Q. **2013 CDM Costs Deferral**

Please provide all documentation that would normally be filed with the Newfoundland and Labrador Board of Commissioners of Public Utilities for the deferred recovery of 2013 costs associated with its 2013 energy conservation plan supporting the request for $2.6M.

A. Please see the attached copy of Hydro's 2013 CDM deferral application, dated January 14, 2013, which did not get approved as per Board Order No. P.U. 21(2013). Hydro anticipates refiling its 2013 CDM application in October, 2013.

newfoundland labrador hydro
a nalcor energy company

Hydro Place. 500 Columbus Drive.
P.O. Box 12400. St. John's. NL
Canada A1B 4K7
t. 709.737.1400 f. 709.737.1800
www.nlh.nl.ca

January 14, 2013

Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, NL
A1A 5B2

ATTENTION: Ms. Cheryl Blundon
Director of Corporate Services & Board Secretary

Dear Ms. Blundon:

Re: An Application by Newfoundland and Labrador Hydro for the approval of the deferred recovery of Hydro's Conservation and Demand Management (CDM) program costs proposed to be incurred in 2013.

The Five-Year Energy Conservation Plan: 2012-2016 (the Plan) was filed with the Board of Commissioners of Public Utilities (the Board) in September 2012 as part of Newfoundland Power's General Rate Application. It was an update to the initial 2008-2013 Plan filed in June 2008 pursuant to Board Order No. P.U. 8 (2007) and outlined the additional programs to be launched jointly by Hydro and Newfoundland Power.

Implementation of the Plan commenced in 2009. Costs to implement the Plan were not included in the CDM costs which comprised a portion of Hydro's 2007 approved expenses for rates set by Board Order No. P.U. 8 (2007). Therefore, the electricity rates charged to Hydro's customers do not recover the costs of the energy efficiency programs outlined in the Plan.

On an annual basis, Hydro has applied and received approval from the Board for the deferred recovery of CDM costs related to the implementation of the Plan. The Board Orders for each of the applications is outlined in Table 1 below.

Table 1: CDM Deferred Costs - Board Orders

Year	Annual Cost ($ millions)	Date	Board Order
2010	2.3	May 12, 2010	No. P.U. 13 (2010)
2011	0.84	March 10, 2011	No. P.U. 4 (2011)
2012	1.7	February 8, 2012	No. P.U. 3 (2012)

Hydro is now applying to the Board for the deferral of the 2013 costs, estimated to be $1.95 million, to be incurred by Hydro that are associated with the conservation and demand management programs outlined in the Plan.

Please find enclosed the original and eight copies of the above-noted Application, plus supporting affidavit and draft order, as well as the 2013 Conservation Cost Deferral and Project Expansion Report (Schedule A). Please be advised that only one copy of the 2012-2016 Plan (Schedule B) and the Marbek Resource Consultant Inc. Report (Schedule C), which are incorporated in this Application by reference, are attached to this Application. Please contact the undersigned should additional copies be required.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

Geoffrey P. Young
Senior Legal Counsel

GPY/jc

cc: Gerard Hayes – Newfoundland Power
Paul Coxworthy – Stewart McKelvey Stirling Scales
Thomas Johnson – Consumer Advocate
Dean Porter – Poole Althouse

IN THE MATTER OF the *Electrical Power Control Act, 1994*, SNL 1994, Chapter E-5.1 (the EPCA) and the *Public Utilities Act*, RSNL 1990, Chapter P-47 (the Act) and regulations thereunder;

AND IN THE MATTER OF an Application by Newfoundland and Labrador Hydro, pursuant to Sections 58 and 80 of the Act, for the approval of the deferred recovery of Hydro's 2013 Conservation and Demand Management program costs.

TO: The Board of Commissioners of Public Utilities (the Board)

THE APPLICATION OF NEWFOUNDLAND AND LABRADOR HYDRO (Hydro) STATES THAT:

1. Hydro is a corporation continued and existing under the *Hydro Corporation Act, 2007*, is a public utility within the meaning of the Act and is subject to the provisions of the *Electrical Power Control Act, 1994*.

2. Further to discussions of energy conservation during Hydro's 2006 General Rate Application and the subsequent filing of the Potential Study by Marbek Resource Consultants on March 20 2008, Hydro and Newfoundland Power jointly filed the Five-Year Conservation Plan for 2008-2013 (the Plan) on June 27, 2008. An update to this Plan for 2012-2016 was filed by Newfoundland Power as part of its General Rates Application in September 2012.

3. Newfoundland Power received approval for the creation of a deferral account for costs related to the implementation of the Plan in Order No. P.U. 13 (2009). Hydro received Board approval for its definition of the Conservation Cost Deferral Account in a letter dated June 24, 2009.

4. On May 12, 2010 Hydro received approval from the Board in Order No. P.U. 13 (2010) for the deferred recovery of the 2010 costs, estimated to be $2.3 million, related to the implementation of the Plan. Hydro's 2010 costs were approximately $480,000, a significant decrease from the original estimate.

5. On March 10, 2011 Hydro received approval from the Board in Order No. P.U. 4 (2011) for the deferred recovery of the 2011 costs, estimated to be $0.84 million, related to the implementation of the Plan.

6. On February 8, 2012 Hydro received approval from the Board in Order No. P.U. 3 (2012) for the deferred recovery of the 2012 costs, estimated to be $1.7 million, related to the implementation of the Plan.

7. Costs to implement the Plan, estimated to be $1.95 million in 2013, were not included in the conservation and demand management costs which comprised a portion of Hydro's 2007 Test Year expenses for rates set by Order No. P.U. 8

(2007). As such, the electricity rates charged to Hydro's customers in 2013 will not recover the costs of the energy efficiency programs outlined in the Plan.

8. The estimated cost of $1.95 million in 2013 to implement the Plan is:

(a) Consistent with the management and operation of sources and facilities for the production, transmission and distribution of power in a manner that results in power being delivered to consumers in the province at the lowest possible cost consistent with reliable service as required by Subparagraph 3(b) (iii) of the EPCA;

(b) Justified under tests consistent with generally accepted sound public utility practice as required by Section 4 of the EPCA; and

(c) Reasonable and prudent and properly chargeable to operating account in accordance with Subsection 80(2) of the Act.

9. The attached 2013 Conservation Cost Deferral and Program Expansion Report (Schedule A) provides the details of the 2013 CDM Program costs that Hydro is seeking Board approval to defer and provides an update on the CDM activities undertaken in 2012.

10. Hydro now makes Application that the Board make an Order approving the deferred recovery of the 2013 costs to be incurred by Hydro in association with

the energy conservation program in 2013, which are estimated to be approximately $1.95 million.

DATED AT St. John's in the Province of Newfoundland and Labrador this 14th day of January, 2013.

Geoffrey P. Young
Counsel for the Applicant
Newfoundland and Labrador Hydro,
500 Columbus Drive, P.O. Box 12400
St. John's, Newfoundland, A1B 4K7
Telephone: (709) 737-1277
Facsimile: (709) 737-1782

IN THE MATTER OF the *Electrical Power Control Act*, RSNL 1994, Chapter E-5.1 (the *EPCA*) and the *Public Utilities Act*, RSNL 1990, Chapter P-47 (the *Act*) and regulations thereunder;

AND IN THE MATTER OF an Application by Newfoundland and Labrador Hydro for the approval, pursuant to Section 58 and 80 of the Act, of the deferred recovery of Hydro's 2013 Conservation and Demand Management program costs.

AFFIDAVIT

I, James R. Haynes, Professional Engineer, of St. John's in the Province of Newfoundland and Labrador, make oath and say as follows:

1. I am Vice-President, Regulated Operations, of Newfoundland and Labrador Hydro, the Applicant named in the attached Application.

2. I have read and understand the foregoing Application.

3. I have personal knowledge of the facts contained therein, except where otherwise indicated, and they are true to the best of my knowledge, information and belief.

SWORN at St. John's in the Province of Newfoundland and Labrador this 14th day of January 2013, before me:

Barrister – Newfoundland and Labrador

James R. Haynes

(DRAFT ORDER)
NEWFOUNDLAND AND LABRADOR
BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

AN ORDER OF THE BOARD

NO. P.U. __ (2013)

IN THE MATTER OF the *Electrical Power Control Act, 1994*, SNL 1994, Chapter E-5.1 (the *"EPCA"*) and the *Public Utilities Act*, RSNL 1990, Chapter P-47 (the *"Act"*), and regulations thereunder;

AND

IN THE MATTER OF an application by Newfoundland and Labrador Hydro for the deferred recovery of 2013 costs associated with the energy conservation program.

WHEREAS Newfoundland and Labrador ("Hydro") is a corporation continued and existing under the *Hydro Corporation Act, 2007,* is a public utility within the meaning of the *Act* and is subject to the provisions of the *EPCA;* and

WHEREAS on January 10, 2013 Hydro filed an application with the Board requesting approval of the deferred recovery of the 2013 costs to be incurred by Hydro in association with the Conservation and Demand Management Program to be implemented in 2013, which are estimated to be $1.95 million (the "Application"); and

WHEREAS on March 20, 2008 Hydro and Newfoundland Power jointly filed with the Board a conservation and demand management potential study prepared by Marbek Resource Consultants which identified the potential contribution of specific technologies and measures in reducing forecast electricity consumption (the "Potential Study"); and

WHEREAS on June 27, 2008, pursuant to Order No. P.U. 7(2008), a Five-Year Energy Conservation Plan: 2008-2013 (the "Conservation Plan") was filed with the Board which sets out the customer energy conservation programs proposed to be jointly implemented by Hydro and Newfoundland Power; and

WHEREAS on September 14, 2012 an updated Five-Year Energy Conservation Plan: 2012-2016 was filed with the Board as part of Newfoundland Power's General Rate Application; and

WHEREAS in Order No. P.U. 14(2009); Order No. P.U. 13(2010); Order No. P.U. 4(2011); and Order No. P.U. 3(2012) the Board approved Hydro's applications for the deferred recovery of the costs incurred by Hydro in association with the Conservation Plan in 2009, 2010, 2011, and 2012 respectively; and

WHEREAS the Board approves the deferred recovery of Hydro's 2013 costs associated with the Conservation Plan.

IT IS THEREFORE ORDERED THAT:

1. The deferred recovery of the 2013 costs related to the Conservation Plan, estimated to be $1.95 million is approved.

2. Hydro shall pay all expenses of the Board arising from this Application.

DATED at St. John's, Newfoundland and Labrador, this day of , .

Andy Wells
Chair & Chief Executive Officer

Darlene Whalen, P.Eng.
Vice-Chair

Dwanda Newman, LL.B.
Commissioner

James Oxford
Commissioner

Cheryl Blundon
Board Secretary

A REPORT TO
THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

2013 CONSERVATION COST DEFERRAL AND PROGRAM EXPANSION REPORT

Newfoundland and Labrador

December 2012

newfoundland labrador hydro
a nalcor energy company

Table of Contents

1.0 Introduction

Newfoundland and Labrador Hydro (Hydro) has applied for approval from the Board of Commissioners of Public Utilities (the Board) for the deferral of the costs to be incurred by Hydro that are associated with the 2013 implementation of the Conservation and Demand Management (CDM) Programs and approach as outlined in the Five-Year Energy Conservation Plan: 2012-2016 (the Plan)[1]. The purpose of this report is to provide the details of the 2013 CDM Program costs and an update of activities undertaken in 2012. The report also provides an overview of the new programs proposed to be launched in 2013.

The Plan outlines the joint utility approach undertaken in partnership with Newfoundland Power. This report describes the provincial approach but focuses on the costs and reach of initiatives for Hydro's portion of program implementation that are addressed by the deferral request.

Hydro is requesting a deferral of an estimated $1,951,000 to be incurred in 2013, which was not included in Hydro's 2007 Test Year approved expenses for rates set by Board Order No. P.U. 8 (2007).

2.0 Background

Energy Conservation Initiatives were a topic of discussion during Hydro's 2006 General Rate Application (GRA). Since that time, Marbek Resource Consultants Limited (Marbek) was commissioned and completed a CDM Potential study in 2008 that provided information to assist in identifying cost-effective conservation programs and the potential contribution of specific technologies and measures in reducing forecast electricity consumption. From the potential study a five-year strategic plan was completed which outlined proposed energy conservation initiatives to be implemented jointly by Newfoundland Power and Hydro, including technologies, programs, support elements and cost estimates that promote a long-term goal of an established conservation culture with sustained reductions in electricity consumption. The potential study was filed with the Board on March 20, 2008 and the 2008-2012 Plan was filed with the Board on June 27, 2008.

In September 2012, the Five-Year Energy Conservation Plan: 2012-2016 was filed with the Board. This updated Plan outlined additional programs to be launched to complement the existing portfolio of programs. The focus for joint utility conservation continues to be 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

[1] The Five-Year Energy Conservation Plan: 2012-2016 was filed with the Board on September 14, 2012 as part of Newfoundland Power's General Rate Application.

supporting activities for awareness, education and community engagement to stimulate attitude change.

An application to defer the recovery of actual 2009 costs to be incurred by Hydro in association with the implementation of the Energy Conservation Program was filed on November 21, 2008. This filing addressed forecasted costs for delivering the programs to Hydro customers in 2009. The Board approved the application in Order No. P.U. 14 (2009), and ordered Hydro to file a definition 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.

An application to defer the recovery of actual 2010 costs estimated at $2.3 million to be incurred by Hydro in association with the implementation of the Energy Conservation Program was filed on January 26, 2010. This filing addressed forecasted costs for delivering the programs to Hydro customers in 2010. The Board approved the application in Order No. P.U. 13 (2010).

An application to defer the recovery of actuals 2011 costs estimated at $840,000 to be incurred by Hydro in association with the implementation of the Energy Conservation Program was filed on March 10, 2011. This filing addressed forecasted costs for delivering the programs to Hydro customers in 2011. The Board approved the application in Order No. P.U. 4 (2011).

An application to defer the recovery of actuals 2012 costs estimated at $1,673,000 to be incurred by Hydro in association with the implementation of the Energy Conservation Program was filed on December 22, 2011. This filing addressed forecasted costs for delivering the programs to Hydro customers in 2012. The Board approved the application in Order No. P.U. 3 (2012).

Hydro is forecasting a total of $2,409,000 to be accumulated in the deferral account to the end of 2012.

3.0 Five-Year Plan Update

2012 has been a very active year with respect to Hydro's conservation efforts, with significant residential and commercial programming launched in Hydro's isolated communities. Program profiles for the Isolated Systems Community Program and Isolated Systems Business Efficiency Program are found in Appendix A. There has been more than 86% participation in the residential component and there are four commercial capital project agreements expected to be in place by the end of 2012.

The Five-Year Energy Conservation Plan 2012-2016 was completed in partnership with Newfoundland Power and filed with the Board in the third quarter. This plan outlines new programs to be offered provincially to address key areas of energy use for commercial and

residential customers as well as outlines new efforts for outreach and education to continue the move towards a culture of conservation. Hydro expanded its program reach and complexity in 2012 with significant new offerings for residential and commercial customers in isolated systems and in the Labrador Interconnected region. 2013 is expected to include an expansion for the provincial CDM portfolio with the implementation of a custom approach for commercial customers. Heat Recovery Ventilation System (HRV) efficiency is also addressed for the residential market.

4.0 Program Portfolio

The existing Energy Savers Rebate programs offered through the takeCHARGE program launched in June 2009 will continue to be offered in 2013. These programs have shown 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 customized Industrial Energy Efficiency Program (IEEP) will also continue to be available to transmission level Industrial Customers.

The Energy Savers Rebate Programs are offered provincially, however the costs associated with delivery in the Labrador Interconnected System are recorded differently than those in other systems. Outside the Labrador Interconnected System, the dominant economic driver is the avoided fuel cost. In the Labrador Interconnected System the dominant economic driver is export market sales. To ensure the costs of conservation are associated with those who receive the primary benefits, the costs of conservation and efficiency on the Labrador Interconnected System are considered non-regulated.

In addition to the existing Energy Savers programs, there are three programs currently being delivered in Hydro's service area. The Isolated Systems Community Program and Isolated Systems Business Efficiency Program were launched in June 2012 and provide rebates, information and technical support to home and business owners in isolated communities. These costs are included in the current application. An additional program addressing Block Heater Timers, being offered only to customers on the Labrador Interconnected System, is launching in November 2012 and the associated program costs will not be included in the deferral request. The use of block heaters for vehicles is very common in the Labrador Interconnected System due to the climate. There is not a high usage of block heaters elsewhere so that program is targeting the highest users.

The following tables show Hydro's total CDM expenses and energy savings from 2009 to 2013 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.

The additional programs outlined in the Plan for launch in 2013 include residential and commercial incentives. These program concepts are outlined in the Appendix B and their costs are included in the tables below.

Table 1: Hydro CDM Portfolio Spending ($000's)

	2009	2010	2011	2012	2013
Windows	44	48	140	101	103
Insulation	40	60	80	110	108
Thermostats	13	19	31	42	34
Coupon Program	-	140	135	-	-
Commercial Lighting	13	12	59	19	49
Industrial	57	221	103	180	402
Block Heater Timer				19	82
Isolated Systems Community				823	1,076
ISBEP				91	146
Heat Recovery Ventilator				-	30
Business Efficiency Program				-	88
Small Technologies				-	28
Total Portfolio	**167**	**500**	**548**	**1,385**	**2,146**

Table 2: Hydro's CDM New Annual Energy Savings 2009-2013 (MWh)

	2009	2010	2011	2012	2013
Windows	12	27	61	70	84
Insulation	31	84	407	318	193
Thermostats	6	25	27	35	39
Coupon Program	-	64	256	-	-
Commercial Lighting	3	10	227	89	175
Industrial	0	0	165	3,500	1952
Block Heater Timer				144	648
Isolated Systems Community				2,170	1884
ISBEP				3	145
HE HRV					22
Business Efficiency Program					228
Small Technologies					-
Total	**52**	**210**	**1,143**	**6,329**	**5,370**

The expanded and existing programs have passed the standard utility economic screening tests[2]. The descriptions of the program concepts for the new programs are found in Appendix A.

The concept descriptions include a feasibility level assessment of the program, estimated costs and savings, and the implementation strategies. Once the concepts have been approved, further detailed work is required to bring it to market.

4.1 takeCHARGE Approach

The takeCHARGE approach was described in detail in Hydro's 2010 Conservation Cost deferral report submitted in January 2011. The joint utility effort allows for economies of scale to be achieved where possible 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.

The utilities continue to receive positive response to the existing programs that address a wide provincial customer base. However, there have been opportunities identified that address different needs within each utilities' customer base. For example, rural customers respond positively to community engagement efforts as demonstrated by the newly launched Isolated Systems Community Program which includes home visits, coupons and technology exchanges held by Hydro. The utilities will continue to work together to create additional provincial scope programs, but there are also projects and programs that would be of benefit if implemented in a system-targeted program.

Technology selection continues to follow the same process of focusing on the significant end uses and identifying niche opportunities where the market can be moved to a more efficient choice. For example, residential home heating is a large end use but the technology portfolio will also include a wider range of savings options for customers to reduce their electricity consumption across more end uses. This is reflected in the proposed expansion to include a small technology program that would provide incentives to homeowners for smaller technologies such as lighting options, timers and water conservation items opening new ways to save energy.

The utilities will continue to use traditional methods of advertising and promotion, participate in community events, work with community leaders and utilize social media opportunities. This holistic approach to addressing technology, the end user and their

[2] The primary test for economic viability is the Total Resource Cost (TRC) test which includes both the participants' and Utility's costs and benefits as factors in the net value of the program. As outlined in the Plan, each program has a positive TRC, which means the total program benefits exceed the total costs of the program.

community is the most effective option for fostering sustainable behaviour and attitude change.

4.2 Program Highlights and Next Steps

Participation continues to increase through 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. Retailers with strong numbers of applications to the takeCHARGE program signed up to complete applications on behalf of customers and receive 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 low enough that it is challenging to determine the exact impact of such an initiative, but it does seem to have had an impact. Building these relationships will continue to be a focus for Hydro in the coming year.

Outreach and non-traditional promotions and awareness building have also shown to have impact in reaching this 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 direct install approach in isolated communities provides technologies to homeowners and businesses as well as the free installation of the technologies. This program is nearing 90% penetration, and clearly shows the value of community engagement and creating an interest around the program at community launch events. Retailer events have been hosted in each of these communities.

Participation in the commercial lighting program has been challenged in 2012 due to an increase in the cost of the more efficient lighting that is eligible for incentive. This is expected to continue as one basic component of the manufacturing of the bulbs continues to rise in price. Hydro continues to work with the distributors to gain insight into the impacts this is having on the market. In the summer of 2011, the Isolated Systems Business Efficiency Program (ISBEP) was launched, providing rebates and technical assistance for commercial customers in the isolated diesel communities and L'Anse au Loup. This custom approach is similar to the Industrial Energy Efficiency Program (IEEP) and Hydro technical staff work with customers one on one to address their energy efficiency needs. This will continue in 2013.

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. Projects continue to be submitted for Corner Brook Pulp and Paper Limited and Teck Resources Limited submitted its first feasibility assessment in 2012. It has taken significant effort to provide support to the Industrial Customers to get them ready to participate in the program. 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.

The updated Plan outlines additional program concepts that, once approved, will be launched in 2013 and 2014. The programs planned for launch in 2013 provide incentives for High Efficiency Heat Recovery Ventilation System (HRVs) to further address home heating energy, expansions into additional commercial lighting applications and a provincial custom incentive for commercial customers, similar to the program offered in Hydro's Isolated Systems Business Efficiency Program (ISBEP). These programs are a strong expansion to the growing CDM portfolio offered by the utilities.

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.

5.0 Program and Support Costs

The energy savings from Hydro customers in relation to programming associated with the annual CDM deferral requests to date and forecast in 2013 are shown in Table 3. It should be noted that while there are costs associated with the Small Technologies program in 2013 there are no associated savings. This is because the program will begin detailed design stage in 2013, but the program launch date is anticipated to be in 2014.

Table 3: Energy Savings from Deferral Account Activity (MWh)

	2009	2010	2011	2012	2013
Windows	31	50	38	41	47
Insulation	12	16	229	116	111
Thermostats	6	15	16	22	26
Coupon Program	0	47	166	-	-
Commercial Lighting	3	0	92	20	41
Industrial	0	0	165	3,500	1952
Block Heater Timer				0	0
Isolated Systems Community				2,170	1884
ISBEP				3	145
Heat Recovery Ventilator				-	22
Business Efficiency Program				-	228
Small Technologies				-	0
Total	**52**	**128**	**706**	**5,872**	**4,456**

Forecast 2012 savings for insulation are higher than budgeted, likely due to the impact of continued awareness of the program after aggressive promotions and increased incentives offered in 2011. The savings for the commercial lighting program are higher than expected due to the unpredictable nature of the commercial lighting incentive and the wide range of rebates. Commercial lighting is currently offered solely through the distributors and as such there is little to no direct customer contact for promotions and information, so this program remains somewhat unpredictable for savings estimates.

The savings for IEEP continue to lag well behind forecast savings. There are continued efforts to support customers and although there has been a strong relationship built and there are additional projects in the system, the decrease to 3,400 MWh per year reflects the expectations of projects that will be installed and energy savings verified in 2012. Similarly, there are a number of additional projects forecast, but only three MWh per year are expected to be realized by the ISBEP by the end of the year.

Program costs associated with this deferral request for 2013[3] are shown in Table 4. The table outlines the programs currently in the market as well as those with an anticipated 2013 launch date.

Table 4: Program Costs from Deferral Account Activity ($000's)

	2009	2010	2011	2012	2013
Windows	44	41	140	87	88
Insulation	40	53	80	92	90
Thermostats	13	18	31	38	32
Coupon Program	-	113	135	-	-
Commercial Lighting	13	-	59	10	33
Industrial	57	190	221	178	375
Block Heater Timer				-	-
Isolated Systems Community				823	1,076
ISBEP				91	146
Heat Recovery Ventilator				-	26
Business Efficiency Program					61
Small Technologies				-	24
Total Portfolio	**167**	**415**	**666**	**1,319**	**1,951**

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.

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 support costs are outlined in Table 5 below. While these costs were in line with expectations for education and support, there was a decrease in planning costs as a result of reduced consultant support for new program development or Five-Year plan development. The focus was on the Five-Year Plan and implementing new programming, therefore no new

[3] Proposed definition of the deferral account was submitted to the Board on April 22, 2009.

programs were in design stage. As well, the Five-Year Plan was driven by the utilities' internal efficiency teams rather than external consultants.

Table 5: Hydro's Support Costs 2009-2013 ($000's)					
	2009	**2010**	**2011**	**2012**	**2013**
Education	262	106	212	204	241
Support	53	48	43	47	48
Planning	176	180	304	93	193
Total	**491**	**334**	**559**	**344**	**482**

6.0 Justification

Hydro is seeking approval to defer the CDM program costs it will incur in 2013 and for the recovery of these amounts in a manner to be determined by the Board at a later date. Hydro's total program costs to be deferred are forecast to be $1,951,000. These costs were not forecast in Hydro's 2007 Test Year to be recovered in rates as set by Board Order No. P.U. 8 (2007). Hydro is not seeking approval to defer non-program costs for 2013, estimated to be $344,000.

If the 2013 CDM program costs are not deferred they must be recognized as expenses incurred in 2013. This will have significant impact on Hydro's income in that year. The CDM costs incurred provide ongoing system benefits through energy reductions and associated fuel savings. The appropriate regulatory treatment of these costs will be the subject of further applications by Hydro.

7.0 Conclusion

Hydro has estimated that it will incur $1,951,000 in CDM Program expenses in 2013 associated with the Deferral Account. These expenses are in excess of Hydro's forecast costs used to set rates by Board Order P.U. 8 (2007). Therefore, Hydro is requesting approval from the Board for the deferral of the costs to be incurred by Hydro that are associated with the implementation of the joint utility CDM approach as outlined in the Plan and further described in this report.

Appendix A:
NLH Program Profiles

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

2013 Hydro Estimated:
Deferral Cost - $90,000
Associated Savings – 111 MWh/yr

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 Heat Recovery Ventilation (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 two 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

2013 Hydro Estimated:
Deferral Cost - $32,000
Associated Savings – 26 MWh/yr

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

2013 Hydro Estimated:
Deferral Cost - $88,000
Associated Savings - 47 MWh/yr

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 au 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 interaction 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

2013 Hydro Estimated:

Deferral Cost - $1,076,000

Associated Savings -1,884 MWh/yr

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
2013 Hydro Estimated: Deferral Cost - $24,000 Associated Savings - 0 MWh/yr due to anticipated launch in 2014

HE 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.

HE 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

2013 Hydro Estimated:
Deferral Cost - $26,000
Associated Savings -22 MWh/yr

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 three 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 three 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

2013 Hydro Estimated:
Deferral Cost - $0
Associated Savings -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

2013 Hydro Estimated:

Deferral Cost - $33,000

Associated Savings -41 MWh/yr

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, (heating ventilation air conditioning) 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. Hydro staff will work with customers to determine baselines and estimates of savings based on the suggested retrofit. 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

2013 Hydro Estimated:

Deferral Cost - $146,000

Associated Savings -145 MWh/yr

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

2013 Hydro Estimated:
Deferral Cost - $61,000
Associated Savings -228 MWh/yr

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

2013 Hydro Estimated:
Deferral Cost - $375,000
Associated Savings -1,952 MWh/yr

Appendix B:
Deferral Account Definition

Appendix B: Deferral Account Definition

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.

FIVE-YEAR ENERGY CONSERVATION PLAN: 2012 – 2016

August 2012

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.

[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

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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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List of Exhibits

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

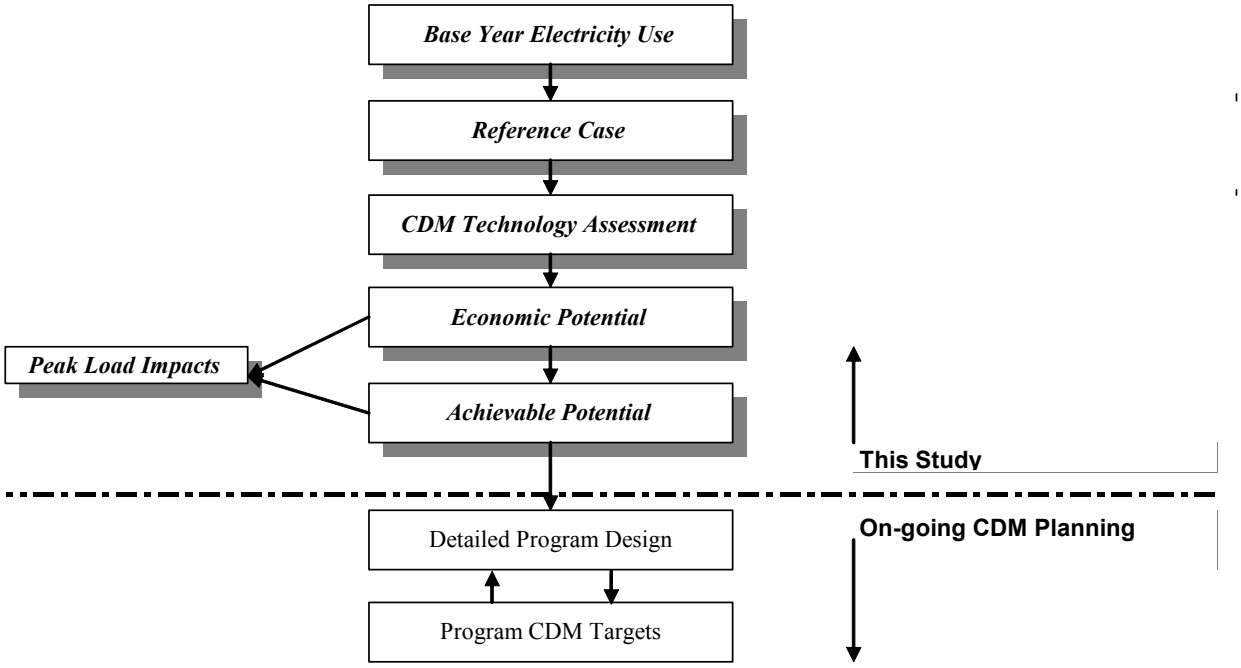
The major steps involved in the analysis are shown in Exhibit 1.1 and are discussed in greater detail in Section 1 of the individual sector reports. As illustrated in Exhibit 1.1, the results of this study, and in particular the estimation of Achievable Potential,[3] support the Utilities on-going work.

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.

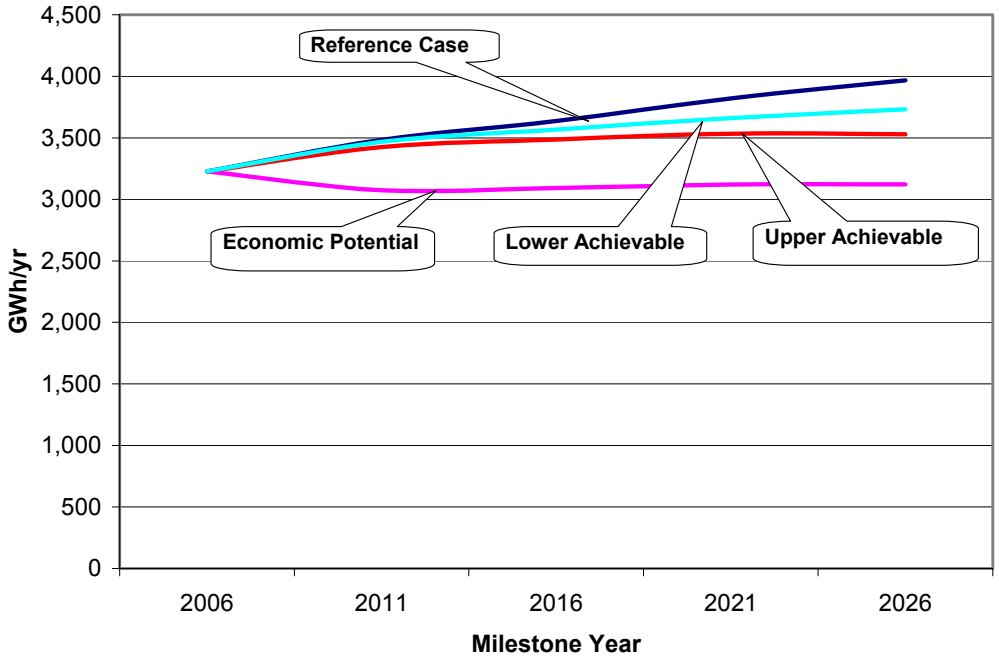
Exhibit 3.1: Summary of Forecast Results for the Island and Isolated Service Region – Annual Electricity Consumption, Residential Sector (GWh/yr.)

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.

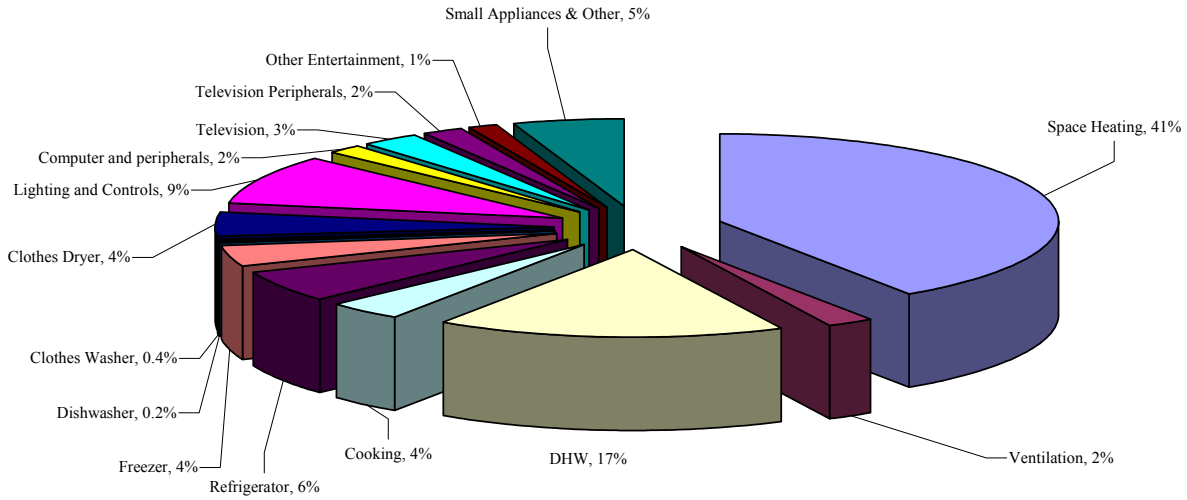
Exhibit 3.2: Graphic of Forecast Results for the Island and Isolated Service Region – Annual Electricity Consumption, Residential Sector (GWh/yr.)



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

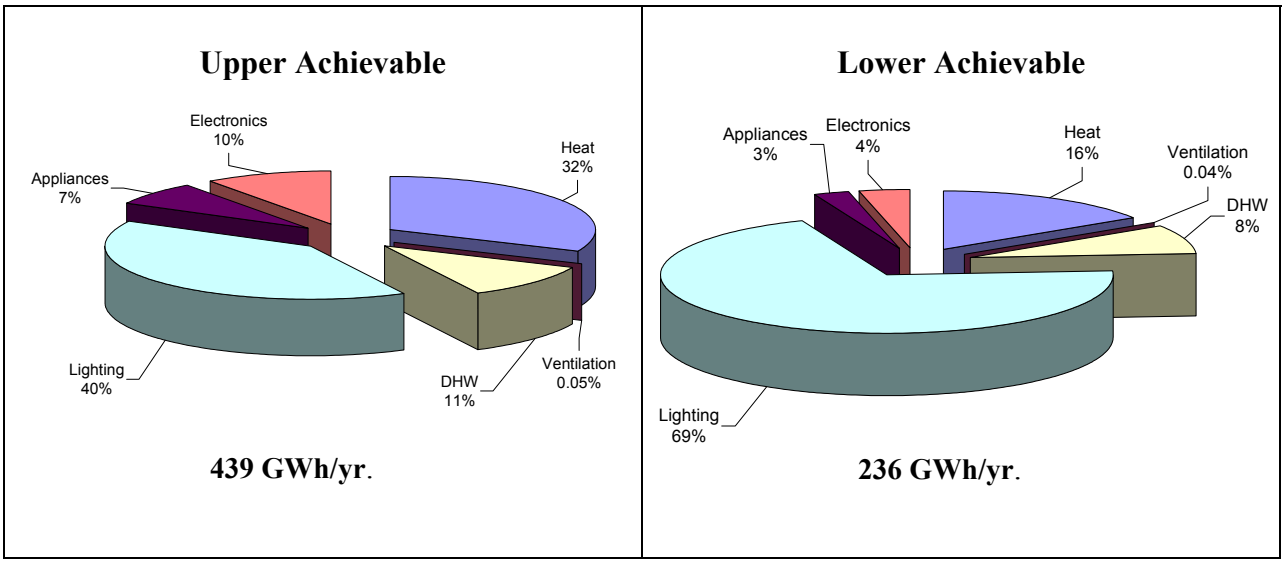
The Achievable Potential is the proportion of the economic electricity savings (as noted above) that could realistically be achieved within the study period. In the Residential sector within the Island and Isolated service region, the Achievable Potential for electricity savings was estimated to be 439 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.

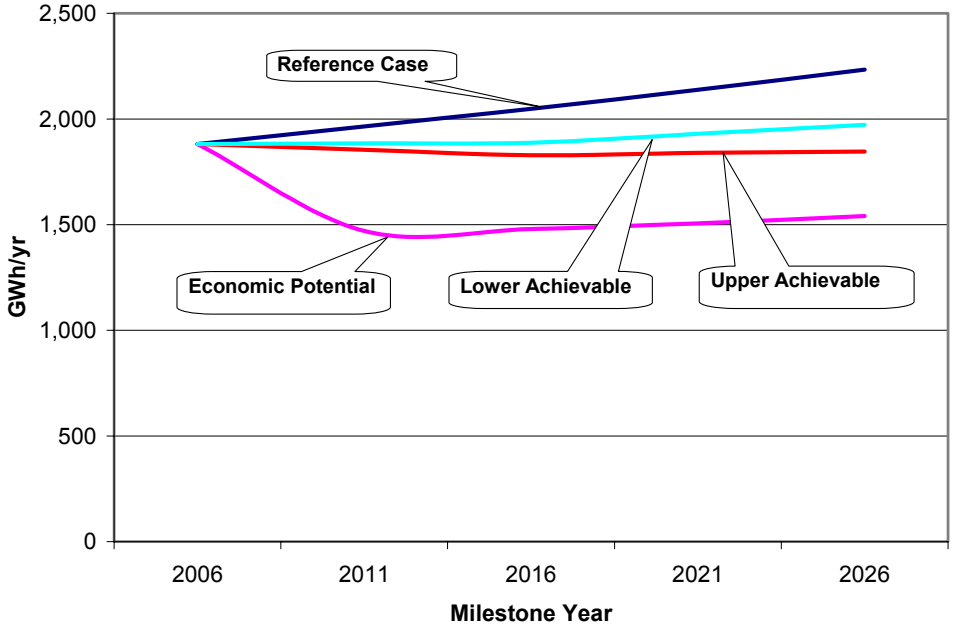
Exhibit 4.1: Summary of Forecast Results for the Island and Isolated Service Region – Annual Electricity Consumption, Commercial Sector (GWh/yr.)

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.

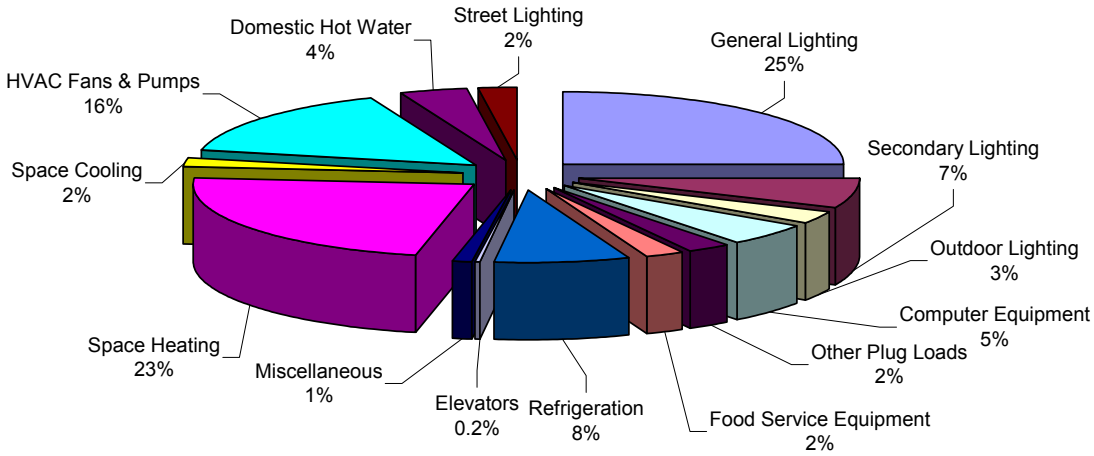
Exhibit 4.2: Graphic of Forecast Results for the Island and Isolated Service Region – Annual Electricity Consumption, Commercial Sector (GWh/yr.)



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

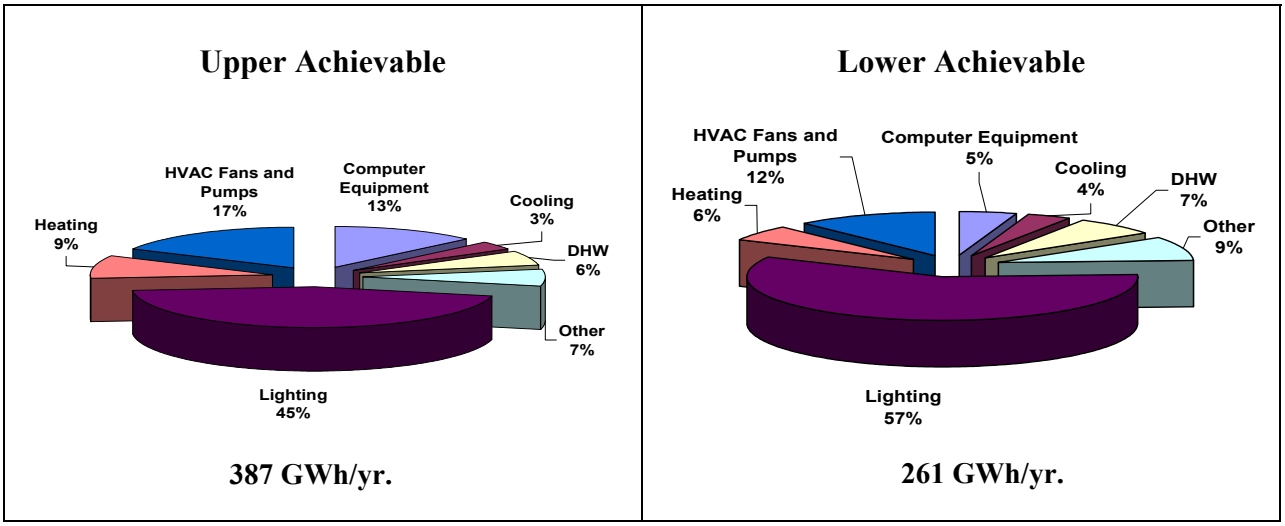
The Achievable Potential is the proportion of the economic electricity savings (as noted above) that could realistically be achieved within the study period. In the Commercial sector within the Island and Isolated service region, the Achievable Potential for electricity savings was estimated to be 387 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.

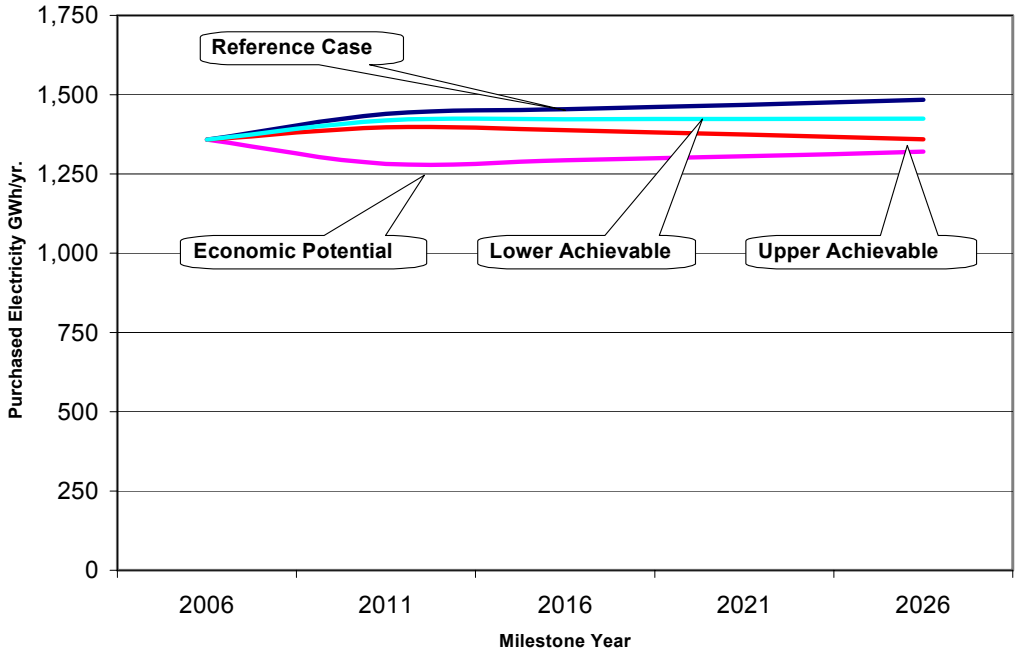
Exhibit 5.1: Summary of Forecast Results for the Island and Isolated and Labrador Interconnected Service Regions – Annual Electricity Consumption, Industrial Sector (GWh/yr.)

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.

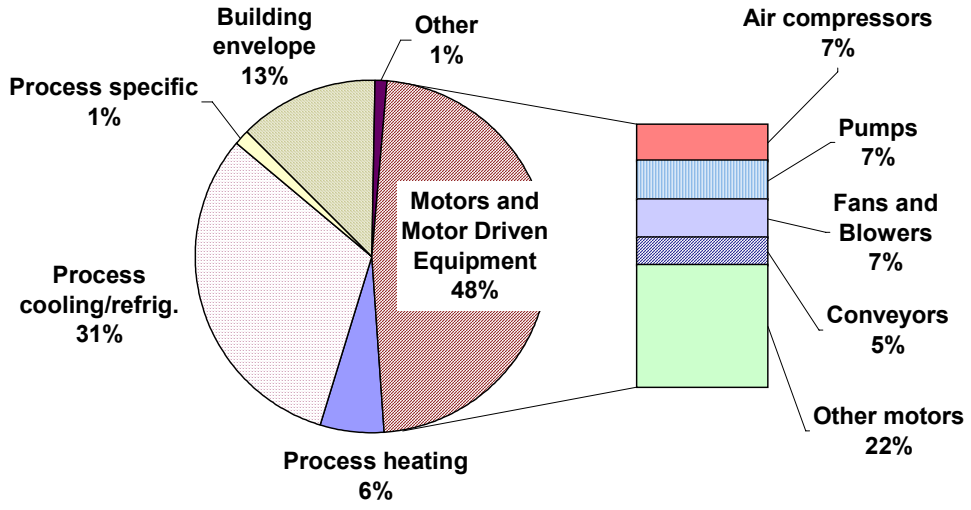
Exhibit 5.2: Reference Case versus Upper and Lower Achievable Potential Electricity Consumption in the Industrial Sector (GWh/yr.)



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

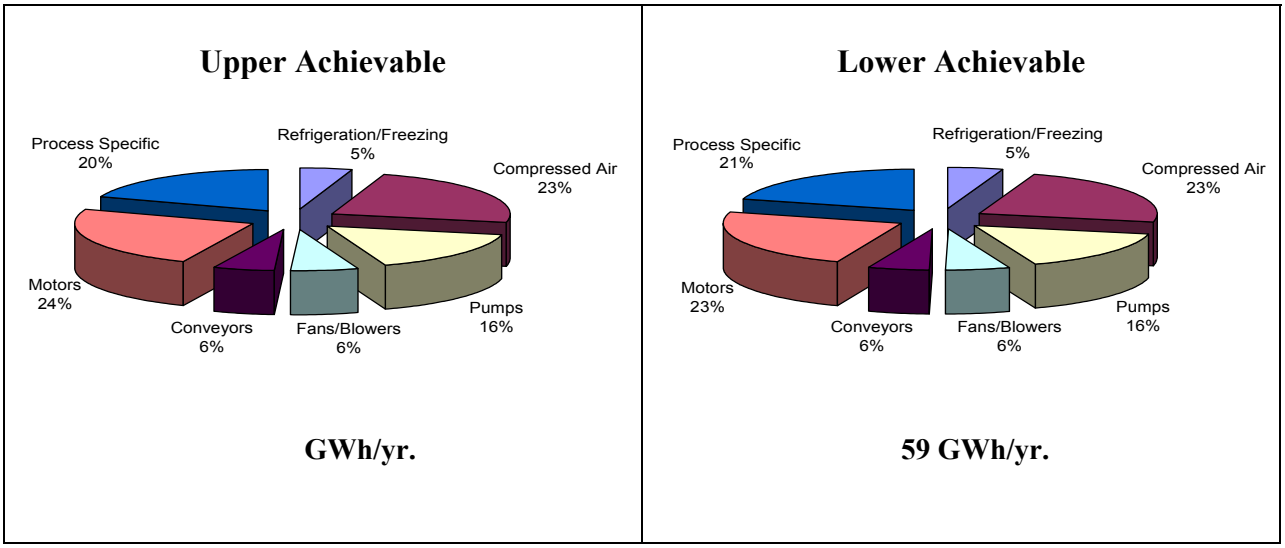
The Achievable Potential is the proportion of the economic electricity savings (as noted above) that could realistically be achieved within the study period. In the Industrial sector within the Island and Isolated and Labrador Interconnected service regions, the Achievable Potential for electricity savings 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.