). The remaining electricity use is in attached dwellings (11%) followed by apartments (6%). Isolated and other residential buildings each account for about 1%.

Reference Case

In the absence of new Utilities' CDM initiatives, the study estimates that electricity consumption in the Residential sector will grow from 3,228 GWh/yr. in 2006 to about 3,968 GWh/yr. by 2026 in the Island and Isolated service region. This represents an overall growth of about 23% in the period and compares very closely with NLH's load forecast, which also included consideration of the impacts of "natural conservation."

Economic Potential Forecast

Under the conditions of the Economic Potential Forecast,[15] the study estimated that electricity consumption in the Residential sector would decline to about 3,124 GWh/yr. by 2026 in the Island and Isolated service region. Annual savings relative to the Reference Case are 846 GWh/yr. or about 21%.

Achievable Potential

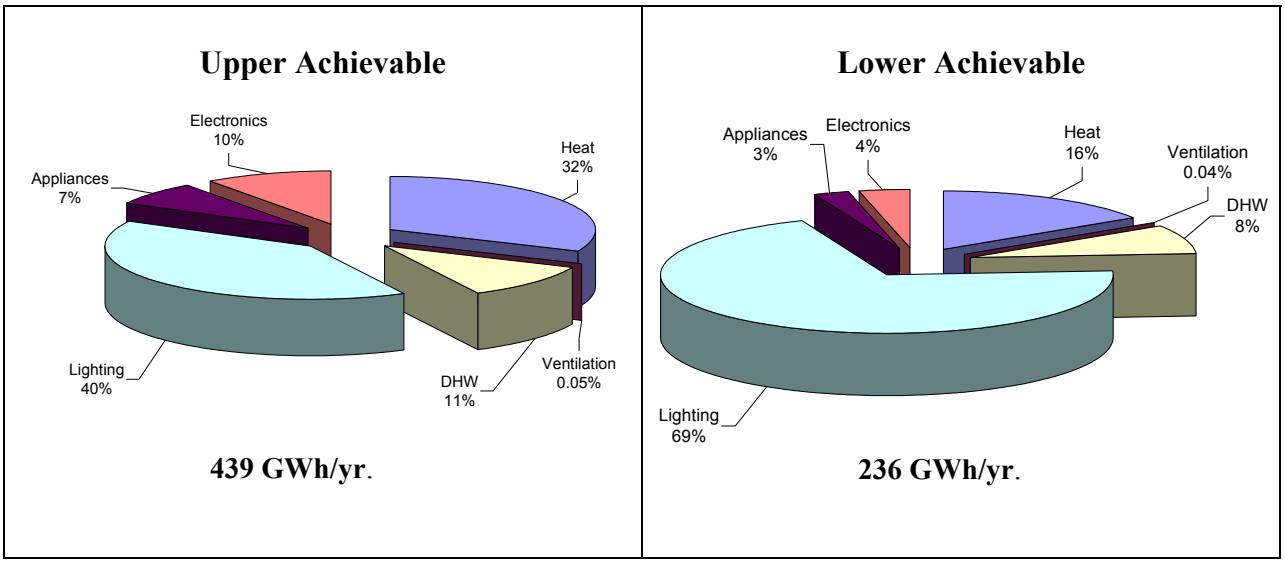
The Achievable Potential is the proportion of the economic electricity savings (as noted above) that could realistically be achieved within the study period. In the Residential sector within the Island and Isolated service region, the Achievable Potential for electricity savings was estimated to be 439 GWh/yr. and 236 GWh/yr. by 2026 in, respectively, the Upper and Lower scenarios.

The most significant Achievable savings opportunities were in the actions that addressed lighting and space heating, followed by water heating, household electronics (e.g., computers and peripherals, televisions and television peripherals) and large appliances.

Exhibit 3.4 shows the distribution of electricity savings in 2026 by end use in the Upper and Lower Achievable Potential scenarios.

[15] The level of electricity consumption that would occur if all equipment and building envelopes were upgraded to the level that is cost effective against future avoided electricity costs.

Exhibit 3.4: Distribution of Electricity Savings by Major End Use in the Upper and Lower Achievable Scenarios, Island and Isolated Service Region, Residential Sector[16]



3.3 PEAK LOAD SAVINGS

The electricity savings noted above also result in a reduction in peak load requirements (MW), which can be of particular value to the Utility during periods of high electricity demand[17].

The resulting Residential sector peak load savings for the Island and Isolated service region are presented in Exhibit 3.5.

Exhibit 3.5: Peak Load Savings from Electricity Savings in the Island and Isolated Service Region, Residential Sector

Milestone Year	Electricity Savings (GWh/yr.)		Peak Load Savings (MW)	
	Upper Achievable	Lower Achievable	Upper Achievable	Lower Achievable
2011	58	16	11	3
2016	151	69	29	13
2021	288	161	58	32
2026	439	236	91	49

As illustrated in Exhibit 3.5, the Residential sector peak load savings was estimated to be 91 MW and 49 MW by 2026 in, respectively, the Upper and Lower scenarios. In each case, the reductions are an average value over the peak period and are defined relative to the Reference Case.[18]

[16] Values may not add to 100% due to rounding.

[17] See Section 1.3 for peak period definition.

[18] The comparable results for the Labrador Interconnected service region are between 6.5 and 3.3 MW in, respectively, the Upper and Lower achievable scenarios. Additional details are provided in the Residential sector report and accompanying appendices.

4. COMMERCIAL SECTOR

The Commercial sector includes office and retail buildings, hotels and motels, restaurants, warehouses and a wide variety of small buildings. In this study, it also includes buildings that are often classified as "institutional," such as hospitals and nursing homes, schools and universities. Street lighting is also included in the Commercial sector.

Throughout this report, use of the word "commercial" includes both commercial and institutional buildings unless otherwise noted.

4.1 APPROACH

The detailed end-use analysis of electrical efficiency opportunities in the Commercial sector employed two linked modelling platforms: **CEEAM** (Commercial Electricity and Emissions Analysis Model), a Marbek in-house simulation model developed in conjunction with Natural Resources Canada (NRCan) for modelling electricity use in commercial/institutional building stock, and **CSEEM** (Commercial Sector Energy End-use Model), an in-house spreadsheet-based macro model. Peak load savings were modelled using Applied Energy Group's Cross-Sector Load Shape Library Model (LOADLIB).

The major steps in the general approach to the study were outlined earlier in Section 1.3 (*Major Analytic Steps*). Specific procedures for the Commercial sector were as follows:

- **Modelling of Base Year –** Marbek compiled data that defines "where" and "how" electricity is currently used in existing commercial buildings. The consultants then created building energy use simulations for each type of commercial building and calibrated the models to reflect actual Utilities' customer sales data. Estimated savings for the Small Commercial, Other and Isolated categories were derived from the results of the modelled segments. They did not directly model those categories because they are extremely diverse and the electricity use of individual categories is relatively small. The consultant's model produced a close match with actual Utilities' sales data.

- **Reference case calculations –** For the Commercial sector, Marbek developed detailed profiles of new buildings in each of the building segments, estimated the growth in building stock and estimated "natural" changes affecting electricity consumption over the study period. As with the Base Year calibration, the consultants' projection closely matches the Utilities 2006 forecast of future electricity requirements.

- **Assessment of CDM Measures** – To estimate the economic and achievable electricity savings potentials, the consultants assessed a wide range of commercially available CDM measures and technologies such as:

    - More efficient lighting systems and office equipment
    - Improved construction in new buildings
    - Upgraded heating, ventilating and cooling systems.

4.2 ELECTRICITY SAVINGS

In, respectively, the Upper and Lower Achievable Potential scenarios, Commercial Sector electricity savings are estimated to be between 387 and 261 GWh/yr. by 2026 in the Island and Isolated service region. [19]

A summary of the levels of annual electricity consumption contained in each of the forecasts addressed by the study is presented in Exhibits 4.1 and 4.2, by milestone year, and discussed briefly in the paragraphs below.

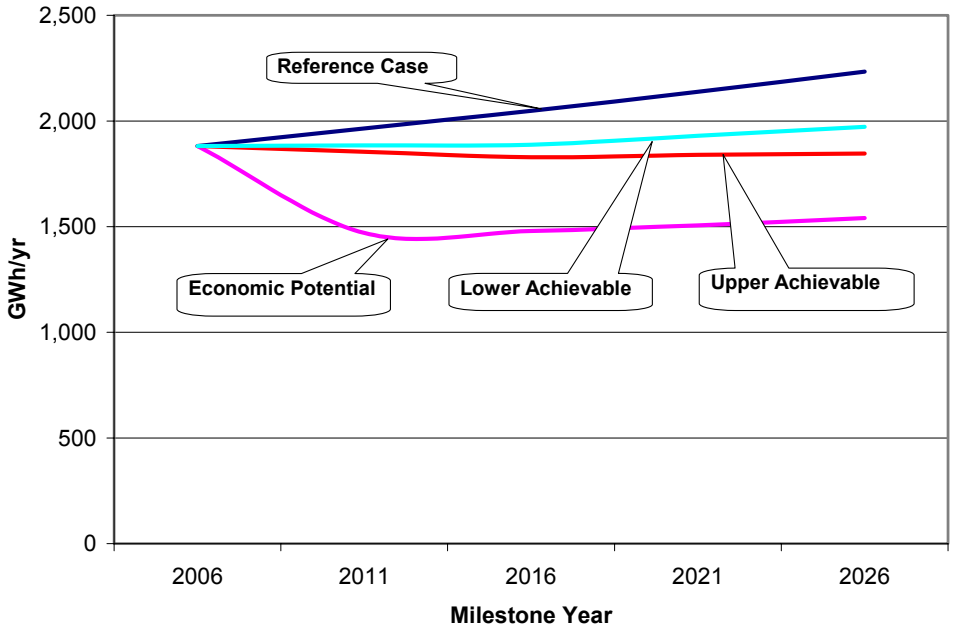
Exhibit 4.1: Summary of Forecast Results for the Island and Isolated Service Region – Annual Electricity Consumption, Commercial Sector (GWh/yr.)

Annual Consumption (GWh/yr.) Commercial Sector						Potential Annual Savings (GWh/yr.)		
Milestone Year	Base Year	Reference Case	Economic	Achievable		Economic	Achievable	
				Upper	Lower		Upper	Lower
2006	1,881	1,881						
2011		1,965	1,471	1,855	1,884	494	110	80
2016		2,048	1,479	1,828	1,888	569	220	160
2021		2,138	1,506	1,840	1,930	632	298	209
2026		2,233	1,541	1,846	1,972	693	387	261

*****Results are measured at the customer's point-of-use and do not include line losses.*

[19] The comparable results for the Labrador Interconnected service region are between 27 and 19 GWh/yr. in, respectively, the Upper and Lower achievable scenarios. Additional details are provided in the Commercial sector report and accompanying appendices.

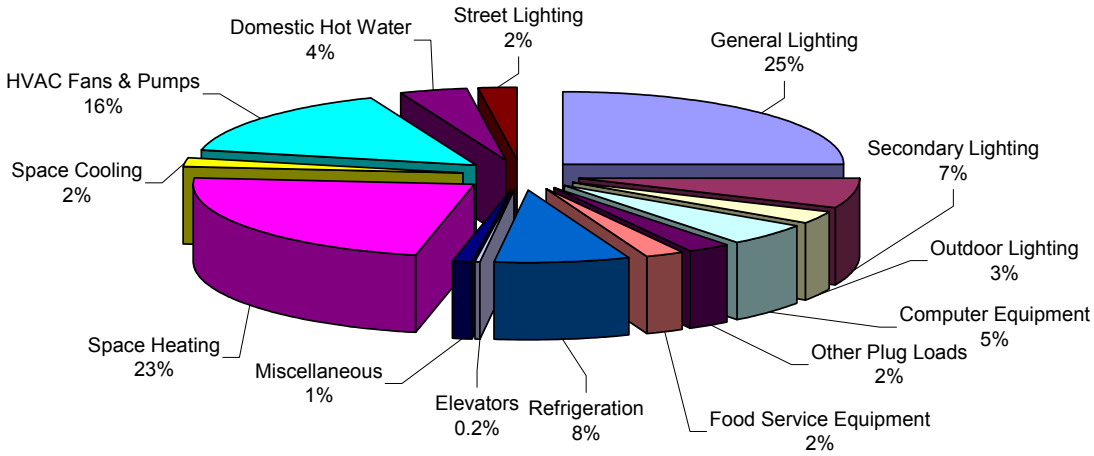
Exhibit 4.2: Graphic of Forecast Results for the Island and Isolated Service Region – Annual Electricity Consumption, Commercial Sector (GWh/yr.)



Base Year Electricity Use

In the Base Year of 2006, the Commercial sector in the Island and Isolated service region consumed about 1,881 GWh. Exhibit 4.3 shows that space lighting accounts for about 32% of total commercial electricity use, space heating accounts for about 23%, followed by HVAC fans and pumps (16%) and refrigeration (8%).

Exhibit 4.3: Base Year Electricity Use by End Use in the Island and Isolated Service Region, Commercial Sector[20]



[20] Values may not add to 100% due to rounding.

In the Island and Isolated Service Region, the Small commercial sub sector accounts for the largest share of the total electricity consumption at 28%, followed by Office at 17%, Other Buildings at 8% and Food Retail at 7%.

Reference Case

In the absence of new Utility initiatives, the study estimates that electricity consumption in the Commercial sector will grow from 1,881 GWh/yr. in 2006 to about 2,233 GWh/yr. by 2026 in the Island and Isolated service region. This represents an overall growth of about 19% in the period and compares very closely with NLH's load forecast, which also included consideration of the impacts of "natural conservation."

Economic Potential Forecast

Under the conditions of the Economic Potential Forecast,[21] the study estimated that electricity consumption in the Commercial sector would fall to about 1,541 GWh/yr. by 2026 in the Island and Isolated service region. Annual savings relative to the Reference Case are 693 GWh/yr., or about 31%.

Achievable Potential

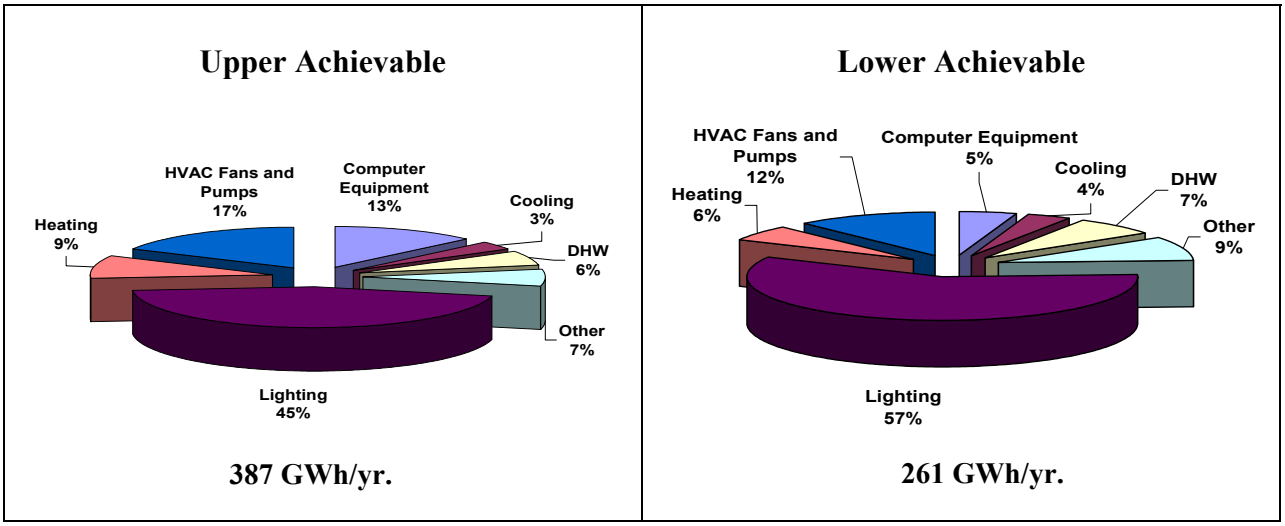
The Achievable Potential is the proportion of the economic electricity savings (as noted above) that could realistically be achieved within the study period. In the Commercial sector within the Island and Isolated service region, the Achievable Potential for electricity savings was estimated to be 387 GWh/yr. and 261 GWh/yr. by 2026 in, respectively, the Upper and Lower scenarios.

The most significant achievable savings opportunities were in the actions that addressed lighting, HVAC fans and pumps and space heating.

Exhibit 4.4 shows the distribution of electricity savings in 2026 by end use in the Upper and Lower Achievable Potential scenarios.

[21] The level of electricity consumption that would occur if all equipment and building envelopes were upgraded to the level that is cost effective against future avoided electricity costs.

Exhibit 4.4: Distribution of Electricity Savings by Major End Use in the Upper and Lower Achievable Scenarios, Island and Isolated Service Region, Commercial Sector[22]



4.3 PEAK LOAD SAVINGS

The electricity savings noted above also result in a reduction in peak load requirements (MW), which can be of particular value to the Utility during periods of high electricity demand[23].

The resulting Commercial sector peak load savings are presented in Exhibit 4.5.

Exhibit 4.5: Peak Load Savings from Electricity Savings in the Island and Isolated Service Region, Commercial Sector

Milestone Year	Energy Savings (GWh/yr.)		Peak Demand Reduction (MW)	
	Upper Achievable	Lower Achievable	Upper Achievable	Lower Achievable
2011	110	80	16	11
2016	220	160	32	23
2021	298	209	42	28
2026	387	261	54	35

As illustrated in Exhibit 4.5, the Commercial sector peak load savings were estimated to be 54 MW and 35 MW by 2026 in, respectively, the Upper and Lower scenarios. In each case, the reductions are an average value over the peak period and are defined relative to the Reference Case.[24]

[22] Values may not add to 100% due to rounding.

[23] See Section 1.3 for peak period definition.

[24] The comparable results for the Labrador Interconnected service region are between 3.2 and 2.2 MW in, respectively, the Upper and Lower achievable scenarios. Additional details are provided in the Commercial sector report and accompanying appendices.

5. INDUSTRIAL SECTOR

The Industrial sector consists of large transmission level customers from the Mining, Pulp and Paper and Oil Refining sub sectors that use more than 50 GWh of electricity annually and over 400 small and medium facilities that use less than 50 GWh annually, including Fishing and Fish Processing, Manufacturing and Other customer categories.

5.1 APPROACH

The detailed end-use analysis of electrical efficiency opportunities in the Industrial sector employed Marbek's customized spreadsheet model. The model is organized by major industrial sub sector and major end use.

Electricity end-use profiles were developed for the six sub sectors described above. The profiles map proportionally how much electricity is used by each of the end uses for each sub sector. These profiles represent the sub sector archetypes and are used in the model to calculate the electricity used by each end use for each sub sector.

Three archetype profiles were developed for large industry based on the results of a survey of the six facilities included in these sub sectors.[25] In each case, site personnel provided data, which addressed both the allocation of electricity use by end use and general best practices implemented at the sites. A copy of the survey instrument is contained in Appendix A of the industrial sector report.

Experience from previous industry studies in other Canadian jurisdictions provided the necessary archetype end-use profiles for the three Small and Medium industrial sub sectors. These profiles were reviewed by industry experts familiar with industry in Newfoundland and Labrador and were revised to be representative of the province's industrial sub sectors.

The major steps in the general approach to the study are outlined in Section 1.3 above (*Major Analytic Steps*). Specific procedures for the Industrial sector were as follows:

- **Modelling of Base Year –** The consultants compiled data on Newfoundland and Labrador's Industrial sector from the Utilities Load Forecasting Department and from a survey questionnaire that was completed by each of the large customers. The macro model results produced a close match with actual Utilities' sales data.

- **Reference Case calculations -** The consultants prepared a Reference Case forecast based on projected growth forecasts provided by NLH, which includes anticipated closing of existing facilities and opening of new facilities. The possibility of new industrial load on the system, related to the processing of nickel from Voisey's Bay in Labrador, is not included due to the uncertainty with the processing technology. The self-generated electricity consumption was frozen for the 20-year forecast.

- **Assessment of CDM Measures** –To estimate the economic and achievable electricity savings potentials, the consultants assessed a wide range of commercially available CDM

[25] The results were also compared with those from detailed studies of similar industries undertaken by Marbek and were found to compare well.

measures and technologies such as more efficient systems for pumps, air displacement (fans), compressed air, material conveyance (such as conveyor belts and chains), industrial refrigeration as well as more efficient, industrial lighting, electric motors, etc.

5.2 ELECTRICITY SAVINGS

In, respectively, the Upper and Lower Achievable Potential scenarios, Industrial Sector electricity savings are estimated to be between 125 and 59 GWh/yr. by 2026 in the Island and Isolated and Labrador Interconnected service regions.[26]

A summary of the levels of annual electricity consumption contained in each of the forecasts addressed by the study is presented in Exhibits 5.1 and 5.2, by milestone year, and discussed briefly in the paragraphs below.

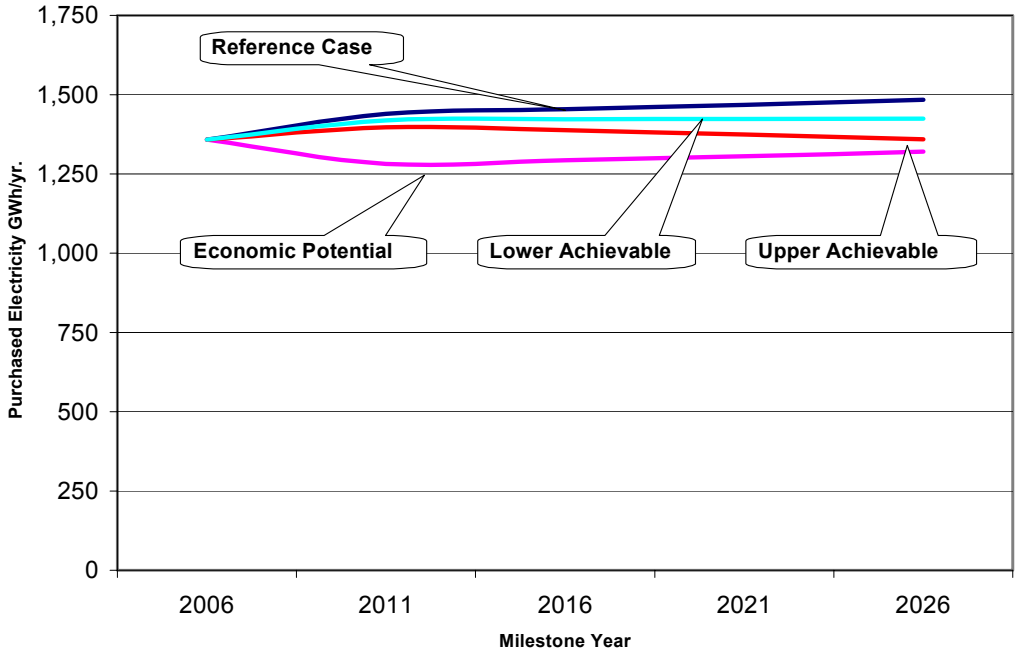
Exhibit 5.1: Summary of Forecast Results for the Island and Isolated and Labrador Interconnected Service Regions – Annual Electricity Consumption, Industrial Sector (GWh/yr.)

Annual Consumption (GWh/yr.) Industrial Sector						Potential Annual Savings (GWh/yr.)		
Milestone Year	Base Year	Reference Case	Economic	Achievable		Economic	Achievable	
				Upper	Lower		Upper	Lower
2006	1,359	1,359						
2011		1,440	1,282	1,397	1,419	158	43	21
2016		1,454	1,293	1,388	1,422	161	66	32
2021		1,468	1,306	1,375	1,424	162	93	44
2026		1,484	1,321	1,360	1,425	164	125	59

**Results are measured at the customer's point-of-use and do not include line losses.*

26 Analysis for the two service regions was combined for the Industrial sector.

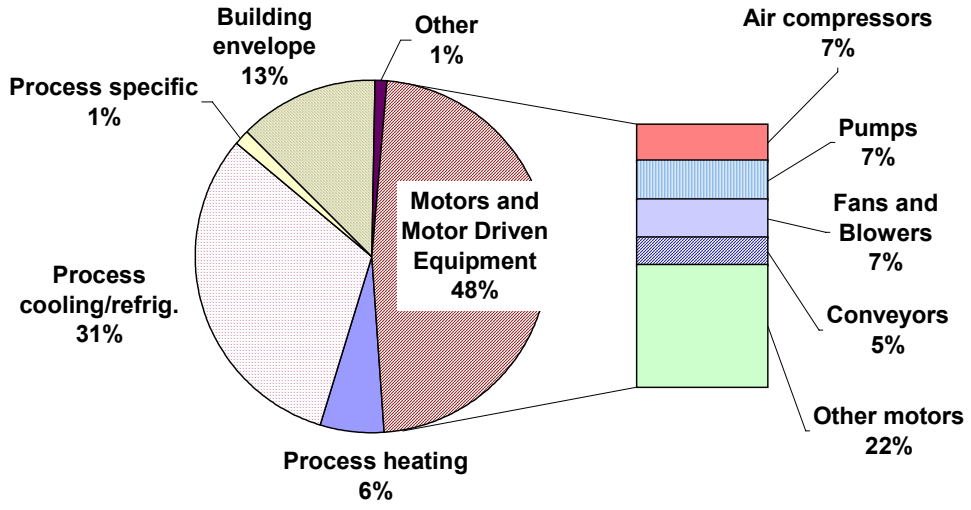
Exhibit 5.2: Reference Case versus Upper and Lower Achievable Potential Electricity Consumption in the Industrial Sector (GWh/yr.)



Base Year Electricity Use

In the Base Year of 2006, the Island and Isolated and Labrador Interconnected Service Regions consumed about 4,558 GWh, of which 1,359 GWh was purchased electricity[27]. The Large industrial sub sector consumed 79% of the total purchased electricity. Exhibit 5.3 shows the purchase electricity use by end use for the Small and Medium industrial sector. Most of the electricity is used by motor and motor drive equipment (48% of the total) and process cooling and refrigeration/freezing (31% of the total).

Exhibit 5.3: Small and Medium Industry Base Year Modelled Annual Purchased Electricity Consumption for the Island and Isolated and Labrador Interconnected Service Regions by End Use, (GWh/yr.)



[27] Self-generated electricity was beyond the study scope.

Reference Case

In the absence of new Utilities' CDM initiatives, the study estimates that purchased electricity consumption in the Industrial sector will grow from 1,359 GWh/yr. in 2006 to about 1,484 GWh/yr. by 2026 in the Island and Isolated and Labrador Interconnected service regions. This represents an overall growth of about 9% in the period and compares very closely with NLH's load forecast, which also included consideration of the impacts of "natural conservation."

Economic Potential Forecast

Under the conditions of the Economic Potential Forecast,[28] the study estimated that electricity consumption in the Industrial sector would decline to about 1,321 GWh/yr. by 2026 in the Island and Isolated and Labrador Interconnected Service Regions. Annual savings relative to the Reference Case are 164 GWh/yr. or about 11%.

Achievable Potential

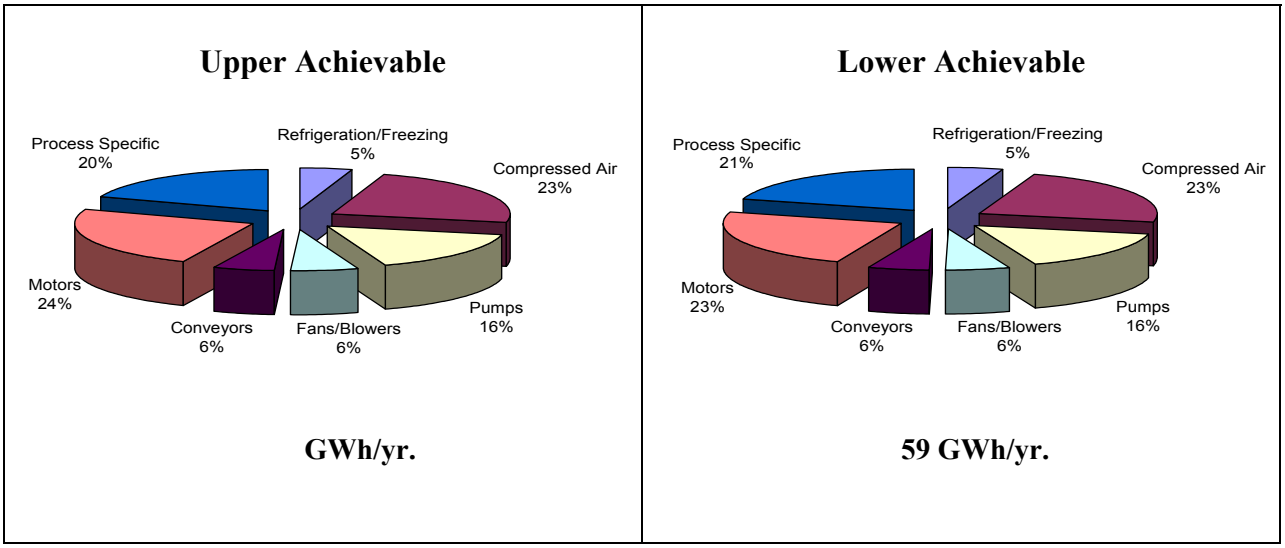
The Achievable Potential is the proportion of the economic electricity savings (as noted above) that could realistically be achieved within the study period. In the Industrial sector within the Island and Isolated and Labrador Interconnected service regions, the Achievable Potential for electricity savings was estimated to be 125 GWh/yr. and 59 GWh/yr. by 2026 in, respectively, the Upper and Lower scenarios.

The most significant Achievable savings opportunities were in the actions that addressed motors and compressed air for the Small and Medium Sector, and process specific equipment in the Large industrial sector.

Exhibit 5.4 shows the distribution of electricity savings in 2026 by end use in the Upper and Lower Achievable Potential scenarios.

[28] The level of electricity consumption that would occur if all equipment were upgraded to the level that is cost effective against future avoided electricity costs.

Exhibit 5.4: Distribution of Electricity Savings by Major End Use in the Upper and Lower Achievable Scenarios, Industrial Sector[29]



5.3 PEAK LOAD SAVINGS

The study did not attempt to estimate peak load savings for the Industrial sector. This approach is consistent with the study scope and recognizes both the greater level of complexity posed by this sector and the absence of the required load shape data.

[29] Values may not add to 100% due to rounding.

6. CONCLUSIONS AND NEXT STEPS

This study has confirmed the existence of significant cost-effective CDM potential within Newfoundland and Labrador's Residential, Commercial and Industrial sectors. The study results provide:

- Specific estimates of the potential CDM savings opportunities, defined by sector, sub sector, end use and, in several cases, specific technology(s)

- A baseline set of energy technology penetrations and energy use practices that can assist in the design of specific programs.

The next step[30] in this process involves the selection of a cost-effective portfolio of CDM programs and the setting of specific CDM targets and spending levels as well as deciding how to best account for CDM expenditures.

6.1 CDM SPENDING LEVELS

To provide a preliminary reference point for this next step in the program development process, the study team conducted a brief literature search in an attempt to identify typical CDM spending levels in other jurisdictions. The literature search identified two (relatively) recent studies that had addressed similar issues on behalf of other Canadian utilities. The two studies are:

- *Demand-Side Management: Determining Appropriate Spending Levels and Cost-Effectiveness Testing,* which was prepared by Summit Blue Consulting and the Regulatory Assistance Project for the Canadian Association of Members of Public Utility Tribunals (CAMPUT). The study was completed in January 2006.

- *Planning and Budgeting for Energy Efficiency/Demand-Side Management Programs,* which was prepared by Navigant Consulting for Union Gas (Ontario) Limited. The study was completed in July 2005.

The CAMPUT study, which included a review of U.S. and Canadian jurisdictions, concluded that an annual CDM expenditure equal to about 1.5% of annual electricity revenues might be appropriate for a utility (or jurisdiction) that is in the early stages of CDM[31] programming. This level of funding recognizes that it takes time to properly introduce programs into the market place.

The same study found that once program delivery experience is gained, a ramping up to a level of about 3% of annual electricity revenues is appropriate. The study also notes that higher percentages may be warranted if rapid growth in electricity demand is expected or if there is an increasing gap between demand and supply due to such things as plant retirements or siting limitations. The current emphasis on climate change mitigation measures would presumably also fall into a similar category of potential CDM drivers.

[30] Full treatment of these next steps is beyond the scope of the current project.

[31] The CAMPUT study uses the term DSM (demand-side management); DSM is used interchangeably with CDM in this section.

The CAMPUT study also notes that even those states with 3% of annual revenues as their CDM target have found that there are more cost-effective CDM opportunities than could be met by the 3% funding. The finding is consistent with the situation in British Columbia. In the case of BC Hydro, CDM expenditures over the past few years have been about 3.3% of electricity revenues.[32] However, the results of BC Hydro's recently completed study (Conservation Potential Review (CPR) 2007) identified over 20,000 GWh of remaining cost-effective CDM opportunities by 2026. The magnitude of remaining cost-effective CDM opportunities combined with the aggressive targets set out in British Columbia's provincial Energy Plan suggest that BC Hydro's future CDM expenditures are likely to increase significantly if the new targets are to be met.

Additional notes:

- Neither of the studies noted above found any one single, simple model for setting CDM spending levels and targets. Rather, the more general conclusion is that utilities use a number of different approaches that are reasonable for their context. In fact, the CAMPUT report identified seven approaches to setting CDM spending levels.

    - Based on cost-effective CDM potential estimates
    - Based on percentages of utility revenues
    - Based on Mills/kWh of utility electric sales
    - Levels set through resource planning process
    - Levels set through the restructuring process
    - Tied to projected load growth
    - Case-by-case approach.

- The CAMPUT study also notes that, although not always explicit, a key issue in most jurisdictions is resolving the trade off between wanting to procure all cost-effective energy-efficiency measures and concerns about the resulting short-term effect on rates. The study concluded that CDM budgets based on findings from an Integrated Resource Plan or a benefit-cost assessment tend to accept whatever rate effects are necessary to secure the overall resource plan, inclusive of the cost-effective energy-efficiency measures.

6.2 COST ACCOUNTING OF CDM EXPENDITURES

The benefits of CDM programs include reduced energy costs for customers, reduced capital requirements and improved operating costs for utilities and environmental and economic benefits for society. However, the realization of these benefits can require significant expenditures. CDM expenditures include the cost of the efficient technology or action to the customer and the cost to the utility of the policy or program to encourage its use; in the case of many electric utilities, the related costs of CDM programs may also include revenue losses. The cost accounting of the related CDM expenditures is, therefore, another important consideration in the process of developing and implementing CDM programs.

One of the important considerations in the treatment of CDM expenditures is whether to expense or capitalize them. To provide preliminary insight into this issue, the study conducted a brief

[32] CAMPUT, 2006. p. 14.

literature review and held discussions with personnel involved with BC Hydro's Power Smart program.

The allocation of CDM program costs involves deciding between those that are expensed in the given year, and those that are capitalized and, hence, depreciated over a number of years. The results of the brief literature review indicated that both practices occur throughout jurisdictions in North America.

On the one hand, the expensing of CDM costs tends to be less expensive in the long run because there are no carrying costs included. However, in the short term, especially where programs are being developed for the first time, there may be rate impacts. On the other hand, capitalizing of CDM costs reduces the immediate cost to implement the program but the carrying cost of the non-amortized balances add to the overall costs of implementing the program.[33]

Discussions with BC Hydro Power Smart personnel indicated that the utility wrestled with this issue during the initiation of their CDM programs. The following points provide a rough framework for how that utility addresses this allocation issue:[34]

- Upfront development costs, such as market assessments, program planning, etc., are allocated to annual operation and maintenance (O&M) budgets and are, therefore, expensed.

- Electricity savings that occur as a result of CDM program implementation-related costs are considered to be an asset. Hence, once a CDM program reaches the implementation phase, all related expenses are linked to the acquisition of that electricity saving asset. All related expenses are, therefore, capitalized (deferred capital).

- In theory, the depreciation period for the capital asset (electricity savings) should be approximately the same as the life of the measures being implemented. For example, if the CDM measure promotes implementation of compact fluorescent lamps (CFLs), which have an average life of about five years, then the depreciation period should also be five years.

- In practice, most CDM program initiatives are likely to involve multiple measures, each having a different life span. In response, BC Hydro uses an average depreciation life in the range of 10 to 12 years for all their CDM initiatives.

- Inevitably, "grey" program cost areas will be encountered. In these cases, the experience to date suggests that it may be preferable to err towards capitalizing the cost item. This approach helps to smooth out multi-year CDM program budgets by reducing program exposure in a given year.

Based on the results of the preliminary review undertaken for this study, it appears that the approach to the treatment of future CDM expenditures by the Utilities can be better defined at

[33] *Demand-Side Management: Determining Appropriate Spending Levels and Cost-Effectiveness Testing*. Prepared by Summit Blue Consulting and the Regulatory Assistance Project for the Canadian Association of Members of Public Utility Tribunals (CAMPUT). January 30, 2006. p. 34.

[34] Discussion with Murray Bond, Manager of Evaluation, Measurement and Verification. Power Smart. November 12, 2007.

such time as there is more certainty regarding expenditure levels, funding sources, and potential impacts on customer rates.