

Efficiency Nova Scotia Corporation

IN THE MATTER OF *The Public Utilities Act*, R.S.N.S. 1989, c.380,
as amended.

- and -

IN THE MATTER OF An Application to Approve Efficiency Nova
Scotia Corporation's Electricity Demand Side Management (DSM) Plan
for 2012.

**Evidence of ENSC
As DSM Administrator**

February 28, 2011

TABLE OF CONTENTS

1.	INTRODUCTION	1
1.1	ENSC Startup and Transition of DSM Administrator Responsibilities in 2010	1
1.2	Program Development Working Group	2
1.3	Development of the 2012 DSM Plan	3
1.4	2012 DSM Plan Summary	4
2.	2010 DSM PLAN RESULTS.....	8
3.	2011 DSM PLAN	10
4.	2012 DSM IRP TARGETS	11
5.	2012 DSM PLAN SAVINGS AND INVESTMENT.....	13
5.1	Reporting Savings Outside ENSC Programs.....	15
5.1.1	Extra-Large Industrial Projects	15
5.1.2	Adoption of Energy-Efficiency Codes and Standards.....	16
5.1.3	Potential Savings from NSPI Initiatives.....	17
5.2	Changes to DSM Screening.....	17
5.3	Evaluation and Verification	18
5.4	Allocation of DSM Program Costs Among Rate Classes	18
6.	DSM PURPOSES AND PRIORITIES.....	20
6.1	Overall Purpose of DSM Efforts.....	20
6.2	Guiding Principles.....	20
6.3	Building the 2012 DSM Plan.....	21
7.	COMMUNICATING DSM BENEFITS.....	23
8.	DSM PROGRAMS FOR LOW-INCOME HOUSEHOLDS.....	25
9.	ENABLING STRATEGIES.....	27
10.	PERFORMANCE-BASED APPROACH.....	29
11.	MULTI-FUELS MANDATE	30

12.	FUEL SUBSTITUTION	32
13.	SAVINGS FROM THE ADOPTION OF ENERGY-EFFICIENT CODES AND STANDARDS	33
14.	CONCLUSION.....	34

TABLE OF FIGURES

Figure 2.1	2010 DSM Evaluated Savings Results	8
Figure 2.4	2010 DSM Plan Expenditures.....	9
Figure 4.1	DSM Targets 2008-2015 (from 2009 IRP Update).....	11
Figure 4.2	Cumulative Savings Targets and Results 2008-2012.....	12
Figure 4.3	DSM Targets and Results 2008-2009.....	12
Figure 5.1	2012 DSM Plan Savings and Investment	14

APPENDICES

Appendix A	2012 DSM Plan
Appendix B	Preliminary Program Cost Allocation
Appendix C	Dunsky Energy Consulting, Electricity Demand Side Management (DSM) Review
Appendix D	Dunsky Energy Consulting, Residential Fuel Substitution Pilot Program
Appendix E	Clean Nova Scotia, Green Schools Pilot
Appendix F	Nova Scotia Home Builders Association, Eco Home Pilot

1. INTRODUCTION

This Evidence is filed in support of the electricity Demand Side Management (DSM) Plan for 2012 (2012 DSM Plan). The Evidence is filed with the Nova Scotia Utility and Review Board (UARB) by Efficiency Nova Scotia Corporation (ENSC or the Corporation) in its role as the new administrator of electricity DSM programs for Nova Scotia.

This section of the Evidence contains background information on the formation of the new ENSC organization in 2010 and the transition of responsibility for DSM from Nova Scotia Power Incorporated (NSPI). The role of the Program Development Working Group (PDWG) and the process used to develop the 2012 DSM Plan are discussed. In addition, a summary of the notable components of the 2012 DSM Plan is provided.

1.1 ENSC Startup and Transition of DSM Administrator Responsibilities in 2010

On January 22, 2010, the Governor in Council proclaimed the Efficiency Nova Scotia Corporation Act¹ (ENSC Act) that established ENSC as the province's new electricity DSM program administrator. On January 26, 2010, the four initial members of ENSC's Board of Directors were formally appointed. Interim staff joined ENSC beginning in late May and work continued on the startup of the new Corporation into the fall, including recruitment of three additional members to expand the Board of Directors and ensure effective governance of the Corporation.

The ENSC Board of Directors, in consultation with its professional advisors, developed a comprehensive policy framework for the operations of ENSC, including the

¹ *Efficiency Nova Scotia Corporation Act*, S.N.S. 2009, c.3 (the ENSC Act).

establishment of corporate vision and mission statements² and implementation of a robust risk-management structure to guide ENSC through the transition of DSM Administrator responsibilities and development of the 2012 DSM Plan. The 2012 DSM Plan aligns fully with ENSC's vision and mission.

ENSC and NSPI, the interim DSM Administrator, formed a Transition Committee, with representation from the UARB, and developed a Transition Plan focused on providing continuity of business planning, program management and delivery of DSM Administrator responsibilities. The Transition Plan was submitted to the UARB on August 30, 2010 and approved by the UARB on September 22, 2010.³ Responsibility and accountability for the administration of DSM programs transferred from NSPI to ENSC effective October 1, 2010, with transfer of operational activities phased in over the fall of 2010. The transition was completed by December 31, 2010. NSPI and ENSC continue to work closely for effective program delivery, data sharing, customer communication and the coordination of planning and forecasting.

1.2 Program Development Working Group

The Program Development Working Group (PDWG), established during NSPI's tenure as interim DSM Administrator, has advised ENSC during the transition from NSPI to ENSC and during the preparation of the 2012 DSM Plan. The PDWG is a valuable resource and stakeholder forum, providing ENSC and NSPI, as the interim administrator, with expert knowledge and sound, thoughtful advice on important issues. ENSC sees value in having the PDWG continue its role in 2011, receiving periodic progress reports on DSM programs, and advising ENSC on the design of new programs and any mid-course adjustments based on program results or changing circumstances.

² ENSC's vision: "Efficiency Nova Scotia envisions a vibrant economy and a healthy environment and climate for generations to come." ENSC's mission: "The Corporation provides sustainable energy efficiency, conservation and energy solutions to those we serve."

³ P-884(3)-ENSC-TRAN - Demand Side Management Transition Plan (Matter No. M03452).

1 ENSC is committed to broad, transparent and effective stakeholder consultation. As
2 noted by the UARB, in its 2011 DSM Plan Decision,⁴ ENSC is now engaged with
3 members of the PDWG in a review of the role and composition of the PDWG. A broader
4 group of stakeholders will be consulted in 2011 on necessary changes to the PDWG or
5 the creation of a new stakeholder process.
6

7 **1.3 Development of the 2012 DSM Plan**

8

9 To aid in the preparation of the 2012 DSM Plan, ENSC developed guiding principles,
10 which are presented in Section 6.
11

12 ENSC received the advice and assistance of Navigant Consulting Inc. (Navigant) and
13 Dunskey Energy Consulting (Dunskey). ENSC also received input and counsel from
14 stakeholders here in Nova Scotia and from leading DSM practitioners across North
15 America.
16

17 On November 30, 2010, ENSC hosted a full-day session for stakeholders and other
18 interested participants. The meeting included an overview of the Corporation, an update
19 on 2010 DSM programs, a presentation on quantifying free ridership and a presentation
20 and discussion on the findings of a DSM review by Dunskey.
21

22 The Corporation convened a meeting on December 1, 2010 with DSM experts from
23 across Canada and the United States to discuss DSM strategies and programming options.
24 A second stakeholder session was held on January 7, 2011. The meeting featured
25 presentations and discussion on the programs, enabling strategies and key policies under
26 consideration for the 2012 DSM Plan.

4 [2010] NSUARB 153, para. 113: "The Board accepts that the PDWG should retain its current role until the transition to ENS is completed. At that time, ENS can then determine whether the continuation of the PDWG, or another committee, would be appropriate."

Continuing with this collaborative approach, ENSC will meet regularly with trade associations, environmental groups, businesses and community groups, to foster open, productive working relationships with Nova Scotians.

Based on the advice received, ENSC considers the proposed program savings targets and investment to be both challenging and achievable. The Plan is consistent with the Integrated Resource Plan (IRP) savings targets, as updated in 2009.

1.4 2012 DSM Plan Summary

This section highlights key components of the 2012 DSM Plan.

Achieving IRP Targets

The proposed 2012 DSM Plan meets the energy savings targets within the level of investment identified in the 2007 IRP⁵ and the 2009 IRP Update⁶ filed with the UARB. Section 4 discusses the overall targets of the 2012 DSM Plan in the context of past efforts and the IRP Update. Section 5 of this Evidence provides an overview of the 2012 DSM Plan savings and its associated investment.

Reporting

Beginning with this filing, ENSC is proposing to expand the reporting of energy and demand savings by: (1) reporting cumulative savings in addition to incremental, annual savings, and (2) reporting appropriate savings from sources outside customer-funded DSM programs. Section 5.1 provides additional information.

5 NSUARB-NSPI-P-884 - 2007 Integrated Resource Plan (IRP) Report – Volume 1 (July 2007)

6 NSUARB-NSPI-P-884 - 2009 Integrated Resource Plan (IRP) Update Report (November 30, 2009)

New Program Components

The 2012 DSM Plan introduces a number of new program components. These include:

- program components for renters and multi-unit residential buildings
- a Home Energy Report program to encourage residential customers to make energy-saving behavioural changes, such as: lowering thermostat settings, using cold water for clothes washing and switching off lights in unoccupied rooms
- program components and strategies to increase access to DSM programs by low-income households, discussed in Section 8
- innovative financing options for residential programs
- enhanced outreach to commercial, industrial and institutional customers through key accounts management and subsector specialization
- additional fuel choice and fuel substitution components to be built into the residential and commercial DSM programs

Additional information about each of the proposed DSM programs for 2012 is contained in Appendix A.

DSM Screening

Beginning with the filing of the 2012 DSM Plan, ENSC is requesting that the DSM screening test using Total Resource Cost (TRC) be applied at the program level, not at the measure level. This will give ENSC the flexibility to consider additional factors to meet long-term DSM goals. Further information is in Section 5.2.

Communicating the Benefits of DSM

The UARB, in its 2011 DSM Plan Decision, emphasized the importance of effectively communicating the benefits of DSM. Efficiency Nova Scotia's plans to communicate to Nova Scotians through education and outreach are identified in Section 7.

DSM programs for Low-Income Households

Responding to intervenors' concerns voiced in hearings on the 2011 DSM Plan, ENSC will provide more opportunities for low-income households, renters and multi-family dwellings to participate in DSM programs. Information is provided in Section 8.

Enabling Strategies

The 2012 DSM Plan includes investments in a number of enabling strategies. Investment continues in Education and Outreach, and Development and Research, two strategies that have been in place since 2008. Enabling strategies such as Innovative Financing are now being introduced to support ENSC's DSM programs and encourage increased participation. Other strategies, including Codes and Standards, Training and Quality Assurance and Working with Local Governments, are intended to drive the longer-term transformation of markets through the adoption of energy efficiency.

Enabling strategies and their objectives are outlined in Section 9 of this Evidence. Additional information is provided in Appendix A.

Work on a number of enabling strategies is planned for 2011. For example, as part of its Innovative Financing strategy, ENSC has engaged a financing specialist to assess and implement new financing tools adapted to the unique characteristics of DSM opportunities, as a complement to ENSC incentive programs.

Communicating with Municipal Electric Utilities

In its 2011 DSM Plan Decision, the UARB directed that ENSC establish a process to interact with all six municipal electric utilities to improve the information exchange with respect to DSM programs.⁷ A staff member of ENSC has been assigned as a liaison and has begun discussions with the municipal utilities.

⁷ [2010] NSUARB 153, para. 105.

Performance-based Approach

Following up on the recommendations of the 2008 Wheeler Report,⁸ ENSC proposes to engage the UARB and stakeholders to further assess the options for implementing a multi-year performance-based approach to DSM planning in the future. This is discussed in Section 10.

Mandate for Non-electricity DSM Programs

ENSC is discussing with the Nova Scotia Department of Energy a mandate for non-electricity energy-efficiency programs. An integrated, multi-fuel approach, whereby ENSC administers both electricity DSM and energy-efficiency programs related to other fuel types, provides opportunities for efficiencies and savings along with clarity and convenience for customers. ENSC's intention to integrate such a mandate with electricity DSM programs is discussed in Section 11.

8 David Wheeler, *Stakeholder Consultation Process For An Administrative Model For DSM Delivery In Nova Scotia – Final Report*, April 20th, 2008 (Wheeler Report).

2. 2010 DSM PLAN RESULTS

In its August 4, 2009 Decision,⁹ the UARB approved NSPI's 2010 DSM Plan to achieve an energy savings target of 81.13 GWh at an expenditure of up to \$22.56 million.

Figure 2.1 shows the savings results compared to the approved targets. These results have been evaluated by the NMR Group (NMR), as described in the 2010 DSM Evaluation Report filed by ENSC with the UARB as a separate document. The evaluated results are to be reviewed by the UARB's verification consultant.

Figure 2.1 2010 DSM Evaluated Savings Results

Energy		Demand	
Target (GWh)	Result (GWh)	Target (MW)	Result (MW)
81.13	84.97	16.63	16.38

The 2010 DSM savings results and ENSC's startup activities were achieved with an expenditure of \$22.71 million. This is based on financial information from NSPI for the nine months ended September 30, 2010, combined with unaudited financial information from ENSC for the year ended December 31, 2010. Expenditures for 2010 are in Figure 2.4.

⁹ [2009] NSUARB 116; NSUARB-NSPI-P-884(2).

1 **Figure 2.4 2010 DSM Plan Expenditures**

	Expenditures (Unaudited) (\$ million)
Residential	
Efficient Products	3.85
Existing Homes	1.30
Low-Income Households	1.85
New Homes	0.49
Commercial and Industrial	
Efficient Products	2.43
Prescriptive Rebate	1.49
Custom	3.59
Small Business Direct Install	4.31
Education and Outreach	0.40
Development and Research	1.44
ENSC Startup	1.55
Total	22.71

Numbers are rounded.

2 The 2010 expenditures include \$1.55 million in startup costs for ENSC to set up the
3 organization, transition responsibility and operations from NSPI and develop the 2012
4 DSM Plan. The startup budget approved by the UARB in June 2010 was \$2.04 million,
5 for expenditures in 2010 and 2011.

1 **3. 2011 DSM PLAN**

2
3 The UARB approved the 2011 DSM Plan on July 27, 2010.¹⁰ The 2011 DSM programs
4 are underway, and will grow and evolve during the year, providing momentum and
5 insights that will guide detailed program development for 2012.

6
7 In 2011, ENSC is implementing three pilot programs, which were approved by the
8 UARB, in its July 27, 2010 Decision. Information on these pilots is appended to the
9 Evidence as follows:

- 10
11 • Fuel Substitution pilot (Appendix D)
12 • Green Schools pilot (Appendix E)
13 • Eco Home pilot, formerly referred to as Advanced Houses (Appendix F)

10 [2010] NSUARB 153; NSUARB-NSPI-P-884(3).

4. 2012 DSM IRP TARGETS

ENSC's primary objective is to "design and administer electricity demand-side management programs with a view to restraining future electricity demand and use in the Province".¹¹ Electricity DSM Plans in Nova Scotia are designed to meet electricity savings and program cost targets set out in the 2009 IRP Update, presented in Figure 4.1.

Figure 4.1 DSM Targets 2008-2015 (from 2009 IRP Update)¹²

Year	Incremental Demand Savings (MW)	Cumulative Demand Savings (MW)	Incremental Energy Savings (GWh)	Cumulative Energy Savings (GWh)	Incremental Program Cost (\$ millions)	Cumulative Program Cost (\$ millions)
2008 ^a	2	2	16	16	3	3
2009 ^a	7	9	50	66	10	13
2010 ^b	17	26	83	149	23	36
2011 ^b	31	57	146	295	41	77
2012^b	44	101	205	500	61	137
2013 ^b	63	164	305	805	82	219
2014 ^b	57	222	276	1081	74	293
2015 ^b	57	279	276	1357	74	367

Numbers are rounded.

^a (expressed in 2008 dollars)

^b (expressed in 2010 dollars)

Previous DSM Plans have focused on achieving annual incremental savings. With this filing, ENSC is reporting cumulative energy and demand savings in addition to annual incremental savings. This is consistent with the 2009 IRP Update.

¹¹ *Supra* note 1, s. 8(b).

¹² *Supra* note 6, 2009 IRP Update Report, Appendix D, Attachment 4, page 1.

Figure 4.2 compares cumulative savings targets from the 2009 IRP Update with the actual and expected savings results for 2008-2012.

Figure 4.2 Cumulative Savings Targets and Results 2008-2012

Year	IRP Target (GWh)	Result (GWh)	IRP Target (MW)	Result (MW)
2008	16	21 ^a	2	5 ^a
2009	66	86 ^a	9	15 ^a
2010	149	171 ^b	26	31 ^b
2011	295	329 ^c	57	62 ^c
2012	500	543 ^d	101	100 ^d

^a verified results

^b estimate based on evaluated but not verified results

^c estimate based on approved Plan

^d estimate based on proposed Plan and includes savings outside DSM programs

Beginning with this filing, ENSC proposes to report cumulative energy savings by recording the variance between target and verified savings on an annual basis as an over- or under-achievement. In the 2012 DSM Plan, ENSC is recording an over-achievement of 19.5 GWh and 6.1 MW for 2008 and 2009, as identified in Figure 4.3.

Figure 4.3 DSM Targets and Results 2008-2009

	GWh Target	GWh Result	GWh Over-(Under) Achievement	MW Target	MW Result	MW Over-(Under) Achievement
2008	16.1	21.4	5.4	2.1	4.7	2.6
2009	50.3	64.4	14.1	6.8	10.3	3.5
Total	66.3	85.8	19.5	8.9	14.9	6.1

Numbers are rounded. Results have been evaluated and verified.

5. 2012 DSM PLAN SAVINGS AND INVESTMENT

The savings and associated investment to meet the 2012 annual and cumulative IRP targets are presented in Figure 5.1. For 2012, ENSC forecasts annual energy and demand savings of 233.6 GWh and 44.0 MW, respectively. On a cumulative basis, forecast energy savings are 543 GWh, compared to the IRP target of 500 GWh. The cumulative forecast demand savings are 100 MW, compared to the IRP target of 101 MW.

The proposed investment for 2012 is \$43.7 million. With the inclusion of electricity savings by others, ENSC has been able to exceed the IRP savings targets for 2012 while keeping the investment for electricity savings close to the 2011 level and below the IRP target program cost of \$61 million.

The details of the programs proposed for 2012 implementation will be further developed and refined in 2011 and 2012 by ENSC. It is anticipated that continued work with stakeholders will allow ENSC the flexibility to make appropriate mid-course adjustments to the programming mix to achieve the total energy and demand savings targets.

1 **Figure 5.1 2012 DSM Plan Savings and Investment**

	2012 Investment (\$ million)	Lifetime Benefits (\$ million) ^a	Incremental Annual Net Energy Savings at Generator (GWh)	Incremental Annual Net Demand Savings at Generator (MW)	Total Resource Cost Test (TRC) ^b	Program Administrator Cost Test (PAC) ^c
OVERACHIEVEMENTS FROM 2008-2009 DSM PLANS						
Overachievements from 2008-09 DSM	-	-	19.5	6.1	-	-
ENABLING STRATEGIES						
Education and Outreach	2.0	-	-	-	-	-
Development and Research	1.5	-	-	-	-	-
Other Enabling Strategies	1.5	-	-	-	-	-
RESIDENTIAL DSM PROGRAMS						
Efficient Products ^d	4.0	13.3	17.4	2.6	1.9	3.3
Existing Houses ^d	9.7	24.3	14.1	4.2	1.9	2.5
New Houses	4.3	10.0	5.6	1.5	1.5	2.3
Home Energy Report ^d	0.9	1.3	13.0	3.0	1.5	1.5
COMMERCIAL AND INDUSTRIAL DSM PROGRAMS						
Prescriptive Rebate	4.5	22.5	21.5	4.2	2.7	5.0
Custom	9.2	47.6	37.9	5.4	2.1	5.1
Small Business Direct Install	6.0	16.7	14.7	2.3	2.1	2.8
SAVINGS OUTSIDE ENSC DSM PROGRAMS						
Extra-Large Industrial Projects			80.0	12.0		
Adoption of codes and standards ^e	-	-	10.0	2.7	-	-
Total	43.7	135.7	233.6	44.0	1.9	3.1

Currency is expressed in 2012 dollars. Numbers may not sum exactly due to rounding.

^a Lifetime benefits are expressed as the net present value of the avoided costs, including energy and capacity, over the life of the program measures.

^b TRC is a benefit/cost ratio comparing lifetime benefits to the sum of ENSC's and participants' costs.

^c PAC is a benefit/cost ratio comparing lifetime benefits to ENSC's costs.

^d This includes participation by low-income households.

^e Historical savings resulting from the introduction of a residential new construction code in 2010 and a proposed federal standard for general-service lamps starting in 2012

5.1 Reporting Savings Outside ENSC Programs

Previous DSM plans relied exclusively on customer-funded, incentive-based DSM programs to meet IRP targets. The 2009 IRP Update is based on the assumption that energy savings from sources in addition to DSM programs would contribute to targets.¹³ Consistent with the IRP Update, ENSC is recording incremental energy and demand from two sources outside of customer-funded DSM programs:

- savings from energy-efficiency projects implemented by the Extra-Large Industrial (ELI) class of electricity customers
- savings from the adoption of energy-efficiency codes and standards

5.1.1 Extra-Large Industrial Projects

ELI customers completed efficiency projects in 2009 and 2010. The resulting energy and demand savings contribute to the IRP targets and are reported in this filing because they are incremental to customer-funded DSM and were not included in the 2009 IRP Update.

The cumulative ELI energy and demand savings are estimated to be 80 GWh and 12 MW. These estimates are based on a preliminary investigation completed on behalf of ENSC by third-party specialists and, as such, are necessarily conservative. These projects will undergo evaluation in 2011. Variances between estimates and final verified results will be reported in the filing of the 2013 DSM Plan.

13 *Supra*, note 6, 2009 IRP Update Report, Appendix D, Attachment 1, page 50, states that:

“All DSM is assumed to be included in the projection used in the 2009 IRP. This encompasses conservation efforts and investments occurring both inside and outside of customer funded DSM programs, including:

- Consumer behaviour and investments,
- Energy efficiency codes and standards,
- Other agencies,
- NSPI, and
- DSM Administrator”

5.1.2 Adoption of Energy-Efficiency Codes and Standards

The adoption of energy-efficiency codes and standards is essential to meet overall targeted energy savings in the long term. Incentive-based DSM programs can be effective for building awareness and capacity, transforming the market and encouraging Nova Scotians to achieve immediate reductions in electricity use. Codes and standards are most effective for ensuring the market transformation is maintained and for capturing late-adopters. It is for this reason that ENSC's approach in the 2012 DSM Plan is to supplement the ongoing delivery of targeted, incentive-based programs for electricity savings, with a strategy to encourage and support governments in implementing energy-efficiency codes and standards, to sustain savings.

Preparing the market for a future code or standard can be a strong objective for a new program. An approach to DSM that includes savings from the implementation of efficiency codes and standards allows ENSC to support market transformation strategies that have long-term DSM benefits. Ultimately, to meet IRP targets without accounting for savings from codes and standards would place increasing reliance on electricity savings from programs, with diminishing cost-effectiveness. It is the government's role to enact codes and standards; ENSC has an important role assisting in their development and compliance.

In this filing, ENSC has reported energy savings attributed to the adoption of codes and standards from two sources: a new residential energy code and a new federal standard for general-service lamps to be phased in over the course of 2012. Additional information is provided in Section 13. Both of these changes are incremental to the electrical load forecast in the 2009 IRP Update.

Emerging industry practises in addition to formal codes and standards can also contribute to energy savings. These include Leadership in Energy and Environmental Design

(LEED) and Building Owners and Management Association (BOMA) certifications. ENSC will support such initiatives for their contribution to reducing Nova Scotia's electricity use.

Assessing the energy savings contribution of activities such as codes and standards that are intended to transform the market requires a different approach than is used for DSM programs. ENSC plans to develop this approach in consultation with stakeholders throughout 2011 and 2012.

5.1.3 Potential Savings from NSPI Initiatives

ENSC has not included Nova Scotia Power initiatives in the 2012 DSM Plan savings projections. However, ENSC recognizes the significant savings contributions that could be realized from NSPI initiatives such as conversion of street lights to Light-Emitting Diode (LED), Voltage control, smart metering and rate design. ENSC will discuss opportunities for energy savings with NSPI for potential inclusion in 2013 and future DSM Plans.

5.2 Changes to DSM Screening

ENSC is proposing that the TRC test for the 2012 DSM Plan be applied at the program level, not at the measure level as was previously required. ENSC is seeking the flexibility to consider factors in addition to TRC, when selecting measures. In some cases, a measure that fails the TRC test may provide strategic or long-term benefits, such as stimulating demand for newer technologies to achieve economies of scale.

The TRC test compares the net present value of lifetime benefits (avoided cost of energy and avoided cost of capacity) to the net present value of the total costs (the sum of ENSC's investment and the participants' cost). Each program in 2012 has a TRC value greater than 1.0, indicating that the lifetime benefits exceed the total cost.

1 The Program Administrator Cost (PAC) test is an additional benefit-cost indicator used
2 by ENSC to screen DSM programs for 2012. PAC is a ratio that compares the net
3 present value of the benefits (avoided cost of energy and avoided cost of capacity) to the
4 net present value of ENSC's investment (excluding participants' costs). Each of the 2012
5 programs has a PAC value exceeding 1.0. The PAC for the programs in aggregate is 3.1,
6 indicating that the lifetime benefits to Nova Scotians are three times ENSC's cost to
7 deliver the programs.
8

9 **5.3 Evaluation and Verification**

10
11 It is anticipated that the Evaluation and Verification process for the 2011 DSM programs
12 will continue as developed for the 2008-2009 and 2010 DSM programs. DSM program
13 Evaluation (Process and Impact) will be undertaken by an independent firm under
14 contract with ENSC. At the discretion of the UARB, DSM Annual Savings Verification
15 may continue to be undertaken by an independent firm under contract with the UARB.
16

17 On May 19, 2010, a one-day session was organized to discuss the effects of free ridership
18 and participant spillover with respect to DSM energy savings in Nova Scotia. The
19 session was attended by NSPI, Navigant, consultants for the UARB and PDWG, the
20 evaluation consultant and experts from other jurisdictions. The outcome was an approach
21 for evaluating free ridership and spillover. This approach was communicated to
22 stakeholders through the PDWG, and at a stakeholder technical conference held on
23 November 30, 2010. It provided direction to the independent evaluation firm for
24 evaluating DSM results starting in 2010. ENSC intends to refine the evaluation of free
25 ridership and spillover as programs evolve.
26

27 **5.4 Allocation of DSM Program Costs Among Rate Classes**

28
29 Appendix B contains a preliminary estimate of the proposed 2012 DSM program costs to

1 be allocated among rate classes. The preliminary allocation uses the methodology
 2 approved by the UARB, in its 2010 DSM Plan Decision.¹⁴

14 *Supra*, note 9, para. 66.

6. DSM PURPOSES AND PRIORITIES

In its 2011 DSM Plan Decision, the UARB recommended that ENSC conduct a “critical evaluation of expenditures to ensure money is spent on the most effective promotions and projects.”¹⁵ This recommendation was in response to a request from the Consumer Advocate to provide an explicit statement of DSM purposes and priorities for determining program designs, budgets, targets and cost allocations. This section outlines the overall purpose of ENSC’s DSM efforts, the guiding principles for potential program designs and the process used by ENSC to build the 2012 DSM Plan.

6.1 Overall Purpose of DSM Efforts

The overall purpose of electricity DSM programs in Nova Scotia is to help meet the province’s long-term electricity needs through conservation and energy efficiency as a lower cost alternative to supply. More specifically, DSM spending is aimed at meeting the overall DSM savings set out in the IRP. The IRP has shown that DSM is the lowest-cost option available to meet the province’s future electricity needs while respecting provincial emissions targets and renewable energy requirements.

6.2 Guiding Principles

In preparing the 2012 DSM Plan, ENSC observed the following guiding principles:

- **Meet IRP Targets:** ENSC’s primary goal is to meet IRP targets as a whole, both in the short term (measured by incremental annual energy and demand savings) and long term (measured by cumulative savings).

¹⁵ *Supra*, note 10, para. 123.

- **Low-cost Programs:** Program costs will be minimized, where doing so does not hinder meeting overall IRP targets in both the short and long term.
- **Accessibility:** ENSC will strive to provide access to efficiency programs for all electricity consumers.
- **Long-term success:** In planning DSM initiatives, it is important to achieve specific savings targets and to build capacity for the long-term success of DSM efforts, including market transformation.

6.3 Building the 2012 DSM Plan

In developing the 2012 DSM Plan, program design choices were made with all four guiding principles in mind. ENSC's approach involved:

- **Reviewing DSM in Nova Scotia to date:** As part of its transition process, ENSC engaged Dunskey to review the existing suite of DSM programs and identify additional savings opportunities. Input from stakeholders was also considered. Dunskey identified opportunities, including residential home energy reporting and enabling strategies. Dunskey's report is in Appendix C.
- **Providing accessibility:** ENSC stresses accessibility in its DSM programs. The residential low-income component was enhanced to increase awareness and participation; and, a study carried out by the Affordable Energy Coalition informed a strategy to facilitate participation by low-income renters. The 2012 DSM Plan also includes strategies to make programs more accessible to people living in rented homes and in multi-unit residential buildings.
- **Consulting stakeholders:** ENSC held two formal stakeholder consultation sessions in the development of the 2012 DSM Plan. ENSC has further consulted

1 with customers and stakeholder groups who, in the past, have not been regular
2 participants in DSM proceedings.

- 3
- 4 • **Engaging experts from other jurisdictions:** ENSC held a roundtable session
5 with North American electricity DSM experts for advice on leading-edge
6 programs that could be implemented in Nova Scotia. This roundtable included
7 representatives from Vermont, Oregon, California, Massachusetts, British
8 Columbia and Ontario.

7. COMMUNICATING DSM BENEFITS

The UARB Decision on the 2011 DSM Plan highlighted the importance of communicating benefits of DSM to the general public.¹⁶ Nova Scotians are investing significantly in DSM programs now and in the years ahead. It is essential for them to clearly see that their investment is being used wisely, providing cost-effective results with financial and environmental benefits. ENSC is focused on providing programs that are widely accessible and effective in helping people manage their electricity consumption. DSM is a proven way to increase energy efficiency, while being the most affordable, most environmentally friendly source of energy. It is an important tool for balancing long-term energy supply and demand on the province's power grid. By becoming more energy efficient, Nova Scotians can prevent or delay the building of new, costly power generation in the province. Energy efficiency is also an integral part of the province's efforts to meet greenhouse gas reduction targets.

Energy efficiency provides an essential and substantial contribution to the objective outlined in Nova Scotia's Environmental Goals and Sustainable Prosperity Act (EGSPA) of fully integrating environmental sustainability and economic prosperity. EGSPA includes commitments to reduce air contaminants and greenhouse gas emissions from electricity generation and to increase energy efficiency. ENSC's 2012 and future DSM Plans have an important role in meeting these commitments and objectives, and in securing Nova Scotia's energy future.

Efficiency Nova Scotia is focused on building capacity to enable Nova Scotia to become a leader in energy-efficiency services, innovation and know-how. Energy-efficiency and conservation projects provide extensive business opportunities and economic benefits throughout the province. Nova Scotia is well positioned to build a strong, new economic

¹⁶ *Supra*, note 10, para. 17 and 122.

1 sector of sustainability and energy efficiency, with growth in the design and management
2 of DSM and in an expert workforce.

3
4 DSM in Nova Scotia is fulfilling its promise. Although the benefits are clear to people
5 involved in DSM matters, those benefits are not widely understood by the general public.
6 Efficiency Nova Scotia acknowledges this and is dedicated to communicating effectively
7 with Nova Scotians. The benefits of DSM are many, as are the channels to reach Nova
8 Scotians with energy efficiency and conservation information.

9
10 Efficiency Nova Scotia will reach out to customers through a wide variety of channels,
11 from traditional advertising to social media, from appearances at trade shows, meetings
12 and conferences to media opportunities, from building a customer-friendly website to
13 getting the message out in schools. Community-based activities, social marketing and
14 social media will also be explored as means to further change behaviour, the long-term
15 objective that will lead to program success.

16
17 ENSC recognizes that, while changing behaviour takes considerable time and effort,
18 Nova Scotians have successfully changed their behaviour and become international
19 leaders in areas such as solid waste management. ENSC is, in fact, in the business of
20 waste reduction of a different sort – reducing energy waste, rather than solid waste. With
21 that in mind, ENSC intends to leverage the lessons learned from past solid waste
22 successes led by the Resource Recovery Fund Board (RRFB), as well as new initiatives.
23 The Corporation will seek opportunities to partner with the RRFB and other groups and
24 organizations with similar goals of sustainability, energy efficiency and conservation.

25
26 Regardless of the communication method, all channels will be closely monitored and
27 adjusted based on research, feedback, and customer insights. What is learned in 2011
28 will help to inform 2012 activities. Although the focus of Education and Outreach is to
29 increase program participation, it also serves as a vehicle for communicating the broader
30 value of DSM.

8. DSM PROGRAMS FOR LOW-INCOME HOUSEHOLDS

During the regulatory hearing of the 2011 DSM Plan, several concerns were raised by intervenors, including the Consumer Advocate, the Affordable Energy Coalition (AEC) and the Ecology Action Centre regarding DSM programs for low-income households. The key concerns were:

- performance of the 2008-2009 Low-Income Households program
- the need for programs designed for low-income renters and renters in general
- the financial ability of households with incomes just above the Low- Income Cut-Off (LICO) eligibility criteria to participate in DSM programs

ENSC and NSPI took a number of actions in 2010 to address these concerns. These included increased outreach efforts within the Low-Income Households program, and the support of a study initiated by the AEC on options for improving access to DSM programs by low-income individuals and families, including renters. ENSC will work with the AEC to continue to enhance DSM programs.

The 2012 DSM Plan is designed so that low-income renters have improved access to DSM programs, notably through the Existing Houses program. The program's low-income component is to be expanded to encompass rental units, including small, multi-unit, residential buildings.

ENSC will continue outreach and awareness efforts, working closely with community organizations, such as local volunteer groups, churches, women's centres, food banks, and local Community Services offices. The Corporation will pursue ways to simplify the qualification process and increase participation in DSM programs by leveraging existing income assistance and related programs.

1 The Efficient Products program for 2011 includes measures for appliance replacement
2 and lighting upgrades that specifically target low-income rental units. These measures
3 will continue in 2012.

4
5 In the 2012 DSM Plan, spending on low-income households, including rental households,
6 is forecast to be \$4.3 million. This includes installation of energy-efficient measures at
7 no cost through the low-income households component of the Existing Houses program.
8 It also includes the installation of energy efficient products, such as Compact Fluorescent
9 Lamps (CFLs), power bars with timers, LED night lights, hot water tank and pipe wrap,
10 low-flow faucet aerators and showerheads, through the Efficient Products program
11 component for low-income renters. A pilot of the low-income rental component of the
12 Efficient Products program is planned for 2011.

9. ENABLING STRATEGIES

The 2012 DSM Plan includes investments in eight Enabling Strategies. These strategies serve two purposes: (1) to support ENSC's DSM programs by encouraging increased participation, and (2) to promote the longer-term transformation of markets through the increased adoption of energy-efficiency practices. Work on several enabling strategies is planned in 2011 to support a timely rollout of initiatives. The strategies below are discussed further in Appendix A.

Education and Outreach: The Plan includes continued investment to communicate the benefits of DSM to increase awareness of, and participation in, DSM programs.

Development and Research: ENSC continues to gather information about markets and new energy-saving opportunities, and to test new approaches to influencing market behaviour.

Innovative Financing: ENSC has engaged a financing specialist to assess and implement new financing tools adapted to the unique characteristics of DSM opportunities, as a complement to ENSC incentive programs.

Codes and Standards: ENSC will support the development and adoption of increasingly advanced building energy codes and product standards for Nova Scotia.

Building Energy Labelling: ENSC will support governments in developing relevant policies to inform the marketplace – including owners, building managers, buyers, renters and lessees – about building energy performance.

Training and Quality Assurance: ENSC's objective is to improve training and quality assurance by working in partnership with third parties so that Nova Scotians can call

1 upon a growing and qualified local DSM workforce.

2
3 **Renewable Heating:** ENSC will work with governments to support the development of
4 a renewable heating strategy, tapping into the province's substantial renewable heating
5 opportunities.

6
7 **Working with Local Governments:** ENSC will work with municipal governments and
8 staff to facilitate participation in relevant DSM programs, and pursue opportunities to
9 partner with municipal governments on unique program offerings. ENSC may also offer
10 technical support and resources as municipalities draft regulations.

10. PERFORMANCE-BASED APPROACH

The creation of ENSC flows from the recommendations of a stakeholder consultation process facilitated by Dr. David Wheeler.¹⁷ The final report resulting from this process envisioned a performance-driven oversight mechanism, whereby ENSC would be responsible for delivering a specified amount of energy and demand savings for a specified investment within a defined performance period. Such a mechanism would eventually use a multi-year framework to increase flexibility and, conceivably, reduce the administrative burden of annual regulatory filings. This multi-year framework is similar to approaches used successfully in other jurisdictions, such as Vermont.

Under such a multi-year, performance-based model, the UARB's oversight role would evolve while continuing to protect the interests of stakeholders and ratepayers through evaluation and verification. Whereas the current regulatory framework focuses on pre-approval of a one-year DSM Plan and strict application of benefit-cost screening mechanisms such as the TRC test at the individual measure level, a performance-based model would focus on the approval of overall investments, savings targets and other relevant indicators, followed by review and validation of performance.

In this filing, ENSC is seeking approval to engage the UARB and stakeholders in 2011 to further assess the options for implementing such a model in the future.

¹⁷ The Wheeler Report, *supra* note 8.

11. MULTI-FUELS MANDATE

The recommendations of the 2008 Wheeler Report, while focusing on the creation of an independent administrator for electric DSM, suggested that consideration be given, “for reasons of longer term cost-effectiveness and synergy” that ENSC become a “one-stop shop for administration of multi-fuel efficiency measures.”¹⁸

The ENSC Act echoes this thinking and sets out two objectives for ENSC:

- (a) design and administer electricity demand-side management programs with a view to restraining future electricity demand and use in the Province; and,
- (b) engage in energy efficiency and conservation programs other than electricity demand-side management programs.¹⁹

As concluded in the Wheeler Report, there are many benefits of having a single administrator for both electricity DSM and energy-efficiency programs related to the use of other fuels. Many Nova Scotians use both electricity and other energy sources. By identifying opportunities for savings within a single building or organization, a multi-fuels program can save money and time. Customers, contractors and vendors prefer a single point of contact, rather than applying to many separate programs targeting similar technologies or end-uses with poorly aligned incentives. Program administration costs can also be streamlined by merging similar programs.

ENSC is discussing a mandate for DSM programs for other fuel types with the Nova Scotia Department of Energy. At the time of filing, the timeline, form and oversight mechanism for this mandate had not been finalized. ENSC recognizes the importance of

¹⁸ The Wheeler Report, *supra* note 8.

¹⁹ *Supra*, note 1, s. 20.

1 harmonizing DSM programs for electricity and other fuels as much as possible to
2 minimize duplication and administrative costs, and expects this to be reflected in an
3 eventual mandate. In 2011 and 2012, the oversight of energy efficiency and conservation
4 for other fuels is expected to be through the terms and conditions of ENSC's contract
5 with the provincial government.

6
7 With the expectation that ENSC will obtain a multi-fuels mandate in time for integration
8 with 2012 electricity DSM programs, program designs will be adjusted to streamline
9 processes, reduce costs and increase savings. ENSC will pay particular attention to avoid
10 cross-subsidization of programs between electricity customers and taxpayers.

12. FUEL SUBSTITUTION

Fuel substitution programs encourage participants to replace systems using electricity for space or water heating, for instance, with non-electric systems. In the case of new construction, fuel choice involves encouraging the use of non-electric systems.

As directed by the UARB, in its 2011 DSM Plan Decision,²⁰ a fuel substitution pilot is to be implemented in 2011 to encourage existing residential homes to use gas, cordwood or wood pellets for space heating and domestic hot water. The 2011 fuel substitution pilot is described in Appendix D.

Lessons learned from the pilot will be used to define fuel substitution measures in the Existing Houses program proposed for 2012. Fuel choice and fuel substitution measures are included in the residential New Houses program and the Commercial & Industrial Custom program for 2012, respectively. More broadly, ENSC intends to engage provincial partners in a renewable heating strategy for the province, which will include fuel substitution from electricity. ENSC's initiatives on fuel substitution will be accompanied by an equally strong emphasis on the importance of sustainability in biomass harvesting and use.

²⁰ *Supra*, note 10, para. 128.

13. SAVINGS FROM THE ADOPTION OF ENERGY-EFFICIENT CODES AND STANDARDS

In this filing, ENSC has reported energy savings attributed to the adoption of codes and standards from two sources: a new residential energy code and a new federal standard for general-service lamps to be phased in over the course of 2012.

Residential New Construction Code

New requirements for residential energy efficiency have been in effect in the province since January 1, 2010, raising the performance requirements of new houses to an EnerGuide rating of 80, which is a three-point increase over prior building practices.

Federal Standard for General-Service Lamps

Regulations defining a new lumens-per-Watt standard are expected to phase out a large number of inefficient incandescent light bulbs starting January 1, 2012, moving the market to more efficient bulbs, while reducing the cost of CFLs.

Other codes and standards under development have the potential to generate savings in the future. ENSC will monitor these for potential inclusion in future plans. They include:

- Commercial lighting regulations in Nova Scotia under development to remove T-12 lighting products from the marketplace, expected to come into effect in 2012-2013.
- For non-residential new construction, an update to the federal Model National Energy Code for Buildings (MNECB) in the fall of 2011, and subsequently, the likely adoption by Nova Scotia of new energy requirements in 2012.

14. CONCLUSION

As the Evidence and Appendix A illustrate, the 2012 DSM Plan continues to build on Nova Scotians' achievements in energy efficiency while setting a path for long-term success. The 2012 DSM Plan addresses the directives and recommendations of the UARB, in its 2011 DSM Plan Decision. The 2012 DSM Plan also incorporates or responds to a wide range of suggestions from stakeholders and DSM experts. In total, the 2012 DSM Plan combines innovation with proven approaches, experience gained from within Nova Scotia and from across North America, and it strives for ambitious energy efficiency and conservation goals while remaining financially responsible.

With this Application, ENSC is seeking approval:

- of the 2012 DSM Plan
- to apply TRC screening tests at the program level
- to engage the UARB and stakeholders in 2011 to further assess options for implementing a performance-based model in the future

Appendix A

2012 DSM Plan

TABLE OF CONTENTS

1.	INTRODUCTION	3
1.1	2012 DSM Budget and Savings	3
1.2	DSM Programs.....	5
2.	RESIDENTIAL PROGRAMS	6
2.1	Efficient Products.....	6
2.2	Existing Houses.....	8
2.3	New Houses	12
2.4	Home Energy Report.....	14
3.	COMMERCIAL & INDUSTRIAL PROGRAMS	17
3.1	Prescriptive Rebate.....	18
3.2	Custom.....	22
3.3	Small Business Direct Install	27
4.	ENABLING STRATEGIES.....	30
4.1	Education and Outreach.....	31
4.2	Development and Research	32
4.3	Innovative Financing	33
4.4	Codes and Standards.....	34
4.5	Building Energy Labelling.....	35
4.6	Training and Quality Assurance.....	36
4.7	Renewable Heating Strategy.....	37
4.8	Working with Local Governments.....	38

TABLE OF FIGURES

Figure 1.1	2012 DSM Plan Savings and Investment	4

ATTACHMENTS

Attachment 1	Sample Home Energy Reports	39

1. INTRODUCTION

1.1 2012 DSM Budget and Savings

Efficiency Nova Scotia Corporation (ENSC) consulted stakeholders and worked with Navigant Consulting Inc. and Dunskey Energy Consulting in designing the 2012 DSM Plan. The proposed plan is a comprehensive portfolio of residential, commercial, industrial and institutional Demand Side Management (DSM) programs that will deliver electrical energy and demand savings in line with energy and demand savings targets in the 2009 Integrated Resource Plan (IRP) Update prepared by Nova Scotia Power Inc. (NSPI). While the Plan includes information on the approach and efficiency measures, all plans must incorporate a degree of flexibility. As ENSC moves ahead with implementation 11 to 23 months from now, the Plan may be revised to reflect lessons learned, new information or changing market conditions.

In 2012, ENSC will invest \$43.7 million (in 2012 dollars), targeting 233.6 GWh and 44.0 MW of incremental installed annual net savings at the generator in 2012. This investment aligns with DSM targets identified in the 2009 IRP Update.

Figure 1-1 presents program budgets, the incremental annual GWh energy and the MW demand net savings at generator. It also reflects the Total Resource Cost (TRC) test and Program Administrator Cost (PAC) test and shows total resource benefits overachievements from the 2008-2009 DSM programs, budgets for enabling strategies and savings contributed from outside DSM programs.

1 **Figure 1.1 2012 DSM Plan Savings and Investment**

	2012 Investment (\$ million)	Lifetime Benefits (\$ million) ^a	Incremental Annual Net Energy Savings at Generator (GWh)	Incremental Annual Net Demand Savings at Generator (MW)	Total Resource Cost Test (TRC) ^b	Program Administrator Cost Test (PAC) ^c
OVERACHIEVEMENTS FROM 2008-2009 DSM PLANS						
Overachievements from 2008-09 DSM programs	-	-	19.5	6.1	-	-
ENABLING STRATEGIES						
Education and Outreach	2.0	-	-	-	-	-
Development and Research	1.5	-	-	-	-	-
Other Enabling Strategies	1.5	-	-	-	-	-
RESIDENTIAL DSM PROGRAMS						
Efficient Products ^d	4.0	13.3	17.4	2.6	1.9	3.3
Existing Houses ^d	9.7	24.3	14.1	4.2	1.9	2.5
New Houses	4.3	10.0	5.6	1.5	1.5	2.3
Home Energy Report ^d	0.9	1.3	13.0	3.0	1.5	1.5
COMMERCIAL AND INDUSTRIAL DSM PROGRAMS						
Prescriptive Rebate	4.5	22.5	21.5	4.2	2.7	5.0
Custom	9.2	47.6	37.9	5.4	2.1	5.1
Small Business Direct Install	6.0	16.7	14.7	2.3	2.1	2.8
SAVINGS OUTSIDE ENSC DSM PROGRAMS						
Extra-Large Industrial Projects			80.0	12.0		
Adoption of codes and standards ^e	-	-	10.0	2.7	-	-
Total	43.7	135.7	233.6	44.0	1.9	3.1

Currency is expressed in 2012 dollars. Numbers may not sum exactly due to rounding.

^a Lifetime benefits are expressed as the net present value of the avoided costs, including energy and capacity, over the life of the program measures.

^b TRC is a benefit/cost ratio comparing lifetime benefits to the sum of ENSC's and participants' costs.

^c PAC is a benefit/cost ratio comparing lifetime benefits to ENSC's costs.

^d Includes participation by low-income households.

^e Historical savings resulting from the introduction of a residential new construction code in 2010 and a proposed federal standard for general-service lamps starting in 2012

1.2 DSM Programs

Programs for the proposed 2012 DSM Plan are separated into three categories:

- Residential Programs, which include four components: Efficient Products, Existing Houses, New Houses and Home Energy Report
- Commercial and Industrial (C&I) Programs, which encompass three components: Prescriptive Rebate, Custom and Small Business Direct Install
- Enabling Strategies, which cover eight areas: Education and Outreach, Development and Research, Fuel Substitution, Innovative Financing, Building Energy Labelling, Codes and Standards, Training and Quality Assurance, Renewable Heating Industry and Working with Local Governments

Program descriptions are given in the following pages.

2. RESIDENTIAL PROGRAMS

This section reviews the four residential DSM programs:

- Efficient Products
- Existing Houses (includes the former Low-Income Households program and fuel substitution measures)
- New Houses
- Home Energy Report

2.1 Efficient Products

Overview

The Efficient Products program is designed to help Nova Scotians achieve long-term electrical energy savings by increasing the sale and installation of energy-efficient lighting, appliances, consumer electronics and other mass-market products and by encouraging them to turn in or replace inefficient extra appliances that are still in use.

The Efficient Products program was launched in 2008. Participants include residential and small commercial, industrial and institutional customers. Low-income homeowners and renters are also included in the target market.

The program provides financial incentives to customers who purchase high-efficiency products and appliances. The program promotes products with the widely recognized ENERGY STAR® label and offers financial incentives for selected products that meet or exceed the ENERGY STAR® level of performance. The program addresses barriers such as customer awareness, pricing, product quality concerns and availability. The program also includes several elements to support the adoption of energy-efficient products, including appliance recycling and components for low-income customers.

2012 Program Strategy

Financial incentives to offset the higher cost of efficient products are the foundation of the Efficient Products program. A successful program must also identify, understand and influence the market channels that support the distribution of consumer products. To this end, key elements of the Efficient Products program include:

- building partnerships with retailers and distributors to stock and promote ENERGY STAR® products
- working through market channels to influence the supply and pricing of energy-efficient products
- encouraging consumers to use energy-efficient products
- working with regional and national alliances to coordinate program activities and share information
- providing salesperson incentives, product education and training on sales strategies for high-volume retail outlets
- working with bulk purchasers who may bypass traditional distribution channels or make purchase decisions across provincial boundaries

ENSC plans to hire an implementation contractor for the merchandising, sales and installation of the energy-efficient products and measures.

Two additional program components address the inefficient practice of using old, but functioning, refrigerators and freezers in other parts of the home:

- The Appliance Retirement program offers cash incentives and free pick-up and recycling of inefficient, extra appliances.
 - The Retail Price Markdown program focuses on Nova Scotians who buy a new refrigerator or freezer. These customers are offered a cash incentive for the purchase of more efficient products.
-

1 The Efficient Products program offers a unique opportunity for low-income customers
2 to receive assistance in acquiring efficient products. Additionally, some products may
3 be provided to low-income customers free of charge. The Nova Scotia Department of
4 Community Services (DCS) and Service Nova Scotia and Municipal Relations
5 (SNSMR) may be called upon to help market the program to qualifying low-income
6 individuals.

7
8 ENSC presently arranges for full recycling of all components of retired appliances.
9 ENSC will work with organizations such as the Resource Recovery Fund Board and
10 other groups and organizations with similar goals of sustainability, energy efficiency and
11 conservation.

13 **2.2 Existing Houses**

15 **Overview**

16 The Existing Houses program is designed to promote comprehensive, cost-effective
17 energy-efficiency improvements to houses and small multi-family buildings, including
18 low-income households. The program was launched in 2009. The Low-Income
19 Households component was launched that same year as a separate program and will be
20 integrated with the Existing Houses program in 2012.

21
22 For weatherization and insulation upgrade measures, the program targets electrically-
23 heated homes.

24
25 The program targets various housing types such as single detached, mobile/mini homes
26 and duplexes. Policies and procedures will be modified for 2012 to include multi-family
27 buildings and rental housing.

The Existing Houses program will be enhanced as follows:

- Eligibility will include small multi-family buildings.
- Direct installation of some low-cost measures may be done during the initial audit.
- Incentives have increased for some measures to compensate for an expected reduction in federal incentives.
- Bonus incentives will be offered for projects that achieve a certain savings threshold.
- Innovative financing methods are being investigated by ENSC.

As well, improvements will be made in the following areas:

- Project Management Assistance: ENSC will develop and maintain a list of qualified contractors who meet defined criteria, addressing one of the barriers to converting assessments into comprehensive retrofit projects.
- Marketing: ENSC will explore opportunities to market the program to high-use households.
- Pilots: Several pilots may be conducted, and may include direct installation of additional measures and stand-alone incentives for certain measures.
- Training: ENSC will support and promote contractor training in building science and key measures, such as air sealing.
- Measures: The program will integrate additional measures, including fuel substitution, based on lessons learned from the 2011 Fuel Substitution Pilot.

1 There are two categories of energy-efficient upgrades: Scope I and Scope II.

2
3 Scope I measures include building upgrades such as draft-proofing and insulating the
4 basement, crawl spaces, walls and attic. Other work may be proposed by the contractors
5 if needed to complete Scope I upgrades. The funding for Scope I upgrades to
6 electrically-heated homes comes from electricity customers. If the home has both electric
7 and non-electric heating, the funding is proportionate to the estimated use of electric
8 space heating.

9
10 Scope II upgrades may include installing CFLs, insulating the electric domestic hot water
11 tank and piping, installing low flow shower heads and faucet aerators, providing power
12 bars to reduce standby losses from electronic devices and replacing qualifying freezers
13 and refrigerators with ENERGY STAR® appliances. The funding for the Scope II
14 electric DSM upgrades, for all homes regardless of their heating source, comes from
15 electricity customers.

16
17 The Low-Income Households component will build on the existing program, providing
18 free energy audits and turn-key implementation of DSM measures at no cost to
19 participants. DCS and SNSMR help to market the program to qualifying low-income
20 individuals. DCS and SNSMR screen participants to ensure they meet program criteria
21 as defined in the government's Household Income Limits or the Low-Income Cut-Off
22 (LICO). Additionally, outreach agents supplement the efforts of the DCS and SNSMR
23 through in-field recruitment of participants who heat mainly with electricity and fall
24 within the income criteria.

25
26 Efforts targeted toward the multi-family sector will address issues unique to
27 landlord/tenant situations through outreach strategies. Direct installation will be provided
28 to low-income renters in both single-family and multi-family homes.

Eligible Measures

Incentives are available for lighting upgrades, measures to reduce electric water heating energy use, appliance upgrades and other items. Incentives for homes with electric space heating may include a full range of building-envelope and heating-system measures, such as air-sealing and insulation, heating system upgrades and fuel substitution.

The low-income customer will receive education on efficiency and, on a site-by-site basis, free installation of program measures. Eligible measures have been expanded to include advanced drain water heat recovery and fuel substitution, which will provide low-income households with higher levels of energy and cost savings. Building owner contributions for installation costs may be required for rental units where owners are not eligible as low-income participants. Details of owner contributions will be developed in 2012 or before.

2012 Program Strategy

The Existing Houses program will continue to be offered within a seamless, home retrofit program. Through a Request for Proposal process, ENSC will contract with service organizations and their energy advisors who will operate throughout the province. Implementation policies and procedures are in place with service organizations and may be modified to enhance the program as it evolves.

In 2011, ENSC will investigate new opportunities for residents of rental homes and multi-family buildings for 2012. Low-income and other renters face many of the same barriers as homeowners. These barriers can be overcome through program strategies such as replacement of appliances free of charge for low-income customers or a deferred payment financing arrangement. Approaches such as bulk appliance purchases for multi-family buildings will also be considered.

A direct installation strategy will target low-income renters in single-family and multi-family dwellings, who pay their own electricity bill or are charged for their electricity

usage through a housing authority. Products such as CFLs, power bars with timers, and hot water tank and pipe insulation will be installed; and, incandescent holiday lighting will be exchanged for Light Emitting Diode (LED) holiday lights. The program will also assess large appliances for potential replacement and deliver a presentation to occupants on energy efficiency.

Program participants can offer insights into the barriers faced by consumers in the rental market. ENSC will survey participating landlords and renters, to find and adopt strategies that will improve their access to this and other relevant programs.

2.3 New Houses

Overview

The New Houses program encourages electrical energy efficiency in the residential new construction market. Launched in 2009, it is available to builders and owner/builders of new houses in Nova Scotia, and supports the growth of a high-performance residential new construction market, promoting energy-efficient design practices and the use of efficient products. The objectives include:

- encouraging homebuilders to participate
- increasing the number of houses that exceed the Nova Scotia Building Code requirements for new residential dwellings, equivalent to an EnerGuide rating of 80. (The EnerGuide system rates houses on a scale of 0-100 based on the modeled energy performance.)
- increasing the number of new houses installing ENERGY STAR® products, creating greater market awareness of the benefits of energy-efficient new houses, and generating greater market demand for their construction

Each year, approximately 3,000 new houses are built in Nova Scotia, creating new demand for electricity. Many builders and consumers choose electric space heating in residential new construction; this market represents an important, time-sensitive opportunity to secure electrical energy savings.

The program leverages the existing Performance Plus and R-2000 programs, which will help ENSC to achieve its DSM objectives without duplication of effort or competing market initiatives.

Measures eligible under the New Houses program include a range of products and practices that focus on heating, insulation, lighting and fuel choice.

ENSC may revise eligible measures based on market conditions, technology development, evaluation and verification results and program implementation experience. The program may require that new houses achieve a minimum EnerGuide rating exceeding standard building code requirements.

2012 Program Strategy

The strategies used to achieve the objectives for the program include promotion and marketing, contractor education and training, design consultation and financial incentives.

Program marketing will target builders and purchasers of new houses and trade allies who support the new construction industry. Through market research, ENSC will learn what motivates home buyers to upgrade to high-efficiency homes and use the findings to design marketing efforts. Marketing will also include generating awareness of the EnerGuide rating system. Trade ally outreach will promote program awareness and participation, followed by training of market participants in the residential new construction industry to focus on best practices, advanced design techniques, and integrating non-electric fuel choice into the design.

1 Energy assessments and practical design advice will be available to builders prior to the
2 construction of new houses. Using data on the planned building envelope and equipment,
3 along with the expected energy consumption, energy auditors will suggest improvements
4 to enhance the expected energy performance. Upon completion of the new house, a final
5 inspection and an EnerGuide rating will be provided along with eligible financial
6 incentives.

7
8 Since December 31, 2009, the Nova Scotia Building Code Act requires all new
9 residential houses to meet prescriptive or performance requirements equivalent to an
10 EnerGuide rating of 80, an increase over the previous requirement of 77. As a result, the
11 New Houses program increased the minimum incentive eligibility threshold from 80 to
12 83.

13
14 The program strategy aims to increase electrical energy savings by encouraging new
15 home buyers to push beyond the boundaries of current efficiency standards. To
16 accomplish this, a tiered structure will be considered to provide a higher incentive rate as
17 projects reach higher savings thresholds. Incentives may be offered for individual
18 measures, bundles of measures and overall levels of building energy efficiency.

19
20 Some program elements may be delivered in cooperation with service organizations to
21 further promote electrical energy savings in residential new construction.

22 23 **2.4 Home Energy Report**

24 25 **Overview**

26 Technology-based strategies achieve a finite amount of efficiency potential because the
27 barriers to wider adoption of energy efficiency are sociological, not technological. The
28 American Council for an Energy-Efficient Economy estimates that the potential

behaviour-related energy savings in the residential sector is roughly 25 percent of current residential sector energy consumption.”¹

Capturing the full potential of energy efficiency requires behavioural change. Therefore energy-efficiency programs need to include behavioural change strategies in implementation plans.

The Home Energy Report is designed to produce measurable, cost-effective electrical energy savings for residential customers by providing feedback on their household energy consumption. The program is expected to drive participation in other ENSC DSM programs. This is not a measure-specific program, but rather targets behavioural changes (for example, lowering the thermostat, using cold water for clothes washing and switching off lights in unoccupied rooms.)

In 2012, a subset of residential customers will receive feedback through direct mailers. More households will be included as the program evolves. Households in selected regions may be invited to enroll in a pilot program to receive information through an in-home device that displays real-time energy usage. This type of feedback has been shown to improve customers’ ability and motivation to better manage their energy consumption. The platforms and approaches will evolve to maintain and increase energy savings.

The program is designed to provide customers with regular feedback on their electricity use, showing their consumption over time and comparing it with relevant benchmarks such as how their consumption compares to similar households in the neighbourhood. (The comparisons will be anonymous.) The program may also provide:

¹ Karen Ehrhardt Martinez, “Testimony of Karen Ehrhardt-Martinez, Research Associate, for the U.S. House Committee on Science & Technology, Subcommittee on Energy and Environment hearing on the role of DOE”, www.aceee.org, April 28 2009, American Council for an Energy-Efficient Economy (ACEEE), retrieved February 14, 2011, <<http://www.aceee.org/tstimony/0428Ehrhardt-MartinezHouseS&T.pdf>> page ii

- qualitative performance assessment focusing on positive reinforcement as energy-efficiency behaviours are implemented and consumption decreases
- recommendations for improving energy efficiency through no-cost, low-cost and larger-scale measures
- referrals to and promotion of relevant DSM programs

The primary feedback tool being considered for 2012 is a standalone report that provides direct feedback to customers. This may involve a combination of mailed information and an Internet portal. A third-party provider could create customizable packages for Nova Scotia, as has been done in other jurisdictions. The format for customer feedback will be determined during program design in 2011. Examples of mail-out reports used in other jurisdictions are provided in Attachment 1.

Customers may be given the option of completing an online or mail-in questionnaire about their home, which will allow ENSC to provide more relevant comparisons and customized recommendations. ENSC will also explore the use of social media to enhance feedback reports, and community-based approaches, such as contests and competitions, to encourage further savings.

2012 Program Strategy

The program strategy will be finalized in 2011. Delivery of the core report component will likely be contracted to a third-party provider selected through a competitive process.

After the launch in 2012, the program will be enhanced and expanded as experience is gained about the factors that influence participants. For example, in addition to expanding the number of customers receiving reports, future versions may incorporate smart meters, other platforms and channels, and modified messaging.

3. COMMERCIAL & INDUSTRIAL PROGRAMS

This section describes the program activities for the Commercial and Industrial (C&I) market segments. The C&I programs also target institutional customers including multi-unit residential buildings, health care, education and government. Beginning in 2011, C&I marketing and outreach efforts will use new program titles that reflect the diversity of eligible customers. The updated terminology will be adopted in the 2013 DSM Plan.

There are three programs for the C&I sector:

- Prescriptive² Rebate, including Smart Lighting Choices (SLC) and Business Energy Rebates (BER)
- Custom³
- Small Business Direct Install

While the primary program strategies for C&I programs remain the same as in 2011, the targeting of customers will be enhanced in two ways.

First, key market segments will be identified and the existing financial incentives from relevant programs will be packaged together in bundles tailored to each segment, along with technical and other support services. Under this approach, C&I customers in these market segments will be offered a suite of products and services unique to their industries.

2 The term “prescriptive” refers to DSM measures and programs that offer fixed incentives for specific equipment or upgrades. Prescriptive programs use established energy savings estimates for each measure, allowing streamlined program delivery without the need for a detailed engineering analysis of every installation.

3 The term “custom” refers to DSM measures and upgrades that are unique to a given project, with energy savings and incentives that are determined on a case-by-case basis.

The second enhancement will be the assignment of key account managers to each identified market segment. Using this approach, C&I program offerings will be delivered through direct outreach and strategic technical support to key industry segments. Rather than requiring customers to self-select program options, ENSC will work with them one-on-one to find the right plans for their businesses.

3.1 Prescriptive Rebate

Overview

Launched in 2010, the Prescriptive Rebate program is intended to secure cost-effective electrical energy savings for non-residential customers in the retrofit and new construction markets through the promotion of a variety of high-efficiency equipment.

The program uses existing market channels to make high-efficiency equipment more competitive and to encourage the adoption of targeted technologies. The Prescriptive Rebate program has two distinct elements: Business Energy Rebates (BER) and Smart Lighting Choices (SLC). BER provides prescriptive rebates to customers for a variety of equipment types. SLC is a program for lighting distributors of high-performance, T-8 lamps and ballasts. Both programs are focused on market-driven opportunities in natural replacement and new construction markets.

Through the BER program, non-residential customers and owners of multi-unit residential buildings are eligible to participate when they purchase qualifying equipment or services. Rebates are available for retrofit and new construction applications. The program offers cross-cutting technologies that address a variety of market sectors and industries. For major market segments, technologies will be bundled into a single application package, along with other program offerings, and delivered directly to C&I customers through their key account manager.

The SLC program encourages vendors to stock and promote efficient products through a targeted outreach effort. Implementation staff train and equip store employees to convey the energy and monetary savings benefits to consumers and communicate equipment eligibility requirements.

Prescriptive measures can capture savings in new construction projects that do not participate in the New Construction components of the Custom program. Two important opportunities to be investigated for implementation in 2012 are: performance incentives to reward efficient lighting designs and prescriptive incentives based on aggressive lighting power density requirements.

Eligible Equipment

The Prescriptive Rebate program targets equipment for which the electrical energy savings can be predicted and standard per-measure savings and incentive levels can be established. This simplifies the application process and reduces administrative costs. The rebates and associated measures are delivered through existing market channels.

Program measures include products and services in the following areas: lighting, heating, ventilation and air conditioning, adjustable speed drives for motors, refrigeration, compressed air, food service and hospitality equipment, and agricultural and food processing equipment.

Measures may be grouped into a series of market segment packages containing measures and services applicable to a particular industry. A single measure may be included in multiple packages. For instance, lighting measures are common across all industries and building types, while commercial ice machines are used only in hospitality and food service.

2012 Program Strategy

The purchase and installation of high-efficiency technologies will be promoted through a combination of market push-and-pull strategies.

The incentives and market awareness efforts increase demand for high-efficiency technologies by educating business customers about the energy and monetary savings associated with efficient products and by equipping vendors to communicate those benefits directly to their customers. Financial incentives, expected to be 20 per cent to 40 per cent of the incremental material cost, will address first-cost barriers. Financing will be available to offset the non-incentive portion of the project cost.

The BER and SLC program components will be enhanced to encourage contractor support for retrofit and new construction. Other program and service offerings will leverage the financial incentives available through this component. Potential enhancements are described below:

- Advanced fluorescent fixtures may be added to the lighting measures to optimize the design and layout of lighting systems and lighting retrofits. This yields energy savings while maintaining the same level of service.
- SLC currently provides incentives to lighting distributors for high-performance T8 lamps and ballasts. Opportunities will be investigated to expand the variety of supported lighting technologies. The products eligible under SLC will shift to more advanced technologies as these products are introduced into the marketplace or minimum lighting standards are raised.
- A Qualified Vendors program will be investigated for implementation in 2012. Qualified Vendor programs provide customers with a list of qualified suppliers, while also giving a level of comfort about

performance. Vendors may qualify by virtue of having successful program experience, and could be eligible for opportunities for co-operative advertising support, additional publicity on the ENSC website or being profiled in case studies.

- ENSC will investigate other opportunities to help contractors and vendors promote the program. Possibilities include allowing the use of ENSC logos in vendor or contractor promotional materials and developing case studies of successful project installations.
- Cross-marketing between BER and SLC, as well as the Custom Program, will be investigated. For example, a customer considering a one-for-one fixture replacement may decide to purchase an advanced lighting design instead.
- ENSC will investigate the use of outreach coordinators to promote the advancement of key technologies in particular markets. For instance, a coordinator could be assigned to address LED refrigeration lighting in grocery stores. Coordinators would be responsible for identifying high-potential customers, conducting outreach and recruitment, conducting a facility audit, managing the rebate application process and coordinating the project installation. They would also be responsible for referring the customer to other programs, leveraging additional opportunities. Outreach coordinators may be provided by third-party contractors or directly by ENSC.
- Other discretionary retrofit opportunities, such as early replacement or unplanned addition of controls, will be investigated.

3.2 Custom

Overview

Launched in 2008, the Commercial and Industrial (C&I) Custom program will secure cost-effective electrical energy savings from efficiency projects and promote fuel choice in new construction and fuel substitution in retrofits of non-residential facilities. The Core Performance and Whole Building components were launched in 2010 for new construction and major renovation projects.

This program targets commercial, industrial, institutional, and multi-unit residential buildings. Eligible retrofit projects are those expected to save at least 20,000 kWh of electrical energy per year. Customers may choose to aggregate multiple sites into a single project, where cost-effectiveness is improved and incentives from other C&I programs do not apply.

DSM industry leaders such as Efficiency Vermont and Energy Trust of Oregon have advised ENSC that a targeted, segment-specific approach is essential in achieving long-term savings through C&I programs. ENSC will adopt this approach by tailoring program services and incentives, both custom and prescriptive, to suit specific market segments. Segments to be targeted in 2012 may include grocery stores, schools, large multi-family buildings, military and the high-tech industry, among others.

New construction and major renovation projects are eligible for the Custom program, using one of two paths: the Core Performance path or the Whole Building path. The Core Performance path is best-suited to small and medium offices, schools, retail, and warehouse buildings, providing easy-to-follow standards for lighting, heating and ventilation, and insulation. For projects not suited to the Core Performance path or that require energy modeling, the Whole Building path offers incentives for feasibility studies and custom measures for new buildings.

The program works with eligible customers to identify and implement cost-effective electrical energy and demand saving measures on a case-by-case basis. Measures can be divided into two categories:

- market-driven measures, commonly referred to as lost-opportunity measures, such as end-of-life equipment replacement, new construction, renovation and expansion, resulting in higher-efficiency choices
- discretionary retrofit measures (commonly referred to as resource acquisition measures), where energy-efficient lighting, HVAC equipment, refrigeration, motors, process equipment or building envelope components are replaced before the end of their useful lives as a cost-effective retrofit

Eligible measures must save electrical energy and may vary based on custom applications. Measures may include: process optimization, monitoring and control systems, fuel choice and fuel substitution and equipment not addressed through other C&I programs.

2012 Program Strategy

The following technical and financial assistance components are planned for 2012. ENSC will:

- help customers to identify and secure qualified third-party sources of technical expertise
- provide incentives and rebates for initial scoping studies and detailed audits of existing facilities, as well as engineering assessments for retrofit projects
- provide funding support for technical assistance to achieve more efficient designs in new facilities and major renovation projects

-
- provide financial incentives for implementing cost-effective electrical energy-efficiency projects
 - provide project financing through interest-free repayable loans. Where available, other financing options could be added to support the program.

An important aspect of the 2012 program strategy is one-on-one delivery of customized offerings that address unique opportunities at customer facilities. Following are some examples:

- A compressed air audit service will assess the efficiency of the entire system and associated operational practices; this initiative would combine a feasibility study and technical assistance with prescriptive and custom rebates. Compressed air upgrades are often cost-effective with a short-payback and may not require incentives. This initiative would provide further opportunities to market other relevant programs and services.
 - Retro-commissioning services will provide technical assistance and incentives for optimizing the energy usage of existing equipment and systems.
 - Support of continuous energy improvement of industrial processes will help to realize operational and retrofit savings. These can be delivered in a cohort environment, where managers from similar industries meet regularly, exchange technical support and compare results, supported by industry-specific expertise.
 - C&I customers may be offered a subsidized preliminary energy feasibility study to help building owners evaluate the cost-effectiveness of switching from electric heat or electric heat pumps to fuels such as wood chips or pellets. The initiative will be open to all existing non-
-

1 residential customers with electric heat or electric heat pumps, including
2 large multi-family buildings.
3

4 Technical assistance services for new construction and major renovations will work
5 through building owners, their agents and the design community. This will capture the
6 long-term electrical energy efficiency opportunities during the design and construction
7 of new buildings, additions and renovations in the non-residential market. To secure
8 these opportunities, several barriers must be addressed, including:
9

- 10 • resistance to new practices and technologies
- 11 • reluctance by owners to accept increased first-year costs for efficient
12 options
- 13 • a tendency to overdesign individual systems for worst-case conditions
14 rather than leveraging the efficiency of an integrated system for expected
15 conditions
16

17 More efficient designs for new construction projects will be eligible for implementation
18 incentives through the Custom or Prescriptive Rebate programs.
19

20 The Custom Program promotes the engineering and installation of electrical energy-
21 efficient products or measures for which the operation and characteristics do not fit the
22 Prescriptive Rebate structure. The installation of these measures is conducted by third
23 parties or qualified in-house staff, as selected and hired by the customer.
24

25 To support the segment-specific approach, ENSC will develop staff expertise to meet the
26 unique needs of the customers and market segments served by this program. For
27 instance, designated teams may be established and unique approaches may be used for
28 new construction versus existing buildings, and large versus small projects.

1 The staffing necessary to support a market sector approach will likely consist of technical
2 and outreach personnel, organized into a market segment team. Market managers would
3 be responsible for a group of large customers, understanding their industry segment,
4 building relationships with customers and trade allies, developing a long-term plan for
5 each major customer, and securing savings through market-driven and discretionary
6 measures. The market managers will be the primary outreach vehicle to the large,
7 assigned C&I customers.

8
9 Technical specialists, either in-house or contracted, who can speak the language of the
10 specific industry or specialized technology will support the market managers. The
11 market segment teams will likely include a number of technical specialists, depending on
12 the complexity of the customer's facilities; and, technical specialists will support several
13 market segment teams. For instance, a refrigeration technical specialist would support all
14 market segment teams with large refrigeration loads.

15
16 Although a market sector approach requires a range of talents and technical expertise, this
17 strategy can achieve significant savings at a relatively low cost. Providing high-quality
18 technical assistance has been shown to increase savings per dollar over time.

19
20 Research data, market analysis and customer segmentation will be used to identify
21 market sectors with the highest potential.

22
23 Custom implementation incentives will be based on incremental cost investment barriers
24 for market-driven and new construction measures and the full-cost investment barrier for
25 retrofit projects. While the program will provide guidance for setting targets for
26 incentive levels, the actual incentive will be based on an analysis of the customer
27 economics of the project, such as cash flow or internal rate of return. ENSC may also
28 offer financing for the customer's share of project costs.

New construction technical services will provide participants with financial support for consulting services that deliver efficient facility designs. Additional implementation incentives through the Custom program and rebates through the Prescriptive Rebate program will be available to participants who opt for qualifying efficient designs. New construction incentives will be based on the incremental electrical energy savings and the difference in measure costs between the proposed design features and a baseline design (for example, one conforming to Canada's Model National Energy Code for Buildings).

For new construction projects, ENSC will encourage the use of natural gas, wood chips or pellets, or geothermal heat pumps with no electric backup, in lieu of electric resistance heat and heat pumps with electric backup, where appropriate. ENSC will also promote the use of non-electric fuels for hot water heating in new construction, where appropriate.

The recruitment of participants with custom projects depends largely upon referrals and networking between contractors, vendors, consultants and ENSC to identify feasible projects. Because of their complexity, custom projects can have longer lead times, therefore, marketing efforts will continue to solicit projects for the months and years ahead.

3.3 Small Business Direct Install

Overview

Launched in 2008, this program is designed to acquire electrical energy savings through the direct installation of energy-efficient measures in small businesses, primarily through high-performance lighting retrofits. The program is available across Nova Scotia and will be expanded to include non-lighting measures, such as refrigeration.

The Small Business Direct Install program targets C&I customers with lighting and commercial refrigeration load, with an average peak monthly demand of less than 100 kW or annual electrical use of 300,000 kWh. Examples include small offices, retail

shops, convenience and grocery stores, service stations, independent restaurants and lodgings, non-profit organizations, small government facilities, cafeterias, bakeries, pharmacies, institutional and healthcare facilities.

The program provides installation of a comprehensive set of cost-effective, energy-efficient measures, targeting small commercial customers with refrigeration loads as well as lighting-only opportunities. Energy-saving opportunities will either be addressed by the current comprehensive suite of measures or recorded for future programming. Implementation contractors identify and recruit service providers for the direct installation of energy-efficient lighting, refrigeration upgrades and the disposal or recycling of old materials.

Projects will focus primarily on upgraded lighting, refrigeration equipment and controls. Program design may be modified to acquire electrical energy savings through the direct installation of other cost-effective, electrical energy-efficient measures.

2012 Program Strategy

ENSC provides the implementation contractor with a list of eligible customers in each territory. The implementation contractor markets the program, generates a qualified lead, and sends the customer request to ENSC. After ENSC approves the request, the contractor conducts the audit at no charge to the customer, using an audit tool provided by ENSC. ENSC reviews all audits and grants approval to proceed. The contractor orders and installs the materials and removes the old materials for disposal and recycling.

ENSC may authorize the contractor to work with third parties, such as business associations or Chambers of Commerce, to promote the program. In addition, ENSC may provide targeted marketing support and approves or develops program marketing materials.

1 The level of incentives provided for installations is determined by ENSC. The program
2 incentive currently covers 80 per cent of the overall project cost and may be paid directly
3 to the contractor to minimize out-of-pocket expenses. Other financing may be offered to
4 cover the balance of customer costs.

5
6 Depending on the development of other programs and the timing of implementation,
7 ENSC may vary outreach and marketing strategies, project eligibility thresholds and
8 other program features to increase participation, balance the costs and savings of the
9 portfolio or otherwise achieve the objectives of the DSM Plan.

4. ENABLING STRATEGIES

Beginning with the 2012 DSM Plan, savings from outside of customer-funded DSM programs will play an important role in achieving IRP targets. To support this role, ENSC will work with partners, including governments and NSPI, to develop longer-term strategies for achieving low-cost DSM and transforming markets through policies, codes and standards and other activities.

This section provides descriptions of eight enabling strategies:

- Education and Outreach
- Development and Research
- Innovative Financing
- Building Energy Labelling
- Codes and Standards
- Training and Quality Assurance
- Renewable Heating Strategy
- Working with Local Governments

Enabling strategies have two purposes:

- to support the effective delivery of DSM programs (Education and Outreach, Development and Research, Innovative Financing, and Training and Quality Assurance)
- to drive market transformation by promoting energy efficiency, notably through regulatory changes (Building Energy Labelling, Training and Quality Assurance, Codes and Standards, Renewable Heating Strategy and Working with Local Governments)

4.1 Education and Outreach

Education and Outreach has been part of the electricity DSM plans in Nova Scotia since 2008. In 2012, this strategy will focus on increasing awareness among Nova Scotians of the value of energy efficiency, leading to greater levels of participation in DSM programs.

Nova Scotians will only adopt energy-efficient behaviours if they understand the value. Many Nova Scotians are already there, achieving significant electric efficiency savings over the past few years. To influence more Nova Scotians to participate in DSM programs, ENSC will continue to focus on systematic education and outreach efforts that enhance customer understanding, complemented by a wide variety of communications activities. Education and outreach strategies for 2012 will build on existing programs, research, feedback from Nova Scotians and lessons learned throughout 2010 and 2011. Areas of focus include:

- educating customers on the value provided by electricity DSM
- distributing information to customers on ways to conserve energy, reduce peak demand, achieve cost-effective energy savings and lower their electric bills
- increasing public awareness of the value of participating in DSM programs
- connecting customers to relevant DSM programs and services

The following activities will support this strategy:

- in-house energy advisors to answer customers' toll-free calls directly, providing energy efficiency information and helping find the right efficiency program for them. ENSC launched this service in February of 2011

-
- a dynamic ENSC website, launched in January 2011, with a customer-friendly focus, providing energy efficiency information, program materials, assistance and links to other resources
 - the use of social media to raise awareness and drive traffic to the website
 - compelling marketing and advertising materials to highlight Nova Scotians' energy efficiency successes and encourage others to participate
 - online energy savings calculators to help make efficiency and conservation more tangible
 - classroom materials to educate young people about energy efficiency and encourage them to act on that learning at home
 - public speaking and presentations on energy efficiency
 - energy-efficiency case studies and success stories in the media

Building on the Green Schools Pilot being launched in 2011, ENSC staff will work with contractors and educational institutions, including schools, community colleges and universities to develop, manage and deliver education and outreach programs.

The savings resulting from Education and Outreach are recorded through participation in individual DSM programs.

4.2 Development and Research

ENSC will continue to develop expertise in new energy-efficient technologies and program strategies that have the potential to generate additional energy savings.

Through activities such as market assessments, baseline evaluations and pilot projects, ENSC will continue to explore opportunities for DSM programming. Although electrical energy or demand savings are not directly attributed to this effort, the knowledge and experience gained through development and research efforts are intended to increase the effectiveness of all DSM programs. The DSM tracking system, public opinion polling

and market research will continue to be important tools that help ENSC to understand Nova Scotians' behaviours and determine effective ways to reach them.

ENSC will focus on emerging energy-efficiency strategies and technologies. This includes staying abreast of strategy and technology development, as well as evaluation results and activities in other jurisdictions. Program activities may include funding innovators, product testing and demonstration projects for beneficial technologies, for example.

4.3 Innovative Financing

The objective of this strategy is to develop innovative financing that will increase participation in DSM programs. Options for all market segments will be evaluated and developed in 2011. The initial emphasis is likely to be residential and smaller commercial markets.

ENSC will evaluate a number of financing options, including opportunities to work with financial institutions, municipalities and utilities. A number of characteristics will be considered, and include, for example:

- longer payment terms that are in line with the expected life of energy savings
- transferable arrangements, where payment responsibility resides with those who benefit from the energy savings, such as the homeowner, building owner or electric utility account holder
- repayment through property tax bills or electric utility bills

Savings from financing will be recorded in individual DSM programs.

4.4 Codes and Standards

To achieve long-term DSM success in Nova Scotia, it will be essential that governments adopt increasingly advanced building energy codes and product standards. ENSC will help to accelerate transformation of the market by educating consumers and offering incentives for efficient products and practices, making it possible for governments to implement new codes and standards that will sustain the energy savings.

A number of opportunities are emerging in the residential and commercial sectors for ENSC to support and promote new energy codes and standards. In particular, two areas to be pursued in the short-term are:

- the adoption of a high-performance T-8 lighting standard (building on the market transformation achieved through the Smart Lighting Choices program)
- the adoption in Nova Scotia of a forthcoming national energy code for commercial buildings

In 2011, governments and other stakeholders will be consulted with respect to ENSC's role in supporting the development, adoption and enforcement of new codes and standards. Initiatives may include:

- identifying and assessing opportunities, providing technical support, participating in national or regional committees and preparing business cases
 - encouraging the adoption of new model codes and standards through promotion and marketing
 - conducting baseline studies to determine the need and value of funding enhanced building code enforcement activities
 - evaluating the amount of energy and demand savings attributable to codes
-

and standards efforts

4.5 Building Energy Labelling

Work on the Building Energy Labelling strategy will begin in 2011. The objective is to support governments in developing policies for both residential and commercial buildings to inform the marketplace—including owners, building managers, buyers, renters and lessees—about building energy performance.

ENSC will support the development of Building Energy Labelling by working with the provincial government and stakeholders and providing technical and other support. Based on lessons learned from Europe, the United States and Australia, a mix of policies may include government lead-by-example labelling and rating requirements for its own buildings and leases, a time-of-sale labelling requirement for residential buildings, and/or a disclosure policy for commercial and industrial buildings.

ENSC's role will be to develop technical expertise to support market participants and provincial or municipal governments interested in mandatory labelling. The federal government is currently developing voluntary labelling systems for both residential and commercial buildings, and ENSC will work to ensure these systems are appropriate for Nova Scotia.

ENSC will also work towards the voluntary use of labels by DSM program participants and organizations to increase familiarity and expertise with labels and labelling tools. Depending on the level of availability of benchmarking tools and labels, ENSC will incorporate labelling into residential and commercial programs. As well, provincial government, municipalities and organizations will be encouraged to adopt internal labelling policies.

The strategy will include discussions with key market participants and agencies, participating in working groups, providing technical and other support and funding research efforts.

Labelling activities are not expected to generate immediate savings. Rather, labelling is expected to increase uptake of other DSM programs, potentially reduce the need for higher incentives and generate additional savings outside the 2012 program offerings.

This strategy is expected to encourage implementation of a number of measures, including building envelope retrofits, heating systems and new energy management initiatives.

4.6 Training and Quality Assurance

The objective of the Training and Quality Assurance strategy is two-fold: to provide customers with access to contractors knowledgeable about energy efficiency and to build capacity of the DSM workforce in Nova Scotia. This strategy will target building owners, operating staff, and market participants (architects, designers, engineers, builders, contractors, tradespeople, wholesalers and retailers). Initial work will begin in 2011, with efforts ongoing in 2012.

Through the Training and Quality Assurance strategy, an ENSC training coordinator role will be established in 2011 and focus on three main areas:

- work with ENSC program managers to enhance existing training and quality assurance
- identify and assess needs and opportunities for training and certification to be provided through third-party organizations

- work with stakeholders such as universities, colleges and professional associations to develop training programs to address priority gaps and to develop capacity to meet future needs

ENSC's training coordinator will use a combination of outreach, research and funding to meet training needs. In 2011, the training coordinator will meet with program staff to conduct a gap analysis and redundancy review. The training coordinator will then develop a long-term training development strategy, and in 2012, begin implementation through outreach and coordination with educational institutions and other partners.

4.7 Renewable Heating Strategy

The objective of the Renewable Heating strategy is to create a broad renewable/advanced heating strategy for the province. The strategy will be designed to reduce electric space and domestic water heating loads by strengthening the renewable heat supply chain and, in the process, reduce greenhouse gas emissions and drive local economic development. The strategy will be initiated in 2011, through initiatives such as the Fuel Substitution Pilot, and continue throughout 2012 to promote renewable heating for all markets.

ENSC will work with stakeholders including the provincial and municipal governments, industry associations and others to create an action plan for developing renewable and advanced heating opportunities, such as wood pellets, solar hot water heating, ground source heat pump systems and district heating. Elements of this plan may include assisting in the development of regulatory frameworks for biomass fuel production, quality and delivery standards and solar hot water heater installation. ENSC will also seek funding partnerships with government and other stakeholders to stimulate local economic development or to assist in developing more efficient supply chains.

The strategy will integrate existing ENSC incentives for specific equipment and potentially add incentives or technical support to develop a manufacturer base and an infrastructure for equipment delivery and installation.

Detailed strategies will be determined in 2011 and will likely include wood chips and pellets, solar hot water systems, ground source heat pumps and district heating systems.

4.8 Working with Local Governments

ENSC has an objective to conduct outreach and provide support for municipal governments interested in implementing-energy efficiency programs and regulations. This strategy will be initiated in 2011 and will be ongoing in 2012.

A number of opportunities exist to collaborate with municipal governments across Nova Scotia. They are potential participants in DSM programs because they retrofit government-owned or operated buildings and procure products that qualify as energy-efficiency measures. They may assist ENSC in promoting DSM programs to citizens, building owners, developers and others. There are also opportunities with respect to the enabling strategies, such as transferable financing, building labelling, and codes and standards.

In 2011, ENSC staff will engage municipalities to develop the opportunities identified above. A key account manager has been assigned to work with municipal governments and staff to facilitate participation in relevant ENSC programs and pursue opportunities to partner with municipal governments on unique program offerings. ENSC may also offer technical support and resources as municipalities draft regulations and design new initiatives.

ATTACHMENT 1

Sample Home Energy Reports

Included here are samples of the Home Energy Report described in Section 2.4.



Home Energy Report

Account number: 1234567890

Report period: 08/31/10 - 10/28/10

We are pleased to provide this personalized report to you as part of a pilot program. The purpose of the report is to:

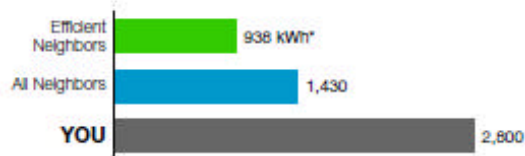
Provide information This report is an educational tool to help you understand your home's electricity use in the context of other homes.

Track progress We will help you learn about how your home's usage changes over time and where you likely have opportunities to save.

Share energy efficiency tips On the back of the report, we provide ideas for saving energy and money. You can find more tips at

JANE SMITH

Last 2 Months Neighbor Comparison | You used **96% MORE** electricity than your neighbors.



* kWh: A 100-Watt bulb burning for 10 hours uses 1 kilowatt-hour.

How you're doing:

You used more than average

Turn over for ways to save →

Who are your Neighbors?

All Neighbors

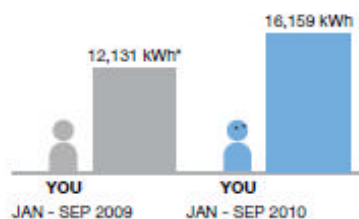
Approximately 100 occupied, nearby homes that are similar in size to yours (avg 2,004 sq ft)

Efficient Neighbors

The most efficient 20 percent from the "All Neighbors" group

Personal Comparison

How you're doing compared to last year:

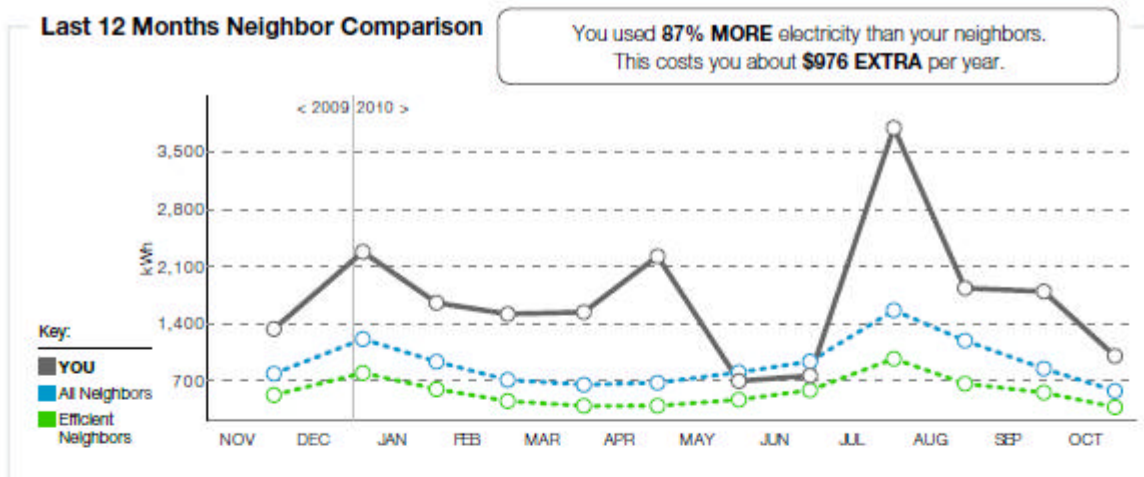


* kWh: A 100-Watt bulb burning for 10 hours uses 1 kilowatt-hour.

So far this year, you used **33% MORE** electricity than last year.

Looking for ways to save? Visit

Turn over for savings →



Prepare for happy holidays and avoid higher energy bills

The holiday season often means house guests, decorative lighting, lots of cooking and a boost in your home's energy use. Try these ideas during the holiday season and year-round to keep energy costs down.



Top Tips For Saving

Save up to

☐ Use your oven efficiently Next Steps: Make your oven do double duty. As long as your oven is on, cook several holiday favorites at once.	\$30/yr
☐ Use your fireplace wisely Next Steps: Turn down your thermostat when you have a fire and close the flue when you don't.	\$25/yr
☐ Save with LED holiday lights Next Steps: Get 20% off plus a \$2 discount on LED holiday lights at the Online Store —	\$10/yr
☐ Be smart about dish washing Next Steps: Fill up the dishwasher before you run it, and let your dishes air-dry instead of using the "heat-dry" setting.	\$15/yr
☐ Set refrigerator temperature wisely Next Steps: Set your refrigerator temperature to 35-38° and your freezer temperature to 0°.	\$20/yr
☐ Unplug stereos and other devices Next Steps: Use power strips that you can easily switch off when the devices aren't on.	\$65/yr
☐ Plan for a year of savings Next Steps: Ring in the new year by talking with your household members and neighbors about saving energy.	\$200/yr

Already do these tips?
Find more ways to save online

UtilityCo

runs on OPOWER

Questions? Comments? 1-888-555-1234 (Press 3, then enter 3285#) |

© 2009-2010 OPOWER

♻️ Printed on 30% post-consumer recycled paper.



Home Energy Report

Account number: 1234567890

Report period: 06/23/10 - 08/20/10

We are pleased to provide this personalized report to you as part of a pilot program. The purpose of the report is to:

Provide information This report is an educational tool to help you understand your home's electricity use in the context of other homes.

Track progress We will help you learn about how your home's usage changes over time and where you likely have opportunities to save.

Share energy efficiency tips On the back of the report, we provide ideas for saving energy and money. You can find more tips at

SARAH SMITH

Last 2 Months Neighbor Comparison

You used **33% MORE** electricity than your efficient neighbors.



* kWh: A 100-Watt bulb burning for 10 hours uses 1 kilowatt-hour.

How you're doing:

Great 😊😊

GOOD 😊

More than average

Who are your Neighbors?

All Neighbors

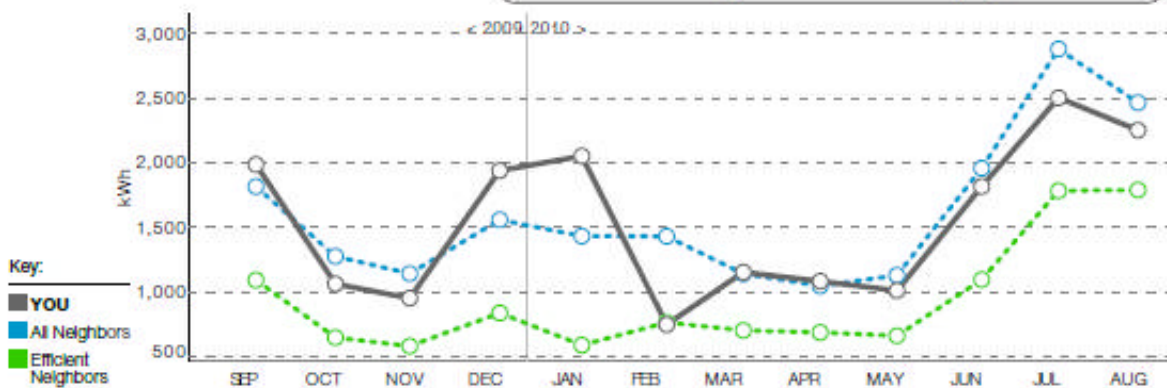
Approximately 100 occupied, nearby homes that are similar in size to yours (avg 3,536 sq ft)

Efficient Neighbors

The most efficient 20 percent from the "All Neighbors" group

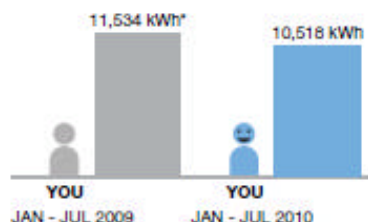
Last 12 Months Neighbor Comparison

You used **65% MORE** electricity than your efficient neighbors. This costs you about **\$732 EXTRA** per year.



Personal Comparison

How you're doing compared to last year:



So far this year, you used **9% LESS** electricity than last year.

★ You're on pace to use less in 2010.

Looking for ways to save even more? Visit

* kWh: A 100-Watt bulb burning for 10 hours uses 1 kilowatt-hour.

Action Steps | Personalized tips chosen for you based on your energy use and housing profile

Great Investment

A big idea for big savings

☐ Look for the ENERGY STAR® label

The Department of Energy tests the energy efficiency of many home appliances and electronics, and the best earn the official ENERGY STAR® label. In 2008 Americans saved \$19 billion on their energy bills thanks to this program.

The ENERGY STAR label can be found on efficient models of clothes washers, refrigerators, televisions, computers and many other products.

Visit www.energystar.gov for more details.

SAVE UP TO
\$600 PER YEAR,
VARIES BY ITEM

Quick Fix

Something you can do right now

☐ Turn off lights when not needed

It's a common misconception that turning a light off and on consumes energy so that you might as well leave it on. This is not the case.

While some lights do require an initial burst of energy to start, the amount is very small when compared to the energy used to keep the light on.

Turning off lights (and other devices too) when not needed will save you money.

SAVE UP TO
\$45 PER YEAR

Smart Purchase

Save a lot by spending a little

☐ Reduce air conditioning costs with fans

Fans help you stay cool while reducing your air conditioning needs. Raise the thermostat setting 3-4 degrees while you use portable fans and ceiling fans to keep air circulating and stay comfortable.

Since your greatest cooling needs typically occur during peak demand times, when the electricity grid can become stressed and less reliable, using fans can make a measurable impact on helping our community conserve energy.

SAVE UP TO
\$25 PER YEAR

UtilityCo

runs on OPOWER

| Questions? Comments? (888) 555-1234 (Press 3, then enter 47264) |

© 2009-2010 OPOWER

♻️ Printed on 30% post-consumer recycled paper.

Appendix B

Preliminary Program Cost Allocation

Line #

TABLE 1 Allocation of 25% of program costs associated with system benefits.**COLUMN****A****B****C****D****E****F****G****H****Program Cost Recovery by Benefits**

System Benefits	25.0%	\$10,936,664
Combined Class and Participant Benefits	<u>75.0%</u>	<u>\$32,809,993</u>
Total	100.0%	\$43,746,657

Functionalization of System Benefit DSM Costs

	Factors
Generation	100%
Transmission	0%
Distribution	0%
Retail	0%

Classification of System Benefit DSM Costs

	Factors¹
Demand-related	33.49%
Energy-related	<u>66.51%</u>
Total	100.0%

Demand-related Costs**Energy-related Costs****Total****Rate Class****3 CP kW Demands ²****Demand-related****\$ Amount****MWh Energy Requirement ³****Energy-related****\$ Amount****Relative Share****Total Amount**

Residential Total ⁵	3,361,452	51.2%	\$1,875,549	4,740,434	38.8%	\$2,822,154	43.0%	\$4,697,703
Small General	161,274	2.5%	\$89,984	235,578	1.9%	\$140,248	2.1%	\$230,232
General Demand	1,320,066	20.1%	\$736,541	2,594,887	21.2%	\$1,544,831	20.9%	\$2,281,372
Large General	168,073	2.6%	\$93,778	427,626	3.5%	\$254,582	3.2%	\$348,359
Small Industrial	101,706	1.5%	\$56,748	259,539	2.1%	\$154,513	1.9%	\$211,261
Medium Industrial	186,552	2.8%	\$104,088	473,510	3.9%	\$281,898	3.5%	\$385,987
Large Industrial	339,445	5.2%	\$189,396	976,078	8.0%	\$581,095	7.0%	\$770,491
ELI 2P-RTP	680,346	10.4%	\$379,604	1,986,608	16.3%	\$1,182,700	14.3%	\$1,562,305
Municipal	127,876	1.9%	\$71,349	206,748	1.7%	\$123,085	1.8%	\$194,434
Unmetered	72,586	1.1%	\$40,500	124,440	1.0%	\$74,084	1.0%	\$114,584
Bowater Mersey (AE only) ⁴	42,857	0.7%	\$23,912	182,570	1.5%	\$108,691	1.2%	\$132,603
Gen. Repl./ Load Foll.	1,576	0.02%	\$879	10,843	0.1%	\$6,455	0.1%	\$7,334
Wholesale Market Backup/Top-up	-	0.00%	\$0	-	0.0%	\$0	0.0%	\$0
1P-RTP	-	0.0%	\$0	-	0.0%	\$0	0.0%	\$0
Total	6,563,808	100.0%	\$3,662,329	12,218,862	100.0%	\$7,274,335	100.0%	\$10,936,664

Classification Breakdown

33.5%**66.5%****100.0%**

(1) The classification is the weighted average of the fully classified total generation plant portion of rate base as shown in the "Base Cost of Fuel Cost of Service Allocation of Fuel Expenses among Rate Classes" table in line #32 under Purchased Power Regular/Fixed section in Appendix C of the 2011 Base Cost of Fuel Compliance Filing submission.

(2) Source: Base Cost of Fuel Cost of Service Allocation of Fuel Expenses among Rate Classes" table under Cost Allocation Factors in Appendix C of the 2011 Base Cost of Fuel Compliance Filing submission.

(3) Source: Base Cost of Fuel Cost of Service Allocation of Fuel Expenses among Rate Classes" table under Cost Allocation Factors in Appendix C of the 2011 Base Cost of Fuel Compliance Filing submission.

(4) Source: Base Cost of Fuel Cost of Service Allocation of Fuel Expenses among Rate Classes" table under Cost Allocation Factors in Appendix C of the 2011 Base Cost of Fuel Compliance Filing submission.

(5) All residential rate classes will use the same unit fixed cost estimate.

Line #	TABLE 2 Preliminary Allocation of 75% of DSM Program Costs associated with benefits realized by participating classes.										
1											
2	COLUMN	A	B	C	D	E	F	G	H	I	J
3											
4	FORMULA									Σ col A to H	I x 75%
5											
6		Program costs incurred on participating rate classes.								Program Costs Directly Assigned to Participating rate classes (75% of the total)	
7	Program	Efficient Products	Existing Houses	New Houses	Home Energy Report	Prescriptive Rebate	Custom	Small Business Direct Install	Enabling Strategies	All Program Costs Combined	
8											
9	Rate Class										
10	Residential	\$3,344,076	\$9,578,162	\$4,223,917	\$886,160	\$342,903	\$372,065	\$840,200	\$4,512,188	\$24,099,670	\$18,074,753
11	Small General	\$291,202	\$0	\$0	\$0	\$261,706	\$164,271	\$707,498	\$245,229	\$1,669,905	\$1,252,429
12	General Demand	\$291,202	\$0	\$0	\$0	\$2,391,452	\$4,010,135	\$3,978,874	\$119,409	\$10,791,071	\$8,093,303
13	Large General	\$0	\$0	\$0	\$0	\$153,414	\$773,038	\$0	\$186	\$926,638	\$694,979
14	Small Industrial	\$0	\$0	\$0	\$0	\$211,903	\$542,584	\$313,889	\$23,668	\$1,092,044	\$819,033
15	Medium Industrial	\$0	\$0	\$0	\$0	\$396,166	\$1,953,301	\$0	\$2,165	\$2,351,632	\$1,763,724
16	Large Industrial	\$0	\$0	\$0	\$0	\$635,708	\$1,233,145	\$0	\$414	\$1,869,267	\$1,401,950
17	ELI 2P-RTP	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$21	\$21	\$16
18	Municipal	\$81,356	\$179,256	\$79,051	\$16,585	\$110,651	\$207,724	\$170,246	\$62	\$844,931	\$633,698
19	Unmetered	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$101,437	\$101,437	\$76,078
20	Bowater Mersey (AE only)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$10	\$10	\$8
21	GRLF	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$31	\$31	\$23
22	Wholesale Market Backup/Top-up	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
23	1P-RTP	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24	Total	\$4,007,836	\$9,757,418	\$4,302,968	\$902,744	\$4,503,903	\$9,256,261	\$6,010,706	\$5,004,820	\$43,746,657	\$32,809,993
25											

Notes:

1 Enabling Strategies allocated based on Customer counts COSS, 2009 Compliance Filing

Line #

TABLE 2 a) Estimate of DSM Program participation by rate classes before accounting for the Municipal Class

1

2

3

4

COLUMN**A****B****C****D****E****F****G**

5

Relative shares of program costs incurred on participating rate classes before Municipal Class.

6

Program

Efficient Products

Existing
Houses

New Houses

Home Energy
ReportC & I
Prescriptive
RebateC & I
CustomSmall Business
Direct Install

7

Rate Class

8

Residential

85.0%

100.0%

100.0%

100.0%

7.8%

4.1%

14.2%

9

Small General

7.5%

0.0%

0.0%

0.0%

6.0%

1.8%

12.2%

10

General Demand

7.5%

0.0%

0.0%

0.0%

54.8%

44.7%

68.3%

11

Large General

0.0%

0.0%

0.0%

0.0%

3.5%

8.6%

0.0%

12

Small Industrial

0.0%

0.0%

0.0%

0.0%

4.8%

5.9%

5.3%

13

Medium Industrial

0.0%

0.0%

0.0%

0.0%

8.9%

21.3%

0.0%

14

Large Industrial

0.0%

0.0%

0.0%

0.0%

14.3%

13.5%

0.0%

15

ELI 2P-RTP

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

16

Municipal

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

17

Unmetered

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

18

Bowater Mersey (AE only)

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

19

GRLF

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

20

Wholesale Market Backup/Top-up

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

21

1P-RTP

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

0.0%

22

Total

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

100.0%

Line #	TABLE 2 b) Preliminary Estimate of DSM Program participation by rate class after accounting for the Municipal Class							
	COLUMN	A	B	C	D	E	F	G
		Calculation of relative class shares in DSM load reduction effects.						
	Program	Efficient Products	Existing Houses	New Houses	Home Energy Report	C & I Prescriptive Rebate	C & I Custom	Small Business Direct Install
5	Rate Class							
6	Residential	83.4%	98.2%	98.2%	98.2%	7.6%	4.0%	14.0%
7	Small General	7.3%	0.0%	0.0%	0.0%	5.8%	1.8%	11.8%
8	General Demand	7.3%	0.0%	0.0%	0.0%	53.1%	43.3%	66.2%
9	Large General	0.0%	0.0%	0.0%	0.0%	3.4%	8.4%	0.0%
10	Small Industrial	0.0%	0.0%	0.0%	0.0%	4.7%	5.9%	5.2%
11	Medium Industrial	0.0%	0.0%	0.0%	0.0%	8.8%	21.1%	0.0%
12	Large Industrial	0.0%	0.0%	0.0%	0.0%	14.1%	13.3%	0.0%
13	ELI 2P-RTP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14	Municipal	2.0%	1.8%	1.8%	1.8%	2.5%	2.2%	2.8%
15	Unmetered	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16	Bowater Mersey (AE only)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
17	GRLF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
18	Wholesale Market Backup/Top-up	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19	1P-RTP	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
20	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Relative Shares of Municipal sales in total NSPI sales by sector

	NSPI	Breakdown of Municipal Class Sales by Sector ¹	
		% of Mun.	% of NSPI
DSM-eligible sales by sector			
Residential	4,297,308,762.01	78,946,949	40.0%
General	3,160,475,829.85	98,683,686	50.0%
Industrial (before ELI 2P-RTP, GRLF, Mersey BB)	1,801,729,475.13	19,736,737	10.0%
	9,259,514,066.98	197,367,372	100.0%

1) Source: Municipal electric utility sales and purchase forecasts for 2011 provided by MEUNSC

Line #

TABLE 3 Preliminary Allocation of Program Costs among rate classes

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

COLUMN**A****B****C****D****E****F****G****H****FORMULA****Table 2
Column K****Table 1
Column H****Table 2
Column L****C + E**

Total Expenditure by Rate class		System Benefit Costs (25% of the total expenditure allocated to classes using COS methodology)		Participating Class benefit Costs (75% of the total expenditure directly assigned to participating classes)		Toal Allocated Costs	
Relative		Relative				Relative	
\$ Amount	Share	\$ Amount	Share	\$ Amount	Relative Share	\$ Amount	Share
\$24,099,670	55.1%	\$4,697,703	43.0%	\$18,074,753	55.1%	\$22,772,456	52.1%
\$1,669,905	3.8%	\$230,232	2.1%	\$1,252,429	3.8%	\$1,482,661	3.4%
\$10,791,071	24.7%	\$2,281,372	20.9%	\$8,093,303	24.7%	\$10,374,675	23.7%
\$926,638	2.1%	\$348,359	3.2%	\$694,979	2.1%	\$1,043,338	2.4%
\$1,092,044	2.5%	\$211,261	1.9%	\$819,033	2.5%	\$1,030,294	2.4%
\$2,351,632	5.4%	\$385,987	3.5%	\$1,763,724	5.4%	\$2,149,710	4.9%
\$1,869,267	4.3%	\$770,491	7.0%	\$1,401,950	4.3%	\$2,172,441	5.0%
\$21	0.0%	\$1,562,305	14.3%	\$16	0.0%	\$1,562,320	3.6%
\$844,931	1.9%	\$194,434	1.8%	\$633,698	1.9%	\$828,132	1.9%
\$101,437	0.2%	\$114,584	1.0%	\$76,078	0.2%	\$190,662	0.4%
\$10	0.0%	\$132,603	1.2%	\$8	0.0%	\$132,611	0.3%
\$31	0.0%	\$7,334	0.1%	\$23	0.0%	\$7,358	0.0%
\$0	0.0%	\$0	0.0%	\$0	0.0%	\$0	0.0%
<u>\$0</u>	<u>0.0%</u>	<u>\$0</u>	<u>0.0%</u>	<u>\$0</u>	<u>0.0%</u>	<u>\$0</u>	<u>0.0%</u>
\$43,746,657	100.0%	\$10,936,664	100.0%	\$32,809,993	100.0%	\$43,746,657	100.0%

Appendix C

Dunsky Energy Consulting Electricity Demand Side Management (DSM) Review

FINAL REPORT

ELECTRICITY DEMAND SIDE MANAGEMENT (DSM) REVIEW

A DUNSKY ENERGY CONSULTING REPORT

With assistance from **Vermont Energy Investment Corporation,**
Energy & Resource Solutions, and **North Atlantic Energy Advisors**

Submitted to Allan Crandlemire
EFFICIENCY NOVA SCOTIA CORPORATION

November 25th, 2010



ABOUT DUNSKY ENERGY CONSULTING

Dunsky Energy Consulting is a Montreal-based firm specialized in the design, analysis and implementation of energy efficiency and renewable energy programs and policies. Our clients include leading utilities, government agencies, private firms and non-profit organizations throughout Canada and the U.S. To learn more, please visit us at www.dunsky.ca.

Our colleagues at Vermont Energy Investment Corporation, Energy and Resource Solutions, and North Atlantic Energy Advisors provided valuable assistance in this project.

Acknowledgments

In preparing this report, we benefitted from the collaboration, insights and experience of Efficiency Nova Scotia Corporation, Nova Scotia Power, Inc. and Conserve Nova Scotia staff, in addition to those of our colleagues in the firms mentioned above. However, Dunsky Energy Consulting remains solely responsible for this report's contents, including any errors or omissions.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
REGULATORY ISSUES & RISKS	9
Introduction.....	10
Oversight in a Performance-Based Model	11
Total Resource Cost (TRC) Screening Requirements.....	14
Harmonizing Electric and Non-Electric Initiatives	17
Clarifying ENSC's Targets (and Costs).....	18
Implications for the 2012 Planning Process	26
OPPORTUNITIES TO ENHANCE 2011 PLAN SAVINGS	29
Overview.....	30
Sector-Level Findings.....	31
Program-Level Overview	34
Residential Market	36
<i>Performance Plus (New Homes)</i>	36
<i>Efficient Products (Lighting and Appliances)</i>	39
<i>Energuide for Existing Houses (Home Retrofits)</i>	42
<i>Residential Energy Affordability Program (Low-Income Retrofits)</i>	45
<i>Behavioural Feedback</i>	47
Commercial & Industrial Market.....	49
<i>Prescriptive Rebates (C&I products)</i>	49
<i>Small Business Lighting Solutions (Small Business Existing)</i>	53
<i>Commercial & Industrial Custom Program (C&I Existing, New Construction)</i>	54
Enabling Strategies and Policy Initiatives.....	59
<i>Overview – ENSC's Potential Role</i>	59
<i>Education and Outreach</i>	60
<i>Development and Research</i>	61
<i>Financing Policy and Development</i>	62
<i>Building Labelling Policy</i>	63
<i>Codes & Standards Policy</i>	64
<i>Training Policy</i>	66
<i>Leveraging Government</i>	67
<i>Renewable Heating Strategy</i>	68
MANAGEMENT, DELIVERY AND LOCAL CAPACITY.....	70
Management and Delivery	71
Local Capacity Development	78

EXECUTIVE SUMMARY

INTRODUCTION

Efficiency Nova Scotia Corporation (ENSC) retained the Dunsky Energy Consulting team to provide strategic advice designed to assist the Corporation as it moves to absorb current DSM Administrator functions, and ramp-up to achieve ever greater levels of electricity savings. With this in mind, the following report provides analysis and counsel organized around three themes:

- a) **Regulatory Issues & Risks:** We begin by examining the current regulatory framework, with a view to ensuring that it is sufficiently supportive of – and does not unduly impede – the Corporation’s ability to achieve what by all measures are very aggressive energy savings goals.
- b) **Plan Review and Enhancement Opportunities:** The bulk of this report presents our review and analysis of the current portfolio of programs and, rooted in our knowledge of best practices, our high-level recommendations both for improvements to those programs, and for design of a series of new strategies we believe will be needed to achieve the Corporation’s objectives.
- c) **Management, Delivery and Local Capacity Building:** Finally, we provide a brief discussion addressing a framework for considering which management and delivery strategies would be most effective going forward, with particular consideration given to the importance of building local capacity.

A Note Re Programs

For the sake of readability, we refer throughout this report to “ENSC programs”. However, the reader should bear in mind that ENSC only recently inherited these programs; until October 2010, they were in fact developed and implemented by the Interim DSM Administrator, Nova Scotia Power Inc.

REGULATORY ISSUES & RISKS

Our review of the regulatory landscape led us to identify four issues that ENSC will need to address to ensure it is able to fully contribute to Nova Scotia’s ambitious electricity DSM goals.

1. **PERFORMANCE-BASED OVERSIGHT:** Currently, DSM oversight follows an ‘annual plans review’ approach, wherein ENSC is expected to propose a DSM plan for UARB approval each year. This approach is not ideal, since it involves substantial administrative and managerial resources, and may hinder critical flexibility. In accordance with the recommendations of the 2008 Wheeler Report, which led to the creation of ENSC, we recommend that Nova Scotia move to a multi-annual, ex-post performance-based approach. Developing this approach would require a discussion between the UARB, ENSC and stakeholders, which we suggest could occur in 2011 in time to develop a framework for post-2012 DSM Plans. In the interim, oversight of the 2012 DSM Plan could follow the current model, with some modifications (see below).

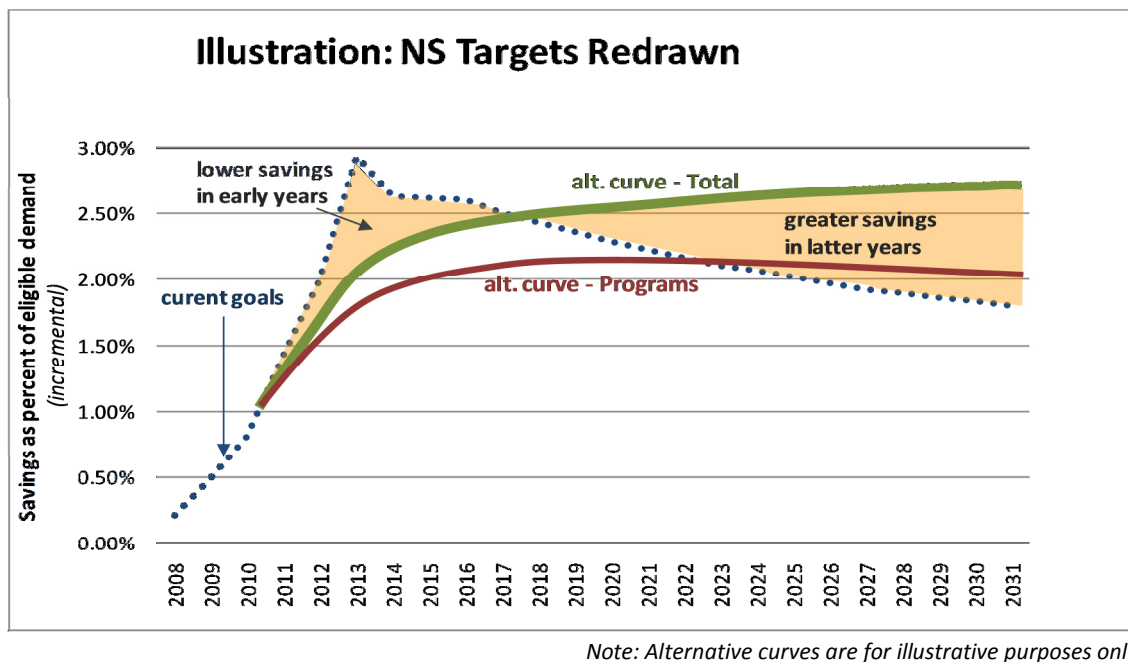
2. **TOTAL RESOURCE COST (TRC) TEST SCREENING REQUIREMENTS:** The TRC test is a standard benefit-cost testing methodology commonly used for screening DSM programs in North America. However, despite its inherent strengths, the TRC is increasingly being challenged as a flawed reflection of the societal perspective it seeks to represent; one that, in substituting analysts' judgment for those of consumers, may lead to unintended consequences. Nova Scotia uses this test, and furthermore applies it at the most restrictive level, requiring all DSM *measures* to meet its threshold. While the TRC has merit, we recommend that in the short-term, it be applied at the plan – not the measure – level. Furthermore, the role of the TRC itself could be revised at a later date.

3. **HARMONIZING ELECTRIC AND NON-ELECTRIC INITIATIVES:** ENSC is likely to take on responsibility for government-funded non-electric energy conservation efforts, under a to-be determined oversight framework. Experience from other jurisdictions underscores the importance of streamlining and/or harmonizing the electric and non-electric frameworks to the extent possible, to avoid duplication of evaluation, measurement, verification and other oversight processes.

4. **CLARIFYING ENSC'S TARGETS AND COSTS:** Nova Scotia has adopted a set of ambitious electricity savings goals, equivalent to – and in some ways more aggressive than – the targets of leading North American jurisdictions. These goals are derived from an overall, long-term ramp-up curve for DSM activities, set out in NSPI's 2006 Integrated Resource Plan (IRP) and the subsequent 2009 IRP Update. A close look at the IRP forecast raises three key issues that ENSC should carefully consider with the UARB and stakeholders as it plans for 2011-2013 and beyond:
 - A. **Program vs. Non-Program DSM Targets:** IRP DSM targets are currently *de facto* equated with ENSC's DSM *programs*, despite the fact that the overall target was initially meant to not only include savings from voluntary programs, but also from non-program activities such as codes, standards and other policy instruments. While ENSC's role should not be construed as limited to voluntary programs, this all-hands-on-deck assumption should both be clarified, and accounted for when considering the expectations of voluntary programs alone.

 - B. **Short-Term Savings Ramp-Up:** Overall IRP targets *in the short-term* (2011-2013) may be too ambitious, particularly if they are assumed to be program targets only. Indeed, while long-term DSM targets (2010-2031) may well be reasonable, achieving the incremental annual savings currently projected for 2013 – fully 2.9% of projected eligible sales – could prove too great a challenge. On the other hand, we believe it is possible to avoid the sudden anticipated drop in savings currently anticipated to begin in 2014, and, in so doing, compensate the longer ramp-up and maintain the IRP's projected capital avoidance. The figure below *illustrates* this principle of reducing short-term targets slightly while achieving similar or greater savings in the long term. The extent to which this "drawing out" of the early targets is indeed needed will depend at least in part, as discussed above, on the determination of whether and to what extent non-program savings can be counted toward the goals.

1 N.S. Alternative Ramp-Up Schedule (illustrated)



C. Program Costs. The IRP forecast includes annual DSM budgets, which to date have been mirrored in budgets for voluntary DSM programs. While the overall cost of achieving provincial DSM targets may be reasonable when non-program activities are included, we find that ENSC's *voluntary programs* component will likely require a higher average unit cost in the future, as ENSC pursues deeper and correspondingly more costly savings. A comparison with other jurisdictions suggests that ENSC's voluntary program budgets may require spending on the order of \$0.35-\$0.45 per first year kWh, rather than the \$0.28 implied by the IRP. Again, we underscore that the IRP's estimate may be achievable, but not without low-cost codes, standards and other policy tools brought into the mix.

Taken together, these issues lead us to recommend that ENSC seek greater clarity from the UARB on the roles of program and non-program activities in meeting provincial DSM targets. Similarly, ENSC's role in achieving non-program savings will require a clear framework to address both savings measurement and attribution. Depending on the potential contributions of non-program activities, we suggest that ENSC may need to revisit the ramp-up forecast in the IRP. Finally, we recommend that ENSC and the UARB review likely unit-costs of savings from voluntary programs, particularly when developing a performance-based contract post 2012.

OPPORTUNITIES TO ENHANCE 2011 PLAN SAVINGS

A key element of this project was a program-by-program overview of current DSM activities. Overall, our review has found that ENSC is inheriting a solid foundation of existing programs, organized largely along common “best practice” program design lines. Given Nova Scotia’s very recent entry into electric DSM, achievements to date are noteworthy and reflect well on NSPI as interim DSM Administrator. While we do suggest a range of enhancements for many programs, these should not be taken as a criticism of this existing foundation, but rather as suggestions for how these programs can continue to expand from a solid base to meet the increasingly more ambitious annual savings goals that have been set for future years.

We summarize our key findings by sector below, and present a two page chart synthesizing our assessments on a program-by-program level.

RESIDENTIAL PROGRAMS: ENSC, in collaboration with Conserve Nova Scotia, has built a solid foundation for residential programs. The most striking need for program redesign is the residential retrofit program, which provides wholly insufficient incentives now that the federal ecoENERGY program has put an end to its own prescriptive incentives. Beyond this, we recommend that programs expand to cover fuel substitution and small multifamily buildings, and that the products program become more aggressive and expand to focus on midstream and upstream actors. We also suggest developing one major new residential program initiative, a behavioural, on-bill feedback program.

COMMERCIAL & INDUSTRIAL PROGRAMS: Existing C&I programs are again a solid foundation for expansion and offer the lion’s share of potential future savings. One of our key suggestions for the C&I sector is an aggressive, targeted submarket approach, wherein staff or contractors with deep knowledge of specific C&I submarkets (otherwise referred to as segments) reach out to customers based on their specific needs and business cycles. This strategy needs to be carefully balanced with the need to present customers with a seamless, integrated single-window offering. A second overarching suggestion is to focus on long-term relationships, via the use of Key Account Managers for larger customers and positive early experiences for smaller customers.

ENABLING STRATEGIES: Enabling strategies include internal ENSC activities which support programs, such as education, outreach, research and development and training activities. They also include ENSC contributions to vitally important non-program activities. We make specific suggestions for how ENSC can support the development and implementation of codes and standards, financing policies, building labelling policies, non-ENSC training policy, governmental initiatives and a renewable heating strategy. Leadership in these areas will help achieve provincial DSM goals, while stimulating local capacity and expertise in areas that hold the promise of significant economic opportunity in the future.

Because of long lead times, most of these initiatives will have limited impact before 2013. However, efforts must be initiated now in order to reap those longer-term rewards.

ENSC Electricity DSM Review

Below we summarize these findings, indicating the relative scope of changes recommended for consideration by ENSC, each program's potential contribution to both near-term and longer-term targets, and summary recommendations. New initiatives are highlighted in blue.

Program / Market Area	Scope of Potential Changes ^a	POTENTIAL SAVINGS		PRINCIPAL RECOMMENDATIONS (see program profiles for more detailed suggestions)
		Near-term (2011-13) ^b	Long-term (2014-30) ^c	
Performance Plus (New Homes)	Moderate	★	★	- Fuel choice measures - Pre-drywall QC visits - Expand to small MF, development-level measures
Efficient Products	Significant	★ ★	★ ★	- Full-scale, long-term appliance replacement program - Work with upstream and midstream market actors - Year-round product incentives; sales, stocking incentives
Energuide for Existing Homes (Home Retrofit)	Major	★	★ ★	- Major incentive level increases - Reducing customer level of effort - Trusted workforce - Reflect participant timelines
REAP (Low-Income Retrofits)	Moderate	★	★	- Add heating measures - Expand income eligibility, building eligibility (multifamily) - Increase participation targets
Residential Feedback	Major New Initiative	★ ★	★ ★	- Provide enhanced on-bill feedback - Explore direct feedback via advanced metering
Business Energy Rebates/ Smart Lighting Choices (CI Products)	Significant	★ ★	★ ★	- Targeted sub-market programs and outreach - Address both market-driven and discretionary opportunities
Small Business Lighting Solutions	Minor	★ ★	★ ★	- Gradually expand to non-lighting measures - Gradually expand eligibility to 200 kW - Cross-train market actors
C&I Custom (Existing / New Construction)	Significant	★ ★ ★	★ ★ ★	- Targeted sub-market programs and outreach - Long-term relationships via account management - Deeper technical assistance - Fully negotiated incentives

ENSC Electricity DSM Review

Program / Market Area	Scope of Potential Changes ^a	POTENTIAL SAVINGS		PRINCIPAL RECOMMENDATIONS (see program profiles for more detailed suggestions)
		Near-term (2011-13) ^b	Long-term (2014-30) ^c	
Education and Outreach	Minor	NA	NA	- Provide knowledgeable single-window initial contact staff
Development and Research	Moderate	NA	NA	- Use experimental program designs where possible - Fund emerging technologies
Financing Policy	Major New Initiative	★	★ ★ ★	- Expand on-bill financing to residential - Transferable financing (on-bill or PACE)
Building Labelling Policy	Major New Initiative	-	★ ★ ★	- Support provincial efforts (studies, pilots) - Pilot Energy Star Portfolio Manager
Codes & Standards Policy	Major New Initiative	★ ★	★ ★ ★	- Explore code compliance support - Electric baseboard ban support - Long term code development support
Training Policy/Programs	Significant	NA	NA	- Coordinated training approach - Support for contractor certification - Work with university and college sectors, local A&E firms
Renewable Heating Industry Strategy	Major New Initiative	★	★ ★ ★	- Develop coordinated strategy targeting biomass, solar thermal and geothermal space and water heating
Leveraging Government	Major New Initiative	★	★ ★ ★	- Work with municipalities to spearhead innovative policies

NOTES: (a) **green**=minor/moderate changes; **orange** = significant changes; **red** = major changes / new opportunities.

(b) relative to 2011 targets. (c) relative to overall 2013 target.

POTENTIAL TO SCALE: ★ Minimal ★★ Significant ★★★ Very significant.

MANAGEMENT, DELIVERY AND LOCAL CAPACITY BUILDING

As ENSC takes on and expands existing DSM programs, it will be faced with decisions on its overall management and delivery structure. A key aspect of this is determining which functions should be performed by permanent, in-house staff, and which should be outsourced to DSM consultants, DSM program implementers, and other market actors.

Our team was not tasked with conducting a workforce assessment or otherwise recommending management approaches. Rather, we provide a limited review of the options, the principal strengths and weaknesses inherent in each, and a set of principles and issues for ENSC to consider as it moves forward, specifically:

- The viability of both models, as shown by the range of approaches used by leaders such as Vermont, Oregon and Wisconsin;
- The overriding importance of setting the tone for a strong, in-house culture driven by performance and focused on market dynamics;
- The similar importance of valuing management and delivery by providing attractive and stimulating working conditions;
- The impact of the anticipated rapid DSM ramp-up that will increase the need to rely on outside contractors in the initial stages;
- The need for a long-term perspective, in particular given the likely importance of outside contractors in the initial stages;
- The Importance of collaboration between in-house staff and contractors, and the need to minimize silos; and
- The need for neutrality where ENSC intervenes in active, competitive markets.

Similarly, we present key strategies for building local capacity, including nurturing in-house staff, considering local content requirements for RFPs, making long-term commitments to key contractors, communicating predictability to the market, developing market transformation strategies, offering assistance to overcome barriers to entry, leveraging existing certification processes, and tracking job creation.

REGULATORY ISSUES & RISKS

INTRODUCTION

As Efficiency Nova Scotia Corporation takes on NSPI's portfolio of Demand Side Management (DSM) programs and continues the sharp ramp-up of efforts and energy savings targets foreseen under Nova Scotia's long term DSM forecast, it is critical to identify and address any potential barriers to success within the current regulatory framework.

Below we briefly discuss four issues that, if properly addressed, can enable the necessary conditions for success. Specifically:

1. **Oversight:** Aligning the review and oversight process with a performance-based model
2. **Screening:** Eliminating the requirement for TRC screening at the measure-level
3. **Harmonization:** Streamlining the electric and non-electric performance assessment and review frameworks
4. **Targets and Costs:** Clarifying the nature and scope of the targets, adjusting the short-term ramp-up and reconsidering costs

We believe addressing each of these issues can play an important role in ensuring that ENSC is able to fully contribute to the province's ambitious electricity DSM goals.

OVERSIGHT IN A PERFORMANCE-BASED MODEL

Regulatory oversight of a dedicated DSM “utility” like ENSC is broadly analogous to regulatory oversight of other monopoly functions. In this respect, regulatory models exist on a continuum, ranging from pure “cost of service” models¹ on one end, to pure “performance-based” models on the other end.

In Nova Scotia, where NSPI’s rate setting process has historically followed a broadly cost-of-service model, it is no surprise that regulation of NSPI’s DSM activities has taken a similar approach. To this end, NSPI submitted its proposed DSM plans to the Nova Scotia Utility and Review Board (UARB), and the UARB undertook to ensure that the proposed associated revenue requirement was in the interest of ratepayers.

In April 2008, following stakeholder consultation, a report prepared by Dr. David Wheeler proposed a new model for DSM administration and delivery in the province.² This model, which led to the creation of ENSC, is predicated on the creation of an independent, third-party delivery agency (ENSC), operating under a performance-based contract with the UARB.

While much effort has been placed to date on creating ENSC and transitioning the programs previously under NSPI administration, the performance-based contract could be considered an equally critical component to the success of the Wheeler model.

The performance-based approach outlined in the Wheeler report is meant to give both flexibility and responsibility to ENSC to achieve the savings goals within an agreed-upon budget and, possibly, an incentivized framework. As such, it fundamentally changes the nature of the UARB’s oversight role. Analogous to performance-based ratemaking regimes, this approach applied to DSM implies focusing *ex-ante* on approval of overall budgets, goals and EM&V³ procedures and protocols, and *ex-post* on a review and validation of performance. Importantly, it implies that the UARB is *not tasked with pre-approving ENSC’s plan for achieving these goals*.

The following table highlights some of the key differences between the two approaches as applied to DSM:

¹ A “cost of service” model is fundamentally prospective, requiring the regulator to determine, in advance, the revenue required to allow the utility to adequately perform its functions and generate a reasonable return for investors, given an assumed risk profile. The revenue requirement is determined by customer class, and rates are then set based on a forecast of annual sales. A variety of adjustments may or may not occur *ex-post* to account for unforeseen variances.

² David Wheeler, *Stakeholder Consultation Process For An Administrative Model For DSM Delivery In Nova Scotia – Final Report*, April 20th, 2008.

³ Evaluation, measurement and verification.

ENSC Electricity DSM Review

	ANNUAL PLANS REVIEW ex: NSPI (past)	PERFORMANCE-BASED APPROACH
ADMINISTRATOR	• Proposes plan to achieve cost-effective savings • Requests approval of budget and plan for set period (e.g. 1 year) • Adjusts programs on an on-going basis only to the extent explicitly permitted by regulator⁴	• Develops and adopts plan to best achieve goals within allotted budgets • Continuously adapts and adjusts plan as results unfold
REGULATOR	• Conducts comprehensive review of proposed plan and programs • Determines whether they are likely to be cost-effective or maximize value / minimize cost • Approves budget requests • Receives ex-post results	• Determines overall goals, budgets and incentives, if any • Reviews ex-post claimed results and determines their credibility (EM&V) • Approves ex-post incentives based on verified results
B/C TESTS	• Tests can play critical role in screening <i>proposed plan</i>, including programs and in some cases even measures	• Goals and budgets can be based either on cost-effectiveness (as determined by TRC-type tests) or policy goals (may not involve screening) • Tests can continue to inform the Administrator but are not used <i>by the regulator</i> to pre-screen or pre-approve plans, programs or measures

The move to a performance-based model would provide ENSC with increased flexibility to adjust and adapt its plans as needed, as situations arise and as feedback comes in. Furthermore, an oversight model focused on outcomes can significantly reduce the time, energy and talent that the DSM

⁴ It is worth noting that in Nova Scotia, the current regulatory structure allows for adjustments or mid-course corrections to the plan; significant adjustments are discussed at the Program Development Working Group.

ENSC Electricity DSM Review

administrator must devote to formal regulatory hearings and processes, freeing them up to focus more on ensuring targets are met.⁵

RISK	<i>While Nova Scotia's regulatory model allows for somewhat more flexibility than others, the annual, pre-approval process is not as conducive to success as a multi-annual, performance-based approach.</i> <i>Note that adoption of long-term goals eliminates one of the prime issues discussed in ex-ante hearings.</i>
RECOMMENDATIONS	• <i>Consider moving to a multi-annual, ex-post performance-based approach and, in so doing, clarify the associated review / oversight framework</i> • <i>In the interim, maintain the flexibility previously afforded to NSPI to adjust programs as needed prior to subsequent hearings.</i>

⁵ In our experience in other jurisdictions, senior DSM management and staff often spend upwards of 6 months of every year focused largely on the regulatory approvals process. The resulting attention often comes at the expense of dynamic program management and strategic assessments and changes.

TOTAL RESOURCE COST (TRC) SCREENING REQUIREMENTS

Current electricity DSM targets were derived from Nova Scotia Power's Integrated Resource Planning (IRP) process. Through this process, a level of incremental annual energy savings, roughly equal to 2% of annual load forecast, was identified as a least-cost resource for balancing supply and demand. This was determined using a total resource cost (TRC) approach, essentially comparing the full cost of energy efficiency to the equivalent long-run cost of offset supply. In this context, the TRC served an important role in determining that the least-cost DSM scenario was the maximum achievable one.

The TRC has other purposes as well. In some regions, where IRP is not the norm, the TRC allows parties to determine whether individual measures, programs or plans are cost-effective. Where utilities are required to achieve "all cost-effective savings", the TRC can be used to assess opportunities accordingly.

In Nova Scotia, the DSM plan is required to promote only measures with a TRC greater than 1 (with rare exception).⁶ This raises two concerns for program performance: undue constraints arising from a measure-level requirement, and unintended consequences arising from the use of the TRC itself.

MEASURE-LEVEL CONSTRAINTS

Despite the valuable information a TRC analysis may provide, this requirement would unduly restrain ENSC's ability to forge an optimal path forward. Indeed, as with any diversified business, different products can play different roles in a portfolio approach: some are "profit centers", generating strong gains on their own at low cost; others may be loss leaders, whose primary purpose is to encourage uptake of higher-return products; and still others may be game-changers, sold at a short-term loss within a longer-term, market-positioning strategy.

The same is true of energy efficiency measures: while some programs focus exclusively on one or two measures, most involve a broad array, at times promoted individually, at times promoted as a package. For example, despite sometimes failing the TRC test, some successful programs provide incentives for certain Energy Star appliances as part of a broader household products effort, because they help to build the Energy Star brand. Others encourage solar technologies, despite lower TRC ratios, with the express intent of generating the economies of scale required for longer-term cost-effectiveness. Yet others provide costly incentives to low-income customers, out of respect for equity considerations.

That is not to say that benefit/cost tests have no value – only that to achieve its targets (already rooted in those same tests), ENSC should be given the flexibility to account for complex market dynamics that a

⁶ "Activities in individual programs which have a TRC ratio of less than one are to be undertaken only if they are critical and their exclusion will jeopardize the whole program." *UARB Decision and Finding, P-884(2), August 4, 2009.*

single, strictly-applied test cannot accommodate. Furthermore, if a performance-based framework is adopted, we assume that pre-approval of programs and plans would no longer be necessary as the focus shifts to outcomes. In all cases, we believe there is little value to a measure-level TRC *requirement*.⁷

UNINTENDED CONSEQUENCES FROM RELIANCE ON THE TRC

Notwithstanding our primary recommendation to eliminate the formal measure-level TRC screening process requirement, we believe it worthwhile to address the types of cost-benefit tests, in the event the UARB and ENSC choose not to proceed with a performance-based contract approach.

The Total Resource Cost test was defined in the California Standard Practice Manual in 1987, and quickly became one of the most commonly-used DSM screening tests. The test is meant to reflect the full costs and benefits of DSM opportunities. To this end, the TRC is intended to include all costs (irrespective of participant contributions both participant and DSM Administrator costs) and all known or readily-measurable resource benefits (primarily the value of saved energy).

Throughout North America, leading DSM practitioners have begun to question the value – and inherent bias – of the TRC. Indeed, central to the test is an assumption that resource benefits are a sufficient reflection of the full value of energy saving measures. This neglects the substantial non-resource benefits that often act as significant, indeed sometimes the primary motivating factors in consumers' decisions to pay for energy savings measures.

A recent paper on this subject⁸ presents several interesting examples of this problem:

- Program managers know that many consumers attribute greater value to non-bill savings, including comfort (e.g. from weatherization), productivity (e.g. from daylighting), and image/standing (e.g. from installation of solar panels), than to the bill savings themselves. The TRC neglects these significant benefits, yet accounts for the full cost of the measures, including the costs customers are willing to pay, often in large part because of the very benefits the TRC ignores.
- A number of studies have now quantified the value of these “non-energy benefits (NEBs)”. For example, a U.S. DOE study found the value of NEBs to exceed the full value of energy savings from low-income weatherization programs; a similar study found NEBs to be more than five times the value of energy savings from new construction building commissioning; and an

⁷ Of course ENSC may well choose to continue to screen its measures and programs, using the TRC and/or other tests, to inform its own goal-oriented planning process. Furthermore, the UARB should continue to use B/C tests if and when it sets out to review targets and budgets, for example within the context of NSPI's integrated resource planning process.

⁸ Neme, Chris and M. Kushler, “Is It Time to Ditch the TRC? Examining Concerns with Current Practice in Benefit-Cost Analysis”, in Proceedings of the American Council for an Energy Efficient Economy's 15th Summer Study, 5-299 – 5-310. August, 2010.

ENSC Electricity DSM Review

assessment of 52 industrial energy efficiency improvements found productivity benefits to exceed 120% the value of energy savings alone. The TRC fails to capture any of these benefits.

- Because consumers may derive far greater value than reflected in the TRC, and because this value varies tremendously from measure to measure, programs that are too-strictly constrained by TRC requirements may unwittingly be losing savings opportunities and/or incurring unnecessary costs. For example, if consumers value solar hot water (SHW) systems more than, say, a heat pump water heater, a program may be able to provide lower relative incentives and generate greater energy savings through the SHW option. Yet by failing to reflect the customer's perspective, and indeed by substituting its judgment for that of consumers, the TRC may determine instead that the heat pump water heater is more beneficial, and in so doing constrain program administrators to spend more money incenting a less productive energy saving opportunity.

In other words, use of the TRC as a strict, binary screen can lead to unintended consequences.⁹ There is no clear consensus yet on appropriate alternatives to the TRC, though the Utility Cost Test (UCT) presents a number of notable advantages.¹⁰ Ultimately, should a single test be required to screen the DSM plan or its components, we would urge that it take into consideration the shortcomings highlighted above.

RISK	<i>The requirement for individual measures to pass the TRC is unduly restrictive, limiting ENSC's ability to consider effective market and sales strategies to meet long-term objectives. Furthermore, the TRC itself can be misleading and lead to unintended consequences, such as missed opportunities for long-term cost-effective savings, or unnecessarily-high program costs.</i>
	
RECOMMENDATIONS	• <i>At a minimum, ENSC should petition to not be subjected to a measure-level benefit/cost requirement, focusing instead on plan-level cost-effectiveness.</i> • <i>Consider alternatives to the TRC to test for DSM cost-effectiveness and value.</i>

⁹ If brought to a logical extreme, one could argue that to maximize TRC results, DSM programs should *actively discourage* customer adoption of technologies such as solar photovoltaics (which do not pass the TRC). Similarly, a purely TRC analysis could argue for governments to actively discourage consumers from purchasing hybrid electric vehicles such as the Prius (e.g. through a special surtax). While absurd, these examples serve to further illustrate the inherent weaknesses of the TRC.

¹⁰ The Utility Cost Test (UCT), also known as the Program Administrator Cost Test (PACT), compares the system benefits (e.g. avoided electric supply costs) with the program's costs (including incentive and non-incentive costs).

HARMONIZING ELECTRIC AND NON-ELECTRIC INITIATIVES

Throughout Canada and the U.S., efficient and effective DSM program delivery is often challenged by the existence of a patchwork of DSM administrators. In some regions, for example, a variety of electric and gas utilities, in addition to provincial or state agencies, may offer different and sometimes overlapping programs and incentives. The resulting multiplicity of actors and program offerings can act as a powerful barrier to clear communication with both customers and market channel actors, and can further result in duplicative administrative, marketing and outreach costs.

With the creation of ENSC, and the likelihood of transferring both NSPI *and* Conserve Nova Scotia programs, the province is well-positioned to avoid this problem. Indeed, while recognizing that the UARB and government may reasonably have different sets of goals (GWh savings for electric resource planning; GJ, economic or CO₂e savings for societal benefits), the *opportunity* for a seamless, streamlined approach exists.

To fully tap into this opportunity, some coordination between the UARB and government is needed. In particular, if performance-based frameworks with ENSC are established, a streamlined approach to performance assessment would avoid duplicative costs associated not only with evaluation, measurement and verification (EM&V), but also with the review process itself.¹¹ Lost opportunities associated with these costs – as well as with the attention required of senior management and staff – is not trivial.

RISK	<i>Not so much as risk as an opportunity for Nova Scotian ratepayers and taxpayers to benefit fully from the transfer of electric and non-electric savings targets to a single entity, paving the way for clearer communications with consumers and market channels, improved senior staff productivity, and cost savings from streamlined regulatory, administrative, EM&V, marketing and outreach costs.</i>
RECOMMENDATIONS	• <i>Encourage UARB and the government to consider a streamlined performance review process for assessing success toward both electric and non-electric goals.</i>

¹¹ An example: ENSC senior management and staff time and attention to delivering on agreed upon targets will be hindered if the organization has to prepare and file two distinct performance reports, using two different sets of EM&V protocols, in the context of two different review procedures at two different times of the year.

CLARIFYING ENSC'S TARGETS (AND COSTS)

OVERVIEW

Nova Scotia has adopted a set of ambitious electricity savings goals, equivalent to – and in some ways more aggressive than – the targets of leading North American jurisdictions. These goals are derived from an overall, long-term ramp-up curve for DSM activities, set out in NSPI's 2006 Integrated Resource Plan (IRP) and the subsequent 2009 IRP Update.

A close look at the IRP forecast identifies three key issues that ENSC should carefully consider with the UARB and stakeholders as it plans for 2011-2013 and beyond:

1. IRP DSM targets are currently *de facto* equated with ENSC DSM program targets, despite the fact that the *overall* target was initially meant to not only include savings from voluntary programs, but also from codes, standards and other tools. This must be clarified and accounted for when considering the expectations of voluntary ENSC programs alone.
2. Overall IRP DSM targets *in the short-term* (2011-2013) may be too ambitious, particularly if they are treated as voluntary program targets only. Indeed, while *long-term overall* DSM targets (2010-2031) may well be reasonable, achieving the maximum incremental annual savings may require a slightly longer ramp-up period. Whether or not this is the case will depend on the potential contribution of non-program activities in 2011-2013, which is unclear at this time.
3. While overall costs for achieving provincial DSM targets may be reasonable, it is important to note that ENSC's *voluntary programs* component will likely require a higher average unit cost.

Overall, we should emphasize that provincial DSM targets are both cost-effective and, we believe, achievable. As such, our recommendations aim merely to more clearly distinguish *overall* targets from the savings expected of ENSC's *voluntary DSM programs* alone, and to adjust *short-term* savings targets without affecting long-term resource planning.

We discuss each issue in more detail below.

ISSUE A: OVERALL DSM TARGETS ARE NOT LIMITED TO ENSC PROGRAMS ALONE

The approved 2009 IRP update¹² clearly suggests that DSM forecasts account for *all* DSM efforts and savings, including not only resource acquisition DSM programs to be managed directly by ENSC, but also:

- Consumer behaviour and investments,
- Energy efficiency codes & standards,
- Efforts by other agencies,
- Efforts by NSPI, potentially including internal DSM such as street-lighting technologies, automated metering infrastructure, and rate design, and
- Direct load control efforts.

On the other hand, DSM targets and associated program budgets from the IRP appear to be presented as ENSC targets and budgets for the 2011-2013 period, and the general understanding of stakeholders and program administrators appears to be that IRP DSM forecasts reflect ENSC targets and budgets in the long term as well.

Having reviewed IRP targets, IRP baseline assumptions, and the DSM context in Nova Scotia, we highlight the need to clarify the goals and the sources of contribution. Two issues warrant particular attention:

1. **ENSC is not alone.** DSM goals should account for the contributions of ENSC programs *as well as of longer-term, enabling strategies*, i.e. strategies that ENSC can actively influence and support, but which ultimately depend on decisions by other parties (provincial government, municipalities). These include most notably aggressive codes and standards, other governmental policies such as building energy labelling or financing, and the initiatives of a host of other, non-ENSC entities (e.g. NSPI for progressive rate design and LED streetlight retrofits, or HRM initiatives on solar hot water). These contributions matter insofar as the IRP baseline projection of total demand was based on historical growth trends which did not involve significant energy codes and other electric savings initiatives beyond business-as-usual improvements.

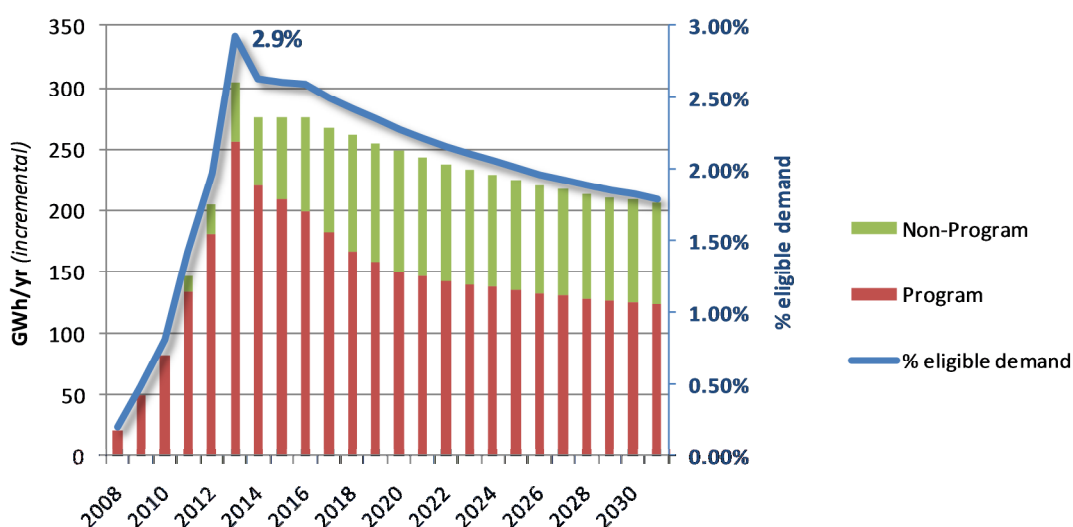
It is beyond the scope of this project to provide rigorous estimates of the potential contribution of these non-program opportunities to DSM goals. We do, however, expect their contributions to be significant, and to increase with time. As an example, New York State assumes that 11% of its 2010 DSM targets (similar to Nova Scotia's) will be met by codes and standards alone, rising to 32% in 2015. Similarly, British Columbia assumes that C&S will contribute 14.5% of savings in 2010 and 28% in 2015.

¹² NSPI 2009 Integrated Resource Plan Update Report (Redacted), Appendix D, page 50.

- 2. Goals are more ambitious than initially considered.** As we understand it, DSM goals for Nova Scotia were initially conceived on the basis of a common metric: percent of total demand. Yet an important rate class has so far not participated in DSM programs *per se*: the Extra Large Industrial (ELI) class. This class represents roughly 19% of total electricity demand, and consists of a small group of customers (currently two). Assuming that the ELI class will continue to not participate in programs, then DSM targets are, relatively speaking, more aggressive than initially considered. We address this further in our discussion of Issue B, below.

The following chart presents Nova Scotia’s long-term DSM goals in terms of both annual incremental GWh savings targets (stack bars), and these targets as a percentage of eligible demand (blue line). For the sake of illustration only, each table assumes that – together – non-program strategies such as codes and standards will contribute 8% of 2011 targets, rising to 24% in 2015 and 40% in 2020. Furthermore, to more accurately reflect the level of effort, projected annual ELI consumption has been removed from the denominator, such that the metric is now showing DSM goals as a percent of *eligible* demand.¹³

2. Annual DSM Targets With Assumed Breakout of Non-Program Savings



Notes: Relative program and non-program contributions are illustrative only. Stack bars are not aligned to the axis to the right.

The point of this chart is not to suggest that ENSC’s role be limited to the “program” component – indeed, contributing to code and other non-program savings opportunities can be an important component of ENSC’s efforts. Rather it suggests that achieving these targets will require a concerted effort. The reader will also note that the chart implicitly raises the question of whether the projected ramp-up is appropriate – we address this second question in “Issue B”, below.

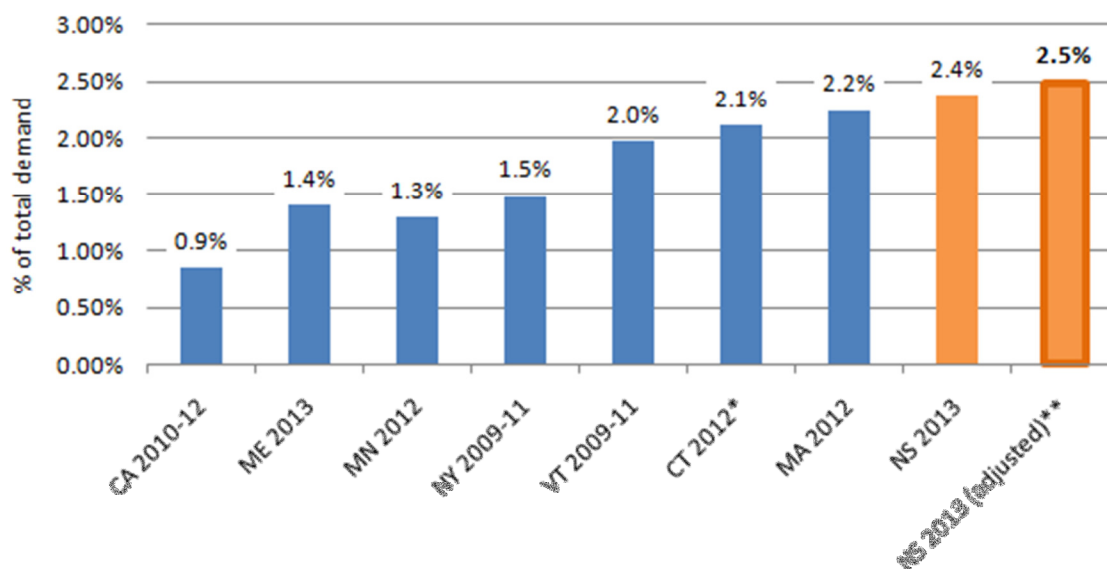
¹³ By “eligible demand”, we refer to the total electricity consumption of rate classes – i.e. all those except ELI – that are currently expected to participate in ENSC’s programs.

ISSUE B: CONSIDER A SOMEWHAT LONGER RAMP-UP

Nova Scotia is to be lauded for setting itself ambitious electric DSM goals. However, a review of these targets raises concerns that *interim* targets for the 2011-2013 timeframe may be overly ambitious. By means of comparison, when considering both the level of savings and speed of ramp-up, they would appear to (somewhat) exceed anything envisaged in other leading North American jurisdictions.

The table below contrasts Nova Scotia's 2013 DSM targets with those of California and leading northeast U.S. states over the coming few years. To facilitate an apples-to-apples comparison, we use the common percent of demand metric. We further present two scenarios for Nova Scotia: one that includes *all* expected savings (including from programs and non-program initiatives), divided by *total* demand, and one that adjusts to reflect our assumed program-only savings, divided by *eligible* (non-ELI) demand only. This second, adjusted savings bar is likely the more relevant for comparing the province against other jurisdictions. In both cases, we are presenting targets for 2013, which is the single most ambitious annual target in the provincial IRP forecast.

3. Comparative DSM Targets (percent-of-demand)



Notes: *Connecticut 2012 goal not yet approved (currently at 1.06% for 2010). ** In "NS 2013 (adjusted)", savings assume our earlier estimate from voluntary programs alone, while demand is adjusted to account only for "eligible demand" (i.e. non-ELI).

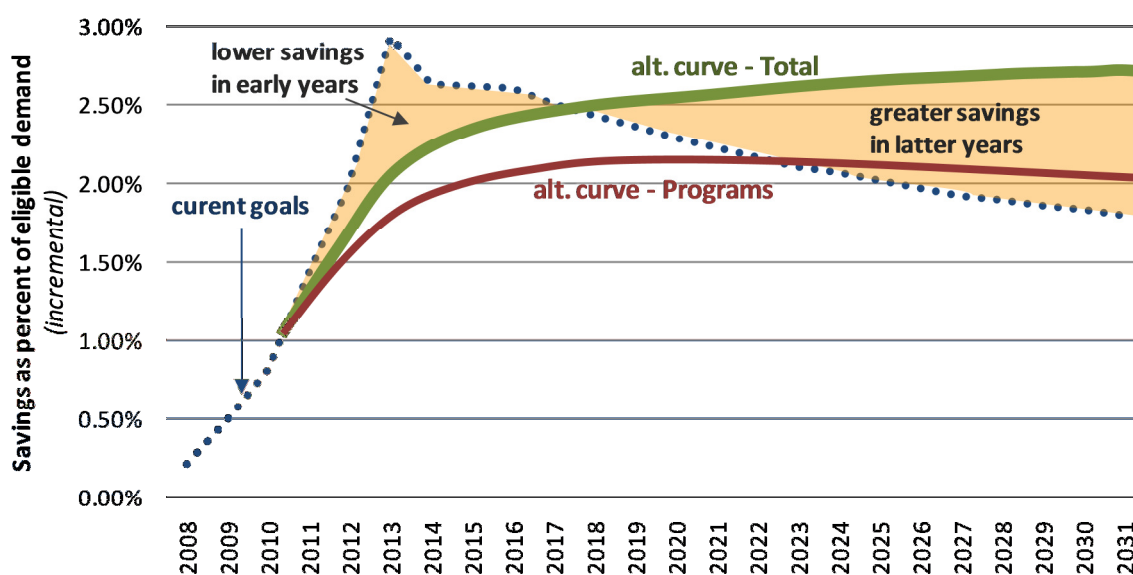
Beyond absolute targets, there is also the question of the speed with which ENSC is expected to ramp up savings levels. The 2009 IRP Update has annual DSM savings moving from 0.66% of total demand in 2010 to savings levels of 2.38% in 2013, an almost four-fold increase in three years. The most ambitious of our comparison jurisdictions, Massachusetts, is aiming to achieve a very similar ramp-up (0.69% to 2.24%), but in *four years* rather than three. Massachusetts also benefits from the advantage of a very robust DSM sector and incomparable DSM experience.

ENSC Electricity DSM Review

Despite Nova Scotia's success to date in ramping up quickly, we are concerned that the 2013 targets may not be achievable within that very short timeframe.¹⁴ We should emphasize that our concern is not with the absolute level of ENSC's cumulative annual savings targets which, while ambitious, are likely feasible over the medium and longer terms (2011-2020 and beyond), particularly when codes and standards and governmental policy are taken into account (see Issue A above).¹⁵ Similarly, we should note that our concern is with expected *incremental annual* savings in 2013; we have not endeavoured to assess the contribution that excess savings in 2008-2010 could make to the implicit cumulative annual 2013 savings.¹⁶

Ultimately, we believe it is likely possible to adjust the expected ramp-up curve to a more realistic level *without* affecting long-run, cumulative DSM savings. The chart below illustrates the sort of alternative ramp-up schedule that could be considered.

4 N.S. Alternative Ramp-Up Schedule (illustrated)



Note: Alternative curves are for illustrative purposes only.

¹⁴ Although one North American jurisdiction (Vermont) has achieved more than 2.5% of total demand via voluntary DSM programs, it is important to note that residential lighting savings contributed disproportionately to its success – a phenomenon that will be difficult to replicate given the baseline shift in CFL market penetration and pending changes to Canadian standards. This is reflected in part in Vermont's somewhat less ambitious 2009-2011 targets.

¹⁵ We would further add that long term total DSM savings may indeed be even *higher* than forecast by the 2009 IRP, once market transformation strategies are incorporated. See chart 3, above.

¹⁶ This in fact raises another issue: while IRP targets are concerned with cumulative annual savings, ENSC's savings targets are focused on incremental annual savings. While useful for the program administrator, this ignores the contributions of past incremental annual savings that may have exceeded incremental targets. On the other hand, in deriving incremental savings targets from the IRP goals, it would appear that no allowance was made for savings degradation, for example from the end of useful measure lives. This only further serves to illustrate the need for greater clarity in defining targets.

The read will note that while we have suggested that the IRP's assumed long-run cumulative annual savings could likely be maintained without materially affecting long-run power needs and associated plant construction, we recognize that short-term changes could nonetheless impact the IRP, insofar as they affect NSPI's ability to meet short-run carbon constraints or renewable content requirements.

ISSUE C: BUDGETS MAY BE INSUFFICIENT FOR VOLUNTARY PROGRAMS COMPONENT

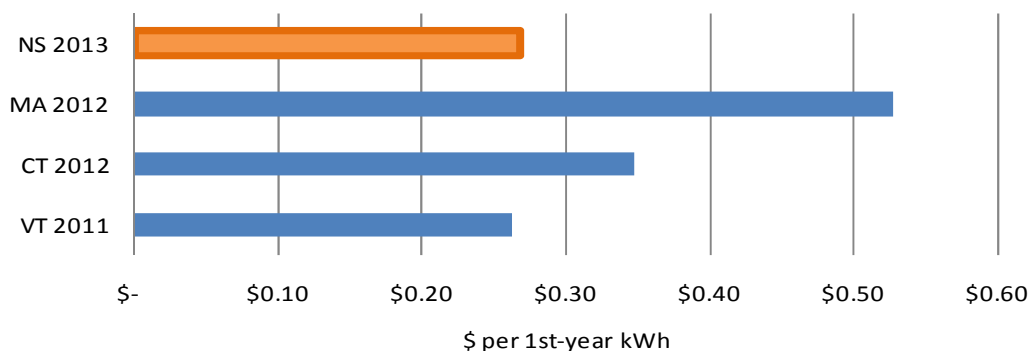
The budgets set out in the 2009 IRP for DSM programs hover around \$0.27-\$0.28 per first-year kWh (expressed in constant dollars through 2020). Compared to the historical record, these budgets appear reasonable and may even appear somewhat high:

- in 2008/2009, verified electric DSM in Nova Scotia averaged \$0.12/1styr kWh (\$0.16/1styrkWh without lighting programs)
- in 2007, leading jurisdictions reported costs ranging from \$0.08-\$0.22/1styrkWh, with an average of \$0.15

However, there is an increasing likelihood that program-related costs per kWh will increase significantly in Nova Scotia – and indeed across North America – primarily for two reasons. Firstly, improved lighting standards and increased baseline penetration of efficient lighting products is reducing the impact of what has been to date the single largest and lowest cost source of DSM savings. This will have the greatest impact from 2013 onwards, but baseline market saturation is already affecting savings. Secondly, more ambitious targets are requiring most jurisdictions to “climb the cost curve” and target higher-cost – albeit still cost-effective – savings opportunities.

The likelihood of increased costs going forward is borne out by a review of the *forecast* unit costs of several nearby jurisdictions with similarly ambitious targets, presented in the chart below.

5. Forecast Program Costs (\$ per 1st-yr kWh)¹⁷



¹⁷ Nominal dollars, not adjusted for currencies.

ENSC Electricity DSM Review

The comparison in Table 4 indicates that ENSC's forecast budgets are on par with Vermont but below those for more aggressive states such as Connecticut and Massachusetts. Vermont's low cost/kWh of \$0.26/1st yr kWh is due to large expected savings from its residential products program, with a forecast cost of \$0.09/1st yr kWh. When the effect of this program is removed, Vermont's average cost per first year kWh rises to \$0.42. Given ENSC's high savings targets and sharp ramp-up rate over the next few years (which will increase ENSC's reliance on more controllable but expensive programs), we believe that ENSC can anticipate higher *program-related* unit costs for 2011-2013, on the order of \$0.35-\$0.45/kWh.¹⁸

This is further borne out by a program-level comparison of ENSC's 2011 program costs with those of similar programs for Massachusetts and Vermont, presented below.

Program	ENSC 2011	Mass. 2011	Vermont 2011
Efficient Products	\$0.21	\$0.24	\$0.09
Existing Houses	\$0.45	\$1.06	\$0.82
Low Income Households	\$0.62	\$1.48	Not available
New Houses	\$0.43	\$1.51	\$1.20
Prescriptive C&I	\$0.16	\$0.32	\$0.30
Custom C&I	\$0.14		\$0.32
Small Business Direct Installation	\$0.34	\$0.50	\$0.57

As can be seen, aside from Vermont's low-cost residential lighting and products program, program costs for Massachusetts and Vermont are considerably more expensive than those forecast for Nova Scotia. Even assuming lower labour costs for Nova Scotia, this suggests a need to substantially increase *voluntary program* cost forecasts.

On the other hand, the cost of savings related to non-program initiatives like codes and standards will be significantly lower. Furthermore, it is worth recalling that a part of the reason for increased *voluntary program* unit costs is that lighting savings are being crowded out by higher standards, i.e. by no-cost, non-program savings. These factors will become increasingly important in the long term (2013 and beyond). As such, it is entirely conceivable that the adjusted *overall* savings targets, when combining both ENSC programs and non-program related savings, could be achieved within the current budget in the long term.

¹⁸ It is also conceivable that the advent of non-program strategies, such as mandatory building energy labeling and property-assessed financing, could contribute downward pressure on unit costs.

RECOMMENDATIONS

Based on the issues analyses above, we find a number of significant risks inherent in the determination, interpretation and reasonableness of the savings targets and expected costs thereof, and recommend these be most urgently addressed.

RISK	<i>Current savings targets are unclear, in particular the extent to which non-program related savings are to be considered, and whether the focus is (or should be) on incremental or cumulative annual savings. Furthermore, there is a real risk that short-term targets may not be achievable, and that the assumed unit costs of program-related savings are too low.</i>
RECOMMENDATIONS	• <i>Seek clarity on the types of savings drivers – including voluntary programs, codes and standards, internal NSPI investments and others – can be considered toward meeting the IRP goals (this should reflect drivers not implicit in the IRP’s demand forecast assumptions), and develop a framework for savings attribution.</i> • <i>Seek clarity on the nature of the goals – incremental annual or cumulative annual – and revisit these to account for both previous-year excess savings and long-run savings degradation.</i> • <i>Depending on the outcome of the previous issues, consider a somewhat longer initial ramp-up (1-2 years), coupled with deeper savings in the medium and longer terms, such as to avoid a material impact on the IRP’s identified long-run DSM value (power plant avoidance). Note that this may have a short-term impact related to carbon constraints and renewable content requirements.</i> • <i>Also depending on the outcome of the previous issues, reconsider the projected unit cost of savings from voluntary programs and, as such, the 2011-13 budgets. Note that any increase may be offset by significantly lower unit costs of non-program savings.</i>

IMPLICATIONS FOR THE 2012 PLANNING PROCESS

As DSM efforts are fully transferred from NSPI to ENSC, ENSC will also take on responsibility for preparing and filing its 2012 DSM Plan with the UARB. The plan must be filed by February 28th, 2010. We propose that our recommendations, if accepted by ENSC, could be addressed in this planning process in three ways:

1. Changes to the 2012 DSM Planning Framework
2. Clarifying 2012 DSM Plan estimates
3. Post-2012 Framework Changes

As discussed in more detail below, we suggest that the ENSC largely take a `business as usual` approach to the 2012 plan, proposing relatively minor changes to the planning framework and clarifying expectations re DSM savings targets, budgets and attribution. We do propose, however, that ENSC, the UARB and stakeholders launch a process – outside of the coming hearings – to discuss a new performance framework that could apply to the 2013 Plan and beyond.

CHANGES TO THE 2012 DSM PLANNING FRAMEWORK

In the short-term, ENSC should consider petitioning the UARB, within the framework of the 2012 plan, to:

- **Remove the measure-level TRC screening:** Removing this requirement for the 2012 Plan would be relatively straightforward and would offer ENSC additional flexibility in both program design and adjustments going forward. For this plan, we urge a plan-level focus for the TRC.
- **Clarifying the nature of overall targets:** ENSC should present its proposed savings target and budget for 2012 within the larger context of the overall IRP 2012 savings target, and clearly demarcate contributions from ENSC voluntary programs against expected contributions of non-program activities (provincial and federal codes and standards, NSPI activities, etc.), noting in particular those that ENSC would seek to actively influence. While it may be too early to establish a proper savings attribution model, this will help set the stage for a more in-depth future conversation as discussed below (see “Post-2012 Framework Changes” on page 27 below). This is also an opportune moment to begin presenting and discussing the value of cumulative annual savings targets, in addition to the current focus on annual incremental savings.

2012 DSM PLAN ESTIMATES

ENSC's staff, consultants, and NSPI colleagues are currently developing 2012 program designs and resulting savings estimates. It remains to be seen to what degree total forecast *program* savings will meet the IRP's overall 2012 DSM target – an outcome of bottom-up forecasting of achievable savings from each program. What is important in the context of the 2012 Plan is that program savings estimates are feasible, and that ENSC also carefully assesses incremental annual savings available from non-program activities in 2012, presenting these together.

Past DSM Plans have presented a three-year projection of IRP DSM savings targets as an illustration of likely future targets for ENSC. ENSC may choose to present a similar projection, but should highlight its intention to review the feasibility of 2013 targets in particular. It can also underscore that any short-term shortfalls will be compensated for by deeper long-term savings, and indicate its intention to work with NSPI to avoid or minimize negative impacts on NSPI resource planning from an adjusted DSM curve.

POST-2012 FRAMEWORK CHANGES

Within or in parallel with the 2012 DSM Plan filing, we suggest that ENSC petition the UARB to hold a broader discussion on a new framework for DSM planning post-2012. This would be an opportunity for ENSC, the UARB and stakeholders to address the following recommendations:

- Developing a multi-year, performance-based process for DSM oversight;
- Streamlining electric and non-electric DSM oversight (assuming that ENSC eventually takes on a provincial mandate to deliver non-electric energy conservation programs); and
- Developing a long-term savings attribution and reporting framework, both to establish ENSC's role in promoting and tracking non-program DSM savings, and to clarify expected reporting of cumulative annual savings (accounting for savings degradation in particular).

This process should begin as soon as possible, in order for discussions to be completed well in advance of the 2013 regulatory proceeding.

OPPORTUNITIES TO ENHANCE 2011 PLAN SAVINGS

OVERVIEW

The transition of DSM programs from NSPI to ENSC offers an opportunity to review specific program strategies and performance. For this project, we have conducted a high-level review with three aims:

- To provide a broad, qualitative review of program designs, informed by our experience as well as lessons learned and best practices elsewhere in North America;
- To identify options for enhancements to existing programs, as well as for new programs and strategies, for ENSC's consideration;
- To qualitatively assess the potential for each program to ramp up and contribute to meeting 2011's sharply increased goals, and contribute to even larger targets in 2012 and 2013.

To accomplish this, we employed a three-step process:

- **Initial Scan:** We reviewed existing NSPI and UARB documents and conducted interviews with NSPI, ENSC and Conserve Nova Scotia staff to prepare initial snapshots of each program. This included identifying DSM markets or policy areas where no ENSC programs are currently in place. Our team of senior staff from four distinct organizations then reviewed the portfolio of programs, both individually and as a group.
- **Additional Research:** Where our initial review warranted, we conducted additional research on specific program strategies and designs, as well as follow-up interviews with NSPI, ENSC and Conserve Nova Scotia staff
- **Final Review:** Our team of senior staff reviewed a second version of the portfolio review document, and additional analysis was incorporated into our final report.

A Note Re Programs

For the sake of readability, we refer throughout this report to "ENSC programs". However, the reader should bear in mind that ENSC only recently inherited these programs; until October 2010, they were in fact developed and implemented by the Interim DSM Administrator, Nova Scotia Power Inc.

We present the results of this portfolio review below, in separate sections for each program and each major enabling strategy or policy effort. Our program-level review is summarized in the chart on page 34; overall themes are discussed below.

SECTOR-LEVEL FINDINGS

Overall, our review has found that ENSC is inheriting a solid foundation of existing programs, organized largely along common “best practice” program design lines. Given Nova Scotia’s very recent entry into electric DSM, achievements to date are noteworthy and reflect well on NSPI as interim DSM Administrator. It is to the credit of the initial program administrators – NSPI and CNS – that they actively reached out to seasoned program administrators in other jurisdictions in North America and incorporated the lessons of those experiences into the initial Nova Scotia offerings. This strategy of modeling Nova Scotia programs after the “best of the best” gave the province the advantage of an accelerated learning curve.

While we do suggest a range of enhancements for many programs, these should not be taken as a criticism of this existing foundation, but rather as suggestions for how these programs can continue to expand from a solid base to meet the increasingly more ambitious annual savings goals that have been set for future years.

Our program-by-program review has led to a relatively large number of detailed suggestions. At a higher level, a few themes emerge, discussed below at the sector level.

EXISTING PROGRAMS – RESIDENTIAL

Broadly speaking, ENSC, in collaboration with Conserve Nova Scotia, has built a solid foundation for residential programs. The newly-launched new construction program sets out ambitious tiers, the efficient products and appliances offerings cover many major opportunities, and the low-income retrofit program offers an excellent zero cost, turnkey service, in line with best practices. **The most striking need for program redesign is the residential retrofit program, which provides wholly insufficient incentives now that the federal ecoENERGY program has put an end to its own prescriptive incentives.**

A common theme of our review of the three buildings-focused programs is our suggestion that programs expand to cover fuel substitution measures and small multifamily buildings. Within the products program, generally a major source of energy savings for other jurisdictions, we suggest a more aggressive and sustained effort, with particular focus on upstream and midstream channels that should lead to significant additional savings, particularly from lighting. We also suggest developing one major new residential program initiative, a behavioural, on-bill feedback program, that would however need to be done in collaboration with NSPI. This approach shows great promise for significant low-cost energy savings, and can be rolled out rather quickly.

Currently, the 2011 DSM plan calls for residential sector savings to roughly double from 2010 levels. To contribute a similar share of currently planned 2013 savings, residential savings will need to roughly quadruple from 2010 levels. We suggest that this ramp-up will be difficult to achieve by 2013.

EXISTING PROGRAMS – COMMERCIAL, INSTITUTIONAL & INDUSTRIAL

Even more than is the case for residential programs, ENSC's suite of commercial & industrial (C&I) programs can serve as a good basis for expansion. The small business direct install program is organized along best practices and promises to deliver significant savings, particularly if eligibility criteria and targeted measures are expanded. The prescriptive products program covers many key measures and includes an excellent upstream buydown approach for high performance T8 lighting. The Custom program promises to meet or exceed 2010 targets, and has adopted a best practices approach to small/medium new construction.

One of our key suggestions for the C&I sector is an aggressive, targeted submarket approach, wherein staff or contractors with deep knowledge of specific C&I submarkets (otherwise referred to as segments) reach out to customers based on their specific needs and business cycles. This segmented approach can, for some markets, include tailored audits and incentives. Related to this, we recommend expanding the current prescriptive products approach, now focused on natural replacement opportunities, to include incentives and services aimed at their *early* replacement. This is particularly important for smaller clients and standardized measures, where the more complex custom approach may not be worthwhile. At the same time, we underscore that this approach should not lead to a large array of narrow, standalone programs, but should be used as a marketing strategy within a larger, integrated single-window offering.

A second overarching suggestion is to focus on long-term relationships. For larger customers, this involves a Key Account Manager strategy, while for smaller customers, it implies ensuring positive, hassle-free early experiences with DSM programs and encouraging repeat customers.

Achieving Nova Scotia's DSM targets will require a systematic effort aimed at all energy savings potential in the province. However, the sharp ramp-up planned for the next few years makes focusing on major opportunities (for example, compressed air and lighting within the C&I program) and major users (such as high-consumption households for retrofit programs) imperative. ENSC should work with NSPI to leverage the latter's data on customer consumption patterns, while still respecting privacy concerns.¹⁹

The 2011 Plan calls for roughly doubling 2010 achievements in this sector, and the 2013 Plan as currently stated would imply a further doubling from 2011 levels. Although we feel that C&I markets can provide tremendous, cost-effective savings, particularly from discretionary (early replacement / retrofit) opportunities, we suggest that it may be difficult to reach these targets within this very short timeframe, given the time lags associated with developing expertise and market awareness of ENSC programs. The Small Business Lighting Solutions program can expand (could conceivably quadruple)

¹⁹ Access to this customer data will be critical for ENSC's success and a logical element of ratepayer-funded DSM efforts. Data-sharing has been done very successfully in multiple jurisdictions and is highly recommended for Nova Scotia.

relatively quickly via expanding eligibility and measures, but is among the more expensive programs. Custom and Products programs can clearly also expand, but likely require more than three years to reach savings levels in line with current 2013 targets. As these programs expand, relatively turnkey prescriptive retrofit outreach for specific markets and market segments, which can be set up quickly, will likely play an important initial role.

EXISTING PROGRAMS – ENABLING STRATEGIES

ENSC has inherited an existing Education & Outreach program and a Development & Research program. Both are important, and we suggest that D&R in particular could be expanded to foster longer-term savings opportunities. More broadly, we suggest that ENSC has important contributions to make to several new enabling strategies that could prove critical to achieving Nova Scotia's DSM targets in the long term. In particular, ENSC can support (and in some cases, lead) initiatives in financing, codes & standards, building labelling, training, municipal and provincial government buildings, and support of the renewable heating industry, that have the potential to transform Nova Scotian markets in the longer term. Leadership in these areas will help achieve provincial DSM goals, while stimulating local capacity and expertise in areas that hold the promise of significant economic opportunity in the future.

Because of long lead times, most of these initiatives will have limited impact before 2013. However, efforts must be initiated now, in order to reap those longer-term rewards.

PROGRAM-LEVEL OVERVIEW

In the forthcoming sections, we address each program or program area individually. Below we summarize these findings, indicating the relative scope of changes recommended for consideration by ENSC, each program's potential relative contribution to both near-term and longer-term targets, and summary recommendations. New initiatives are highlighted in blue.

Program / Market Area	Scope of Potential Changes ^a	Potential Savings		Principal Recommendations (See program profiles for more detailed suggestions)
		Near-term (2011-13) ^b	Long-term (2014-30) ^c	
Performance Plus (New Homes)	Moderate	★	★	- Fuel choice measures - Pre-drywall QC visits - Expand to small MF, development-level measures
Efficient Products	Significant	★ ★	★ ★	- Full-scale, long-term appliance replacement program - Work with upstream and midstream market actors - Year-round product incentives; sales, stocking incentives
Energuide for Existing Homes (Home Retrofit)	Major	★	★ ★	- Major incentive level increases - Reducing customer level of effort - Trusted workforce - Reflect participant timelines
REAP (Low-Income Retrofits)	Moderate	★	★	- Add heating measures - Expand income eligibility, building eligibility (multifamily) - Increase participation targets
Residential Feedback	Major New Initiative	★ ★	★ ★	- Provide enhanced on-bill feedback - Explore direct feedback via advanced metering
Business Energy Rebates/ Smart Lighting Choices (CI Products)	Significant	★ ★	★ ★	- Targeted sub-market programs and outreach - Address both market-driven and discretionary opportunities
Small Business Lighting Solutions	Minor	★ ★	★ ★	- Gradually expand to non-lighting measures - Gradually expand eligibility to 200 kW - Cross-train market actors

ENSC Electricity DSM Review

Program / Market Area	Scope of Potential Changes ^a	Potential Savings		Principal Recommendations (See program profiles for more detailed suggestions)
		Near-term (2011-13) ^b	Long-term (2014-30) ^c	
C&I Custom (Existing / New Construction)	Significant	★ ★ ★	★ ★ ★	- Targeted sub-market programs and outreach - Long-term relationships via account management - Deeper technical assistance - Fully negotiated incentives
Education and Outreach	Minor	NA	NA	Provide knowledgeable single-window initial contact staff
Development and Research	Moderate	NA	NA	- Use experimental program designs where possible - Fund emerging technologies
Financing Policy	Major New Initiative	★	★ ★ ★	- Expand on-bill financing to residential - Transferable financing (on-bill or PACE)
Building Labelling Policy	Major New Initiative	-	★ ★ ★	- Support provincial efforts (studies, pilots) - Pilot Energy Star Portfolio Manager
Codes & Standards Policy	Major New Initiative	★ ★	★ ★ ★	- Explore code compliance support - Electric baseboard ban support - Long term code development support
Training Policy/Programs	Significant	NA	NA	- Coordinated training approach - Support for contractor certification - Work with university and college sectors, local A&E firms
Renewable Heating Industry Strategy	Major New Initiative	★	★ ★ ★	Develop coordinated strategy targeting biomass, solar thermal and geothermal space and water heating
Leveraging Government	Major New Initiative	★	★ ★ ★	Work with municipalities to spearhead innovative policies

NOTES: (a) **green**=minor/moderate changes; **orange** = significant changes; **red** = major changes / new opportunities.

(b) relative to 2011 targets. (c) relative to overall 2013 target.

POTENTIAL TO SCALE: ★ Minimal ★★ Significant ★★★ Very significant.

RESIDENTIAL MARKET

PERFORMANCE PLUS (NEW HOMES)

OVERVIEW: Conserve Nova Scotia has just launched (Sept 2010) a revamped new construction program due to recent (December 2009) changes in building code (performance path requiring Energuide 80, prescriptive path requiring a set of principally envelope measures). The Performance Plus program requires a pre-build and post-build Energuide assessment (\$250 after subsidy) and offers:

- Subsidized Energuide assessment
- Prescriptive rebates:
 - Energuide 83 or 84: \$3,000
 - Energuide 85-87: \$5,000
 - Energuide 88+: \$7,000
 - Energuide 83 +
 - solar ready: \$200
 - solar (thermal) installed: \$1,000
 - Standalone incentives from separate solar programs
 - \$2500 combined from CNS and ENSC for solar hot water

The program is capped at 1,200 homes on a first come, first served basis, up until June 2011 and homes must be completed within one year of registration (historical provincial housing starts are 3000-4000/year). Note that most of these homes will be electrically heated (>80% of new homes in the province in recent years), and NSPI's 2011 forecast plan assumes a full 1,200 participants.

A particular challenge in this market for Nova Scotia is the prevalence of electric resistance heating for new construction, which is undesirable from both a greenhouse gas emissions and overall efficiency perspective. The prevalence of electric baseboards is an issue, since it limits future fuel switching options, due to the lack of any central distribution system. The Performance Plus program addresses this by requiring participating homes to have an air or hydronic heating system unless smaller than 1,600 ft², in which case ETS or ductless ASHP are eligible. Resistance baseboard heating is ineligible for the program.

Conserve Nova Scotia works actively with the provincial Home Builders Association (HBA) to promote efficient building, co-funds a biannual conference, assists the HBA in training and provides technical support via its hotline.

Interest in the program has already been strong only months after launch. Notably, manufactured home providers are expressing interest; one of the two principal manufactured home providers is considering having all of its homes meet program requirements.

ASSESSMENT: Overall, the new Performance Plus program is a well-designed program with ambitious targets – leading new construction programs in other jurisdictions have tended to capture 20-40% of new homes, while the PP program is aiming for roughly 33% in its first year.

We offer several suggestions for potential improvements; however, none of these are “make-or-break” issues for the program’s success in our view:

- **A baseline study should be undertaken** to determine current builder standard practices and levels of code compliance. This will lead to more reliable energy savings estimates for the program (and can also feed into code compliance efforts – see Codes & Standards section).
- **Incentive levels for electrically-heated homes should be reviewed** in the light of incremental costs and electric avoided costs – this exercise was not part of the initial all-fuels program design. Properly assessed incentive levels will maximize participation while minimizing program costs.
- **Requiring a pre-drywall inspection** of insulation and air tightness installation quality is likely of value. This is a key element of the Energy Star for New Homes program in the United States, where it has frequently driven improvements in installation quality and the avoidance of thermal bridging, even in jurisdictions with good existing standard practice. From a energy savings perspective, it ensures that claimed savings actually occur, and can boost consumer interest in the program since it adds an important level of quality control.
- **‘A la carte’ prescriptive incentives** could be used to complement the program and obtain energy savings from the >66% of homes not participating in the full program. For example, the program could offer rebates for the installation of greywater heat recovery systems, efficient lighting products or other measures. This would require careful planning to ensure that prescriptive incentives as a package are less rewarding than program performance tiers.
- **Affecting the choice of fuels and heating systems** in new construction is perhaps the largest potential option for reducing electricity use in the long run. This is particularly worth consideration where natural gas is available, although over time advanced, wood pellet heating systems (including fully-automated systems) could be just as important. As discussed in the section on a Renewable Heating Strategy, this will require that automatic, full-home wood pellet furnaces and boilers become available in the province and that lower-cost bulk delivery of fuel pellets becomes a reality. Other viable options for consideration include greater use of solar water heating, and use of advanced heat pumps under certain circumstances.

- **Expanding eligibility to small multifamily buildings** (up to 3.5 stories/20 units/600m², for example) would eliminate a potential gap and increase market share.
- **Developing a coordinated approach at the development or neighbourhood level** will open the door for broader measures such as passive solar orientation and renewable district heating systems.

POTENTIAL TO SCALE BEYOND 2011 LEVELS: Moderate in the short-term. The incremental electric savings targets set out in the 2011 plan reflect the new Performance Plus program design and its relatively aggressive targets. In the short term (2011-2013) this likely represents something close to a maximum savings level, as participation levels beyond 35-40% of new homes are rare even in established jurisdictions. In the mid to long term, these savings levels could be substantially expanded, particularly as fuel substitution and expansion to small multifamily and development/neighbourhood-level efforts occurs. However, as an overall share of ENSC savings, the residential new construction market will remain a relatively small contributor.

EFFICIENT PRODUCTS (LIGHTING AND APPLIANCES)

OVERVIEW: The current Efficient Products program aims at increasing market share of energy efficient lighting, appliances, consumer electronics and other mass-market products. It currently offers:

- Information on Energy Star products available on NSPI's website
- Two appliance turn-in program pilots, in the summer and fall of 2010, which will likely be expanded to a full-time program in 2011
- General marketing and awareness activities, including a mass media campaign
- Periodic incentive campaigns including:
 - An annual seasonal lighting turn-in program
 - A fall campaign ('Power Down Discount') offering instant rebates for:
 - Regular and specialty CFLs
 - Energy Star fixtures
 - Electronic baseboard thermostats
 - Power bars
 - Indoor and outdoor timers
 - Dimmers
 - Energy Star refrigerators and clothes washers

NSPI is also a member of umbrella organizations such as the Consortium for Energy Efficiency, which offers resources, information-exchange opportunities, and high-efficiency product specifications.

New federal standards on general purpose lighting are slated to come into effect beginning in 2012. The standards are largely similar to the US EISA 2007 standards in terms of stringency (requiring an increase in efficiency of roughly 20%-30% from current levels). The full impact of federal standards will occur in 2013, as existing pre-standard stocks are depleted.

ASSESSMENT: The Efficient Products program is a standard products program using an incentive-focused approach. We have identified several options that could be considered to increase savings in this program:

- **Strategically review lighting opportunities.** Although the market penetration of standard CFLs has dramatically increased, lighting remains one of the largest potential end uses in residences (after heating and water heating). There likely remain an average of at least 10 locations per home that are good retrofit opportunities. Although new lighting standards will reduce per unit savings as of 2012/2013, even standard CFLs will continue to offer substantial savings, and specialty bulbs (3-way, dimmer, etc.) are not covered by regulations. In parallel, LED technology is continuing to develop rapidly. A systematic review of the lighting market will uncover additional savings and feed-in to many of the program design options discussed below.

- **Develop appliance replacement program into full-scale, long term program.** Full-scale appliance replacement programs can typically reach 2-3% of all households per year – equivalent to 8,000-13,000 units/year (principally refrigerators) in Nova Scotia. Due to impending new refrigerator standards and gradual declines in the performance of existing equipment over time, the stock of available older refrigerators will be to some degree renewed, and an aggressive refrigerator recycling program should be feasible to run through the 2015-2020 timeframe and possibly beyond.
- **Consider greater use of upstream product strategies.** Efficiency programs have successfully worked with manufacturers and distributors to reduce the cost and increase the availability of efficient products. As has been demonstrated in the commercial lighting market with high-performance T8 linear fluorescents, this can be a highly cost-effective strategy. Applying this approach to a range of products may lower costs and increase participation. Regional or national alliances can be particularly effective for working with national retailers and on complex, quickly changing products such as consumer electronics.
- **Continue to work with regional or national alliances to coordinate efforts and exchange information.** Notable organizations to leverage include the Consortium for Energy Efficiency, Energy Star, and the U.S.-based Topten initiative.²⁰
- **Consider targeting midstream market actors.** Midstream market actors – for example, cable television providers – can be an effective lever for achieving large scale savings. For example, the U.S. Energy Star Partners program provides recognition to cable television providers that ensure a certain percentage of set-top boxes are Energy Star. This is a significant source of potential savings given that set-top boxes are one of the most important single sources of electronic products energy consumption in homes.
- **Consider year-round product incentives.** Year round, rather than periodic product incentives could capture additional savings and can be complemented by periodic campaigns.
- **Consider stocking and salesperson incentives and education.** Educating and incenting sales staff (via `SPIFF` incentives) may be an effective approach for increasing sales of certain products competing in complex markets with no clear differentiation of efficient products (such as consumer electronics). Incenting retailers to increase stocking and product visibility has also been used successfully by other programs.
- **Working with bulk purchasers.** Sustainable procurement has growing momentum as an approach to procuring equipment for all sizes of organizations. Outreach directly to

²⁰ Note that it may be difficult to directly claim savings from these efforts, which would therefore require validation from a market transformation perspective.

procurement officers via education and tailored incentives can leverage their relatively large purchasing power, particularly for items such as office equipment, consumer electronics, lighting and appliances.

POTENTIAL TO SCALE BEYOND 2011 LEVELS: Significant. Aggressive action in this area should allow savings to scale up and contribute significantly to overall ENSC savings. In the short-term, year-round incentives for an expanded set of products, along with more aggressive work with retailers and bulk purchasers, should boost annual savings. In the longer term, upstream incentives and targeting of provincial midstream actors such as cable companies should enhance these savings. However, the cost per kWh of these programs will increase with larger savings, particularly as lighting standards come into effect in 2013.

ENERGUIDE FOR EXISTING HOUSES (HOME RETROFITS)

OVERVIEW: Conserve Nova Scotia operates the Energuide for Existing Houses program, in part with funds from ENSC for electric measures. Participants must undertake a subsidized energy audit (\$150 after subsidy). Current strategies and offerings are:

- Subsidy for energy audit (energy auditors can also be installers, and can sell customers on measures)
- Prescriptive incentives:
 - Province
 - Up to \$1,500 (insulation, air sealing, GFX)
 - \$1250 for solar DHW
 - \$400 for solar air
 - Additional electric incentives:
 - GSHP:\$2,500
 - Electric Thermal Storage: \$100/unit, \$500/furnace, \$600/boiler
 - ASHP: \$900-\$1200 central, \$750-\$1,000 ductless
 - Solar DHW: \$1250 (on top of \$1250 from CNS)
 - GFX: \$130 (on top of \$130 from CNS)
- \$5,000 zero-interest loan from province

During 2007-2010, when both provincial and federal incentives were available, the program conducted initial audits for an average of roughly 2.5% of single-family homes/year, which compares favourably to both the Canadian average in that period (1.8%) and U.S. jurisdictions (for example, Massachusetts with 3%/year in 2007). Of these participants, an average of 31% installed measures and applied for incentives, a somewhat low rate compared to Canada (average of 39%) and U.S. programs (for example, Massachusetts with 40% in 2007 and Connecticut with 100% due to direct install model).

Both Conserve Nova Scotia and ENSC feel that this program will need to be redesigned extensively, both to compensate for lost federal ecoENERGY incentives (up to \$5,000/home) and to make participation easier for homeowners. Participation has dropped 80% since the cancellation of the federal program, and the program is unlikely to meet its 2010 targets.

Other issues to consider regarding the existing homes market include the high percentage (71%) of electrically heated homes dependent on baseboard heating; ENSC's plans to pilot a fuel substitution offering for this market (incentives to move towards wood, gas and wood pellets), and a strong trend for oil-heated homes in the province to move towards toward electric heating due to issues with house insurance and cost.

ASSESSMENT: This is a significant but largely untapped source of potential electricity savings. As with other jurisdictions, this is a difficult market to reach, due to high retrofit costs, homeowner access to capital, and homeowner issues with the effort and disruption caused by renovations. More effective program design is part of the solution: however, enabling strategies are the key to opening this market at relatively low cost. Transferable financing eliminates the uncertainty re customer paybacks and access to capital barriers; time-of-listing labelling creates a powerful incentive in the form of increased sale or rental prices. Finally, development of renewable heating industries, particularly full-home wood pellet systems (and fuel delivery) and ground-source heat pumps (via utility or ENSC ownership of ground loops) offer major savings. Work on all of these strategies needs to begin at once; however, these strategies will likely take three to five years to be put into place and beginning having significant impact. In the meantime, ENSC could consider a number of options to increase the savings from the current program by:

- **Increasing incentive levels to match or go beyond previous levels (including federal contributions)** In the short-term (until policy measures such as transferable financing and building energy labelling are in place), high incentive levels are important to the success of any residential retrofit program. Without high incentives and a low-effort offering, consumer barriers are simply too high to allow substantial participation. Incentives need to be relatively high for ‘invisible’ and slow payback measures, such as insulation and air sealing, but can be lower for quicker-payback measures such as air source heat pumps
- **Improve the ease, attractiveness and use of financing:** Ideally, ENSC should offer low or zero-interest on-bill financing, at least until more structured transferable financing options are in place.
- **Reducing customer efforts**, by offering customer assistance in contractor selection or potentially offering a turnkey service. This could include free direct install of some measures by auditors – for example CFLs and air sealing.
- **Further developing the workforce**, by requiring and supporting installer certification/training in building science.
- **Reflecting participant timelines**, by eliminating time limits for renovations and developing a long term relationship with participants to ensure that efficiency is included in all of their renovations. This should likely also involve a second, parallel program targeting home renovation opportunities via contractors (encouraging contractors to make sure that homeowners consider efficiency during major renovations such as roof replacement, siding replacement and major interior renovations)

- **Target marketing to high-use households** using NSPI's databases can increase the potential savings per project²¹
- **Investigating innovative approaches** such as social media and marketing, project aggregation (to negotiate lower costs for batch jobs), and campaign-style door-to-door marketing
- **Expanding to small multifamily buildings** for which commonly used modelling tools (currently Hot2000) are already designed. The additional barrier for this market created by split incentives between owners and renters may require more generous incentives.

POTENTIAL TO SCALE BEYOND 2011 LEVELS: Relatively minimal in the short term. By 2013, more effective program design and additional funding can definitely scale up program savings from 2010 levels, but likely no more than to current 2011 targets, which are 300% of 2010 targets (themselves unlikely to be achieved). Indeed, even this is unlikely unless many of the recommendations made above are undertaken, which will likely increase program costs per kWh. Deeper, lower-cost savings will depend on enabling strategies, which if pursued aggressively could have significant impacts in the mid to long term (2013-2020).

²¹ This would only be possible if NSPI were to market on behalf of ENSC, since NSPI cannot transfer personal information about customers to ENSC due to federal privacy legislation.

RESIDENTIAL ENERGY AFFORDABILITY PROGRAM (LOW-INCOME RETROFITS)

OVERVIEW: ENSC funds the REAP program, administered by Conserve Nova Scotia, for lower-income electrically-heated homes and manages its own application and outreach process for these homes. Participants receive a free, turn-key audit and installation of weatherization measures and electric measures such as lighting, light domestic hot water measures and selective refrigerator replacement. Greywater heat recovery systems are being tested in a pilot program. Program eligibility criteria are based on Canada's Low Income Cut Offs (LICO), equivalent to \$36,500 for a family of four in HRM and \$32,000 for a family of four elsewhere. (Average income for a family of four in NS in 2005 was \$76,000; median income for all families in NS in 2008 was \$61,000.)

Obtaining participants from electrically-heated homes has been an ongoing challenge for the program. ENSC has addressed this via marketing and the use of outreach staff to find and assist potential participants in applying, and expects participation to rise; however it remains a challenge. ENSC may not meet 2010 savings targets, which were estimated based on 1500 participants. The 2011 Plan calls for reaching 1188 households. These targets are in fact quite ambitious, equivalent to roughly 3-4% of eligible households each year.²² As a rough benchmark, low-income programs elsewhere have typically reached 1%-3% of the eligible population per year, and leading jurisdictions such as California have reached as many as 4%-8% of eligible households/year when funding is not constrained.

ASSESSMENT: The overall design of the program reflects the majority of best practices, in that it offers a zero-cost, turnkey retrofit and uses outreach officers to assist potential participants. Potential improvements include:

- **Adding heating measures**, including in some circumstances system replacements in favour of either fuel substitution or advanced air-source heat pumps.
- **Expanding income eligibility requirements** beyond LICO cut-offs. Other Canadian jurisdictions such as Manitoba and Ontario have used 125%-135% of LICO cut-offs, which is in line with many U.S. jurisdictions. Higher cut-offs reflect the fact that even moderate-income households have difficulty paying for efficiency retrofits, and would ease the challenge of obtaining sufficient participants. ENSC will need to carefully consult with stakeholders in setting an appropriate

²² Assuming a) target includes all REAP participants regardless of heating fuel; b) 12.1% of NS households meet LICO criteria, as indicated by 2008 provincial statistics; c) NS has roughly ~270,000 single-family households (2006 data). The actual number of eligible households is worth further investigation based on housing type and fuel source.

eligibility cut-off; a report pending from Dalhousie Legal Aid on this issue may be of use for this discussion.²³

- **Expanding to multifamily buildings and rented housing:** A large portion of the income-eligible population lives in these types of housing. These are challenging situations due to the “split incentive” problem of rental housing where the investor (building owner) is typically not be the primary recipient of energy-savings benefits; this often justifies high incentives for this market, despite building owners not being income-eligible.²⁴
- **Increasing participation targets over time,** assuming that current difficulties marketing to participants can be resolved.

POTENTIAL TO SCALE BEYOND 2011 LEVELS: Significant scaling, but relatively small contribution to overall ENSC targets. On the one hand, difficulties to date reaching 2010 participation levels suggest that even 2011 targets (a 160% increase in terms of savings, despite reduced participant numbers) may be difficult. On the other hand, once knowledge of the program is more widespread, and as outreach methods are refined, demand should increase given the program’s generous incentives. Similarly, expanded income criteria and the inclusion of renters and multifamily buildings will also increase demand. Finally, for many homes, heating measures offer major additional savings.

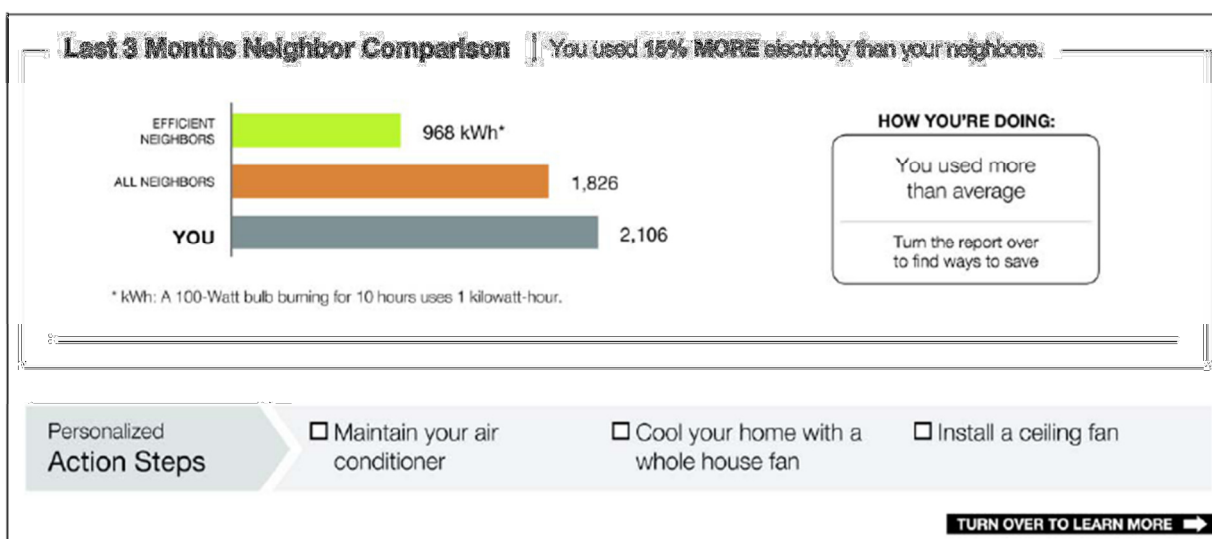
²³ Note that, in setting goals for this program, several years ago, it was not assumed that eligibility would be limited to the LICO level, but that this would be a reasonable segment to start with.

²⁴ Note that when the goals were set for this program, it was assumed that these types of housing would also be included. The limitation to single-detached owner-occupied homes was only intended to be a start-up limitation and there has always been the intent to expand program eligibility.

BEHAVIOURAL FEEDBACK

OVERVIEW & ASSESSMENT: Reducing energy use by providing feedback to electricity customers is a major emerging opportunity to obtain low-cost energy savings. Behavioural feedback can range from ‘enhanced billing’ to real-time feedback broken out to the appliance level. Enhanced billing provides feedback on energy bills or via third-party mail-outs or web displays based on billing data. Real-time feedback depends on either in-home energy displays or advanced metering technologies to provide actual feedback and in some cases interact with appliances and the home (home automation). In both cases, the most effective approaches provide frequent feedback, compare the recipient against appropriate groups (neighbours or similar homes), and provide simple, concrete steps to improve performance.

6 Example of Enhanced Billing



An important new study from the American Council for an Energy Efficiency Economy (ACEEE), published in June 2010, summarizes the results of a rigorous meta-analysis of 57 studies from North America, Europe and Asia on feedback initiatives.²⁵ It suggests that typical savings range from 4%-12% of total residential energy use, i.e. the equivalent of 187-562 GWh/year in Nova Scotia. Enhanced billing was associated with the lower end of this range and higher savings were generally achieved with greater frequency and detail of feedback, and greater use of benchmarking or consumer hand-holding.

Costs for behavioral feedback can be relatively low per kWh. For example, Massachusetts plans to obtain 52 GWh of savings in 2011 using OPower (a third-party enhanced billing service), at a cost of \$0.03/1st yr kWh. Caution should be used in comparing this cost with other programs, since behavioral

²⁵ Available at: <http://www.aceee.org/research-report/e105>

interventions generally have very short measure lives – on the order of one to two years where evaluated. Nonetheless, this remains an extremely low-cost measure. Direct feedback via automatic metering or in home energy displays comes at a higher cost, but with associated higher savings.

One major caveat in considering a behavioral feedback program is that the long term impact of such programs is not fully understood: any feedback program ENSC embarks upon should be carefully evaluated. Programs should also be carefully designed and implemented to ensure that early experiences are largely positive; for example, if initial feedback is inaccurate, consumers may discount it in the long-term.

POTENTIAL TO CONTRIBUTE TO ENSC GOALS: Significant. Enhanced billing can be implemented quickly – a 12 month timeline seems reasonable for a basic on-bill or mail-out comparison using OPower or a similar provider. A conservative reading of the ACEEE analysis suggests that, if implemented effectively, this could obtain savings of at least 0.5% to 2% of residential use in 2012 or 2013 – i.e. 23 to 94 GWh/year, or 11% to 46% of 2012 goals. It should be noted that these savings occur in an initial implementation year or years, and then require long-term effort to simply be maintained – i.e., the program will not necessarily offer annual incremental savings after its first years of operation.

COMMERCIAL & INDUSTRIAL MARKET

PRESCRIPTIVE REBATES (C&I PRODUCTS)

OVERVIEW: The C&I products market generally consists of relatively uniform products with standard energy savings/unit. Programs targeting products alone can focus on market-driven opportunities in both natural replacement and new construction markets, or on discretionary opportunities (early replacement, retrofit, or unplanned addition of controls). ENSC has two programs in this market, Business Energy Rebates (BER) and Smart Lighting Choices (SLC), both of which essentially target market-driven opportunities.

The BER program, newly launched in the summer of 2010, provides prescriptive incentives for:

- Lighting
- Motors & variable speed drives
- Refrigeration
- Compressed air equipment
- Commercial Central Heating & Cooling (HVAC) products

Participants apply via downloadable application forms which are then mailed in. Projects requesting more than \$2,000 per measure category must be pre-approved. The program is currently focused on marketing to end-users, with some work with distributors and limited work with retailers and contractors at this stage.

The SLC program is an upstream program that provides per-unit incentives to lighting distributors for high performance T8 lamps and ballasts.²⁶ Most if not all of the major lighting distributors participate and the program successfully covers most (greater than 75%) of T8 sales. Work is currently in progress by Conserve Nova Scotia/NS Dept of Energy to take T 12 lighting product (Class 7) out of the marketplace, with a draft regulation likely in late 2010 for public review and comment and potential implementation for 2011 Q2. A draft specification making HPT8s the minimum standard for the province is expected in 2012, with regulation expected in 2012-2013 to eliminate Class 8 product from the market mix. The SLC program will likely continue until these regulations come into effect.

Targets for this sector in 2011, at 32 GWh, are three times those of 2010. The SLC program, responsible for roughly 3 GWh/year, is unlikely to scale up much further with a focus on T8 lighting, as it is already capturing most of the market. This leaves an ambitious ramp-up for the balance of the BER program.

²⁶ Note that ENSC administers this program as part of its Efficient Products program, described on page 39.

ASSESSMENT: The BER program is comprised of a wide range of prescriptive incentives for a relatively broad set of measures using a typical program approach. It is too early to judge the effectiveness of the program; however, experience from other jurisdictions suggests several options to consider that could secure further savings.

We make two overall suggestions for this market. Firstly, ENSC does not presently distinguish between market-driven and discretionary opportunities for products. While complex, this is worthwhile: while low incentive levels and a focus on vendors works well for the natural replacement market, discretionary opportunities require more aggressive marketing and incentives, including in many cases some form of audit. Overall, we suggest distinguishing between these, and in particular developing a discretionary opportunities strategy.

A second major suggestion we make is the use of tailored incentives and offerings for specific markets or market segments, combined with a degree of specialized outreach. This ‘submarket’ approach is worthwhile for both natural replacement *and* discretionary opportunities. There will likely be some overlap between these prescriptive offerings and a similar submarket outreach approach we recommend for the Custom program.

A key distinction with the submarket approach discussed below is that it does necessarily involve creating multiple, standalone programs. Instead, these can be seen as tailored outreach within the overarching prescriptive products program, or even more broadly, within a single prescriptive and custom C&I program offering. The nuance is important as ENSC moves towards a more market-focused or customer-focused approach. CI customers should be offered a single window that deals with their individual situation: they should not have to navigate through multiple program descriptions and eligibility requirements to find where they fit. The submarket approach can largely complement and exist within a broader, coordinated single-window program.

Identifying which specific provincial submarkets are worth targeting in this way will require further research. We should also note that targeted submarket efforts can combine a mix of prescriptive product incentives and custom incentives, and will usually involve some form of audit.²⁷ Common, successful approaches from other jurisdictions worth considering include:

- **An expanded prescriptive lighting initiative** to include advanced fluorescent fixtures. Although there is an upstream program, not including advanced linear fluorescent fixtures implies that there are no advantages to be gained. In addition, an opportunity to provide design assistance is lost.

²⁷ Note that this list of possible submarket initiatives overlaps with that provided for the Commercial Custom program.

ENSC Electricity DSM Review

- **A prescriptive commercial kitchen initiative** covering electric and gas that offers incentives for ovens, steamers, fryers, variable frequency drive hoods, icemakers, etc.²⁸
- **A hospitality sector initiative** that offers incentives for guest room space conditioning controls, swimming pool measures, display/decorative lighting, efficient televisions, etc.
- **A grocery store sector initiative** that targets such measures as commercial refrigeration, daylighting, lighting controls, etc.
- **Industrial sector compressed air leak detection and repair service** providing ultrasonic detection and paying a fixed incentive per leak repaired & custom incentives for system upgrades. Offering prescriptive incentives for compressed air measures without significant technical assistance often leads to wasteful program spending. Typically more than half of the waste energy usage associated with compressed air systems is operational.²⁹ Replacing/installing equipment, such as receivers often provides only a small improvement in dramatically inefficient systems. To be successful, all compressed air system programs (prescriptive and custom) should include a system assessment of compressor plants and air delivery systems.³⁰
- **A prescriptive agriculture initiative** that offers incentives for wet-location lighting, efficient milking machines, low rpm/high volume fans for potato storage, etc.
- **A greywater heat recovery incentive** focused on gyms, restaurants, laundromats and other high-quality end-users.

While Nova Scotia's relatively small size arguably makes it more difficult to conduct submarket-level outreach and offer targeted programs, we note that other jurisdictions of similar size (for example, Maine) have used this strategy very successfully for the C&I market.

Beyond these two principal recommendations, other program adjustments could include:

²⁸ For smaller customers, this and the other additional targeted prescriptive initiatives discussed below could be developed as either specialized tracks within the DI program, or the DI audit could be used to identify additional non-DI measures that could be subsequently captured through the target, market-specific initiative. Larger customers, outside of the range of the DI program, would access these tracks separately. Bundled incentives that are made available to all facilities in a chain under one ownership should be negotiated.

²⁹ An added strategy could be to train the facility personnel during the initial leak detection and supply them with an ultrasonic detector (\$1,200) for persistence of savings.

³⁰ Generally speaking, targeted submarket efforts should focus on a market rather than a single technology. However, some technologies, such as compressed air, offer major savings and benefit from specialized audits and installers, making them a better fit with a targeted approach. Care should be taken to ensure that program delivery agents also market other programs so that opportunities are not lost.

- **Consider other products that would be well-suited for an upstream buy-down.** When first conceived of, the Smart Lighting program was not intended to be limited to T8 lighting; other lighting and non-lighting products could benefit from a similar upstream approach.
- **Tightening pre-approval requirements and quality control on incentive applications,** particularly as the program is in its early stages. Other jurisdictions have experienced problems with vendors and participants misusing programs or making application mistakes.
- **Developing a “Qualified Vendors” program.** Participants would qualify by virtue of have extensive (x number of successful projects processed by ENS) program experience with zero or minimal post-installation inspection issues, consistently accurate applications with appropriate accompanying purchase verification, etc. Qualified vendors could be eligible for such enhanced program features as opportunities for co-operative advertising, additional publicity in the press or in case studies, etc.
- **Consider efforts to leverage market actors,** via incentives or co-branding to achieve low-cost program promotion.
- **Consider ways to maximize cross-marketing between the BER and Smart Lighting initiative, as well as the custom program** in materials and promotion. More broadly, consider opportunities to market other programs as part of consumer participation in each program. Specifically, consider when and how to promote movement from prescriptive lighting to custom lighting and from “1 for 1” fixture replacement to lighting design.
- **Encourage repeat customers:** Past participants are much more likely to participate in programs and should be marketed to. Program participation should be kept as simple as possible to encourage repeat participation.
- **Ensuring customers are aware of all opportunities:** Products programs from other jurisdictions (for example, Maine), have reported common issues with participants not realizing the full extent of program offerings. Too often, customers look at a prescriptive lighting or HVAC form and conclude that this is all a program offers, without realizing that other prescriptive incentives, services and custom programs are available.

POTENTIAL TO SCALE BEYOND 2011 LEVELS: Somewhat constrained short-term potential, but significant contribution to overall ENSC goals. The product list for this program is already relatively well developed, though additions will be appropriate over time. The greatest opportunities for the natural replacement market may be in identifying other opportunities for upstream strategies similar to the Smart Lighting Initiative. To the extent that these can increase participation at reasonable costs, they can have a substantial impact. Submarket outreach and additional incentives focusing on retrofits could also increase savings, but given the very ambitious ramp-up plans in 2011, opportunities to go far beyond these levels in 2012-2013 without higher levels of spending/kWh are likely to be limited.

SMALL BUSINESS LIGHTING SOLUTIONS (SMALL BUSINESS EXISTING)

OVERVIEW: The Direct Install Program for Small Businesses offers lighting retrofits via third party implementation contractors. Eligibility requires <100,000 kWh/year and <100kW average monthly demand. Incentives cover 80% of costs and measures include HPT8s and T5 lighting, LED exit signs, CFLs and lighting controls. The program currently offers interest-free on-bill financing, which has a 75% uptake rate.

As of August 2010, the program had achieved 50% of its 14 GWh 2010 target. The program is province-wide. There are currently limited waiting lists in some areas, but for the most part participants are served quickly. Very little marketing has been required to date due to high incentive levels. Targets in 2011 are slated to increase somewhat, to 18.5 GWh.

Another very successful program, Powered Right, uses door-to-door marketing and free change outs from incandescent technology to CFLs and LED exit signs only. The program is on track to achieve 200% or more of 2010 goals (i.e. >35 GWh); however it appears that the market opportunity for the current approach is declining and may be largely captured by early 2011.

ASSESSMENT: The Small Business Lighting Solutions program uses an excellent program design for this market. We suggest consideration of several adjustments that could increase savings from this strategy:

- **Consider expanding electric measure options** to include various refrigeration, air conditioning and heating options, recognizing that this would require the introduction of other skilled trades. (In comparable programs refrigeration measures can produce 5-10% additional electric savings.)
- **Consider expanding eligibility to other size customers** – for example, Connecticut and National Grid programs have a cap of 200KW / 400 MWh; Minnesota uses a cap of 400 KW; Hydro-Québec uses a cap of \$50,000 in annual bills, roughly equating to 600 MWh/yr. In Vermont, a similar initiative is focused not on small customers, but on mid-size customers. Clearly, there is cause to consider expanding eligibility.
- **Consider cross-training contractors to seek, record and potentially market offers to address other efficiency opportunities.** Similarly consider utilizing this program as an entry point into more expansive programs. For example, the direct install of a spray valve in a restaurant should lead to a discussion of other commercial kitchen opportunities.

POTENTIAL TO SCALE BEYOND 2011 LEVELS: Significant. With additional marketing and outreach, this turnkey, high-incentive level program could generate substantial interest beyond 2011 levels, particularly if eligibility is widened. This increase would contribute significantly to overall ENSC goals. Broader eligibility could deepen savings/participant, as could the inclusion of non-electric measures. This approach, however, is relatively costly due to high incentives. This limits the role it can play in the overall portfolio.

COMMERCIAL & INDUSTRIAL CUSTOM PROGRAM (C&I EXISTING, NEW CONSTRUCTION)

OVERVIEW: The current Commercial and Industrial Custom Program is open to medium and large industrial customers (≥ 250 kW demand). It targets both discretionary and market-driven opportunities in existing facilities, as well as construction of new facilities, with projects needing to save at least 20,000 kWh/year. All electric measures are eligible, with savings calculated on a per-project basis. The program uses three core strategies: audit/feasibility study incentives, negotiated case-by-case, per-kWh incentives, and optional interest-free, on-bill financing (up to 24 months).³¹

Maximum incentives are as follows:

- \$1,000 for a preliminary energy audit/scoping study
- \$15,000 for a feasibility study (ENSC can also offer templates, guidelines, and equipment loans)
- Up to \$500,000 or 50% of eligible costs for implementation

Program staff negotiate incentives within an upper (internal) limit of \$0.15/first year kWh. The program also conducts a degree of targeted outreach to submarkets (currently via a single salesperson) and offers informal technical assistance.

Measures with a pre-incentive payback of less than one year are ineligible. Other ineligible measures include cogeneration, demand-limiting, power factor correction, fuel-switching and others as determined by ENSC.

As of August, 2010, the program had met 38.6% of its 2010 target of 20 GWh. A good pipeline of enrolled projects, however, makes it likely that the program will meet the 2010 target overall, and provides a good starting point for 2011's nearly tripled target of 58.6 GWh. It is worth noting, however, that new programs for this market often benefit from an initial period of high savings as pent-up demand is releasing – often the largest, most sophisticated customers are the first participants. This effect should be taken into account when estimating future savings based on initial program performance.

Small/Medium New Construction: The new construction program was launched in September 2010 for facilities under 7,000 m², based on NBI's Core Performance Guide, which has been adapted for Nova Scotia. Larger projects can be served through a custom path that provides incentives for modeling and a custom implementation incentive (per custom retrofit) The new construction program is aimed at design-build firms and offers a detailed design guide, technical assistance, and incentives for design process and prescriptive measure requirements.

³¹ Fifteen percent of customers currently opt for the financing option.

During early September, program staff received training in the Advanced Building: Core Performance methodology, and assistance in reviewing design documents for the first two projects to be included under this initiative.

ASSESSMENT: This is a relatively standard approach to the CI Custom market, supplemented by the Core Performance approach to small and medium commercial new construction. Typically, these programs have some of the largest savings potential in the overall portfolio. It has achieved remarkable results given the few staff carrying it out. It has also been constrained in its design and implementation because of limited staff, and going forward under ENSC offers opportunities for previously unavailable strategies and delivery approaches.

As with the products market, one of our principal suggestions is the addition of “sub-market” – or segment-specific – strategies, initiatives and targeted outreach. This requires outreach personnel with a deep understanding and technical expertise regarding the targeted segment, and who are trained and able to aggressively target opportunities.

As discussed under Business Energy Rebates, it is important to note that sub-market initiatives should be contained and coordinated within a single, overarching customer-focused program. This is particularly the case for the larger customers and projects dealt with in the Custom program, where submarket strategies will mostly focus on ensuring outreach staff are credible and knowledgeable.

Identifying the most promising submarket efforts for Nova Scotia will require further research. We offer examples of successful efforts from other jurisdictions here. Note that many of these submarket programs can combine prescriptive and custom incentives, and that there is some overlap between this list and that discussed under prescriptive products. Examples of potential submarket initiatives include:

- **Grocery stores** offer a discreet market opportunity that is well-addressed in a targeted manner, taking advantage of common end uses and efficiency technologies, and chain store approaches.
- **Compressed air audit/incentive initiative** addressing the entire delivery system and particularly operational opportunities. Note that this is a major savings opportunity and cannot be fully captured by prescriptive programs – it requires a feasibility study and technical assistance component. Compressed air audits are a short-payback measure that often allows a ‘foot in the door’ for marketing broader program.
- **Industrial processes/productivity initiative** that is energy/unit produced based, to allow benchmarking against others within the sector and ensure best in class efficiency.
- **Ski area snowmaking program** that evaluates systems and pays incentives for efficiency snow-guns, air delivery controls and repairs, and VFDs for pumps and compressors. Large savings can

ENSC Electricity DSM Review

be achieved by improving snowmaking efficiency. Although Nova Scotia ski areas are not large, they rely heavily on snowmaking.

- **Retro-commissioning services** that provides technical services and incentives for optimizing the energy usage of existing C&I equipment.
- **Building operator certification** – This program can be franchised and provides energy and operational training for facility operators. This program has demonstrated success in parts of New England, New York, and the Pacific Northwest.
- **High performance schools** – An initiative that promotes the construction and renovation of efficient schools as well as provides O&M assistance with a focus on energy and the environment.
- **Large multifamily buildings** – this market has relatively unique opportunities and issues and can benefit from a targeted program.
- **Small business performance contractor** model: weatherization savings in small commercial spaces have been successfully targeted in Vermont with a certified-contractor method similar to the residential Home Performance with Energy Star model,
- **Military installations** – Nova Scotia has 40% of Canada’s military installations, which may warrant a targeted program intervention.
- **High-tech industry:** Nova Scotia’s high tech industry is growing rapidly, making programs targeting server farms and other opportunities potentially relevant.

Beyond the submarket approach, we suggest several other adjustments for consideration:

- **Consider developing staff expertise and initiative design that differentiates among the different types of markets within this program.** Specifically, consider Key Account Management for the largest energy users, different staff and approaches for new construction versus existing buildings, and differentiation of services between large and small projects. In particular, key account management involves using a team of managers, each of whom has responsibility for 10-15 large customers. They are held responsible for understanding their customers’ businesses and drivers, building relationships, developing a long-term plan and securing savings through both market-driven and discretionary measures. This requires a range of talents and technical expertise, but can achieve high levels of savings at relatively low costs compared to other programs in other sectors.
- **Target high-potential participants:** Consider using billing data, market analysis and customer segmentation to target customers with the highest potential for outreach and recruitment.

- **Consider offering deeper technical assistance:** More and deeper high-quality technical assistance, including free walkthrough/pre-feasibility audits, has been shown to increase savings per dollar over time. Such a strategy would include deployment of sector specific technical specialists who can “speak the language” of the specific industry.
- **Consider greater flexibility in custom incentive levels:** While some guidance is useful in bounding and/or setting targets for incentive levels, the economics of different projects and economic perspectives of decision makers vary considerably. To maximize uptake at lowest cost, guidance for customer incentives should be based on a *custom* analysis of the customer economics of the project (e.g. cash flow, IRR, etc.), not merely payback or percent-of-cost.³²
- **Consider adjusting feasibility study approach and incentive levels:** incentives should be based on a cost sharing model (% of total study cost), to avoid over subsidizing and increase participant buy-in. Feasibility studies should be conducted by third party firms, with program overseeing or carefully reviewing study results. Vendor studies should not be funded, although they can be considered as part of the intake process. Bonus incentives for studies which lead to implementation should be considered.
- **Consider ways to further minimize program paperwork:** Even minimal paperwork can be a surprising barrier for these programs, and it is worth offering assistance to participants, particularly smaller customers with less in-house resources. This should tend to increase the number of projects that follow-through to implementation.
- **Consider offering ‘backstop’ approaches for the new construction market:** As with residential new construction, prescriptive measures (with additional incentives for bundling complementary measures to increase depth of savings) can capture savings in projects that are unable/ unwilling to follow the full Core Performance and/or Custom program approach. An important opportunity is performance lighting (rewarding better lighting design, as well as prescriptive incentives based on aggressive lighting power density requirements).
- **Consider embedded energy manager and cohort strategies:** Funding the salary of energy manager positions for large organizations can be an effective option for obtaining operational and retrofit savings. Energy managers can be supported and encouraged by cohort strategies, as used in Oregon, where managers from similar industries meet together regularly, exchange technical support and compare results, supported by industry-specific expertise. The Energy Trust of Oregon has seen savings of up to 25% with this approach to large industrial customers.

³² Similarly, it is worth considering the provision of at least some incentives to customers who have come through the program but are deemed to be free riders due to short payback periods. Excluding these customers can potentially convert them into ‘bad will ambassadors’. A relatively small incentive can be provided to reflect their effort in participating in the program and ensure a positive experience.

Similarly, in Ireland, the Sustainable Energy Authority of Ireland has had considerable success with a program that is achieving substantial business sector savings from structured peer exchange and commitment to goals and actions.³³ BC Hydro has had some success funding shared energy managers for smaller organizations.

- **Reconsider the approach to free-ridership screening:** Currently, the Custom program makes an effort to assess potential free-ridership at the application stage, and in some cases excludes projects if it appears that they would have been conducted without program support. While unusual, the purpose is laudable: many custom programs are saddled with significant free ridership, often in the range of 25%. Yet this approach may also be difficult to maintain as the program scales up. Furthermore, it can have unintended consequences, including reduced interest, bad will, gaming and inadvertently excluding potentially valid participants. As the program scales up, ENSC may wish to consider alternative strategies for minimizing free ridership, in particular by incenting account managers appropriately and by allowing them to use their knowledge and negotiating flexibility to minimize incentives when possible.

POTENTIAL TO SCALE BEYOND 2011 LEVELS: Moderate in the short term, however contributing significantly to ENSC's overall 2013 goals. Short term ramp up may be moderate, given 2011's sharp ramp-up from 2010 levels and the associated budgets; indeed, there is a risk that ENSC will not meet these ambitious goals within the 2011 time frame. For example, Massachusetts, despite having strong existing programs, has 2011 goals very similar in size to ENSC's for the 2011 period (when prorated by population), and only surpasses ENSC's (prorated) targets by 25% in 2012. Efficiency Vermont, a leading state for DSM in many ways similar to Nova Scotia, has targets for this sector roughly equivalent to 70% of ENSC's in 2011 (again prorated by population). In both cases, it should be noted, costs are more than double those forecast, on a per-kWh basis, for ENSC's program.³⁴ While we suggest difficulties in meeting the early-year goals, it is also worth noting that in the longer term, and especially as ENSC develops greater experience and expertise at addressing this market (and in particular discretionary opportunities), savings could be scaled up much more significantly.

³³ http://www.seai.ie/Your_Business/Large_Energy_Users/LIEN/

³⁴ Due to reporting differences, in both cases these numbers compare ENSC's prescriptive and custom CI programs with their counterpart's equivalent programs.

ENABLING STRATEGIES AND POLICY INITIATIVES

OVERVIEW – ENSC’S POTENTIAL ROLE

Enabling strategies include education and outreach, research and development, training, financing, building labelling, and codes and standards. They exist on a spectrum – some are foundational, supporting participation in short-term voluntary programs (education, outreach, training, financing), or supporting the development of the next generation of opportunities (R&D). Others are transformational, not only enhancing participation in voluntary programs, but shifting the baseline of common practice. And even among transformational strategies, some are voluntary (training, certification, financing), while others are mandatory (codes, standards, labelling).

Each enabling strategy requires a different approach and a different mix of actors. ENSC may drive some, yet only influence or support others. Yet in all cases, ENSC’s role as *the* experts in energy efficiency in the province means that it can and should play a pivotal, if varying, role. For example, ENSC can encourage and provide technical support to government to encourage consideration of further improvements to building codes, even though code is clearly a governmental responsibility.³⁵

Below we address each of the enabling strategies individually.

A Note on Savings Attribution from Enabling Strategies

The suite of policy options we set out below have the potential to generate substantial electric savings in the mid to long term. As discussed earlier, determining the savings impact and attribution of these initiatives raises important challenges. Nonetheless, these challenges are surmountable over time, and ENSC is well-positioned to play a major role in advancing them. It will be necessary to resolve savings attribution issues if ENSC is to invest in many of these enabling strategies and policy options.

Alternatively, Nova Scotia could consider adopting the recently developed approach in Vermont where “non resource acquisition” budgets are established separately from resource acquisition budgets.

³⁵ It may be worth noting that increasingly, private and public utilities are allocating budgets – and attributing savings – to deliberate efforts to encourage, influence and support tighter codes and standards.

EDUCATION AND OUTREACH

OVERVIEW: The current Education and Outreach component comprises a general marketing campaign, an information hotline directing customers to programs, and targeted activities for educational institutions (the development of classroom curriculum and materials).

ASSESSMENT: This is a standard and appropriate approach to general education and outreach. As ENSC's programs develop a more market-based approach (where ENSC attempts to offer a simple, flexible one-stop-shop service offering to any interested customer), the EnerInfo hotline will become increasingly important and responses may need to be provided directly by knowledgeable, sales-oriented program representatives.

POTENTIAL TO CONTRIBUTE TO LONG TERM DSM TARGETS: Education and outreach are important inputs to all ENSC programs. Further savings can be derived from more advanced behavioural feedback mechanisms, which we address separately on page 47.

DEVELOPMENT AND RESEARCH

OVERVIEW: Development and Research (D&R) efforts in the current DSM Plan encompass market assessments, technology reviews, staff development, baseline studies and demonstration projects. To date, a substantial portion of the budget has been used in the development of the DSM Data System, for tracking program activity, expenditures and results. The 2011 budget will in part fund a residential fuel substitution pilot program.

ASSESSMENT: The current definition here includes costs for the data system, evaluation and staff development, which are not conventionally consider as part of Development and Research. They are all appropriate activities, but at some time would be better captured in other budget categories. More conventional definitions of Development and Research that may well be appropriate for ENSC could be expected to add to the budget. For example, pilot budgets may be needed as ENSC experiments with new program designs to achieve future targets (as is the case with its forthcoming fuel substitution pilot). ENSC may want to set aside funds for experimental program designs - using multiple approaches, in different regions, to test program effectiveness (this may be particularly relevant and feasible for behavioural feedback efforts). Similarly, ENSC may want to fund testing or development of emerging technologies. For example, cold-climate ductless mini-split air source heat pumps could provide a viable solution for existing buildings with electric baseboard heating (funding of the design, development and testing of such a technology could be shared with other jurisdictions facing the same challenge, such as New Brunswick and Quebec). Similarly, D&R may be used to experiment with new automated wood pellet systems, or with advanced solar thermal technologies.

ENSC should also consider leveraging other ongoing research efforts in North America, such as those sponsored by the New Buildings Institute, the Consortium for Energy Efficiency, the US national laboratory system, etc. There are also excellent private subscription-based R&D services, such as ESource.

POTENTIAL TO CONTRIBUTE TO LONG TERM DSM TARGETS: Minor in the short-term. In 2011-2013, budgets for additional D&R activities could be increased, with limited or no short-term savings. In the longer term, productive D&R activities would be expected to support achievement of greater savings in the future, notably by helping replenish the pool of DSM savings opportunities in the province.

FINANCING POLICY AND DEVELOPMENT

OVERVIEW: Providing attractive financing for efficiency projects is an important tool for overcoming the barrier of access to capital for major investments. Ideally, financing payments are lower than monthly energy savings, enabling positive cash-flow such that investments literally “pay for themselves”. Providing on-bill financing emphasizes this link, and reduces the psychological impact of new financing on customers. Even more importantly, transferable financing – financing tied to the building rather than to the owner – eliminates the risk that a building owner will have to sell the building before energy savings have completely paid for the original investment, without necessarily recouping the investment in the building price. Transferable financing can be combined with on-bill financing; it is also being pursued by many jurisdictions via Property Assessed Clean Energy (PACE) loans. PACE financing is typically provided by municipalities, and paid via property taxes, though other models may be viable as well.

On-bill financing is offered as part of some C&I programs, but it is not currently available for residential programs. NSPI has indicated that it is open to continuing to provide on-bill financing as a service under contract to ENSC. ENSC is not currently working on advocating policy for transferable financing or green mortgages, although ENSC, Conserve Nova Scotia and HRM are considering the potential for a PACE financing pilot program for solar hot water systems.

ASSESSMENT: Financing, particularly transferable financing, is a powerful tool that should be pursued by ENSC. In the short-term, on-bill financing can and should be continued, and expanded to the residential market. Development of transferable, property tax financing should also be pursued. Other financing mechanisms may be considered, including mortgage products for new and existing homes (for example, a deep retrofit refinance product), home equity products, financing services similar to purchased power agreements, and new types of ESCOs³⁶. At the same time, ENSC can contribute to development of municipal-led, PACE-like financing initiatives, similar to the one the HRM is currently pursuing.

POTENTIAL TO CONTRIBUTE TO LONG TERM DSM TARGETS: moderate in the short-term; larger over time. Indeed, this could be one of the major determinants of whether aggressive energy-savings goals can be reached at a reasonable public investment cost. In particular, transferrable financing, tied to the property, has the potential to support rapid ramp-up of efficiency investments at a relatively lower cost.

³⁶ See a review of options in “Developing Effective and Sustainable Financing Approaches,” Blair Hamilton, VEIC, May, 2010, http://www.veic.org/Libraries/Resumes/Financing_chapter_-_Developing_Effective_and_Sustainable_Financing_Approaches.sflb.ashx

BUILDING LABELLING POLICY

OVERVIEW/ASSESSMENT: Mandatory building energy performance labelling is a potentially powerful tool to allow markets to better value energy efficiency, thus incenting better performance. In the residential sector, a ‘time of listing’ approach works by requiring homeowners to obtain and publicize an energy performance label in all sales advertisements. Where this approach has been adopted, it has led to price premiums for energy efficient homes, which can in turn encourage homeowners to consider energy retrofits in the same way that they consider other home improvements with known resale value (kitchens, bathrooms). The same approach can be used in the commercial market, as can required year-round public disclosure of the operational performance of buildings, benchmarked against similar buildings using a tool such as Energy Star Portfolio Manager (ESPM).³⁷ Existing mandatory annual public disclosure requirements in Europe and the U.S. are all relatively recent and impacts have not yet been fully studied, but anecdotal evidence suggests significant impacts on building performance, especially for high profile buildings and organizations.

Mandatory energy labelling was initially retained in provincial policy, but was not included in the recent building energy code legislation. To our knowledge, neither ENSC nor the provincial government is actively working on the topic, although Conserve Nova Scotia continues to monitor the issue, and in fact are members of a national committee, chaired by the federal Office of Energy Efficiency, tasked with developing a residential label. Should the province implement mandatory labelling, it could potentially support considerable energy savings, both within and outside of voluntary programs, and reduce the need for financial incentives.³⁸

POTENTIAL TO CONTRIBUTE TO LONG TERM DSM TARGETS: Minor in the short-term, but significant in the long run. Mandatory requirements are likely to have impacts only in the mid to long term (2013 and beyond). That being said, the use of rating tools can be tested via ENSC’s current programs, for example by incorporating ESPM and eventual residential labels into programs. It should be noted that building energy performance labelling can work very effectively in tandem with efficiency financing products, by creating a low risk investment opportunity for building owners.

³⁷ Energy Star Portfolio Manager is a low-cost, web-based tool developed by the U.S. Environmental Protection Agency (EPA) and presently being adapted for Canada by the federal Office of Energy Efficiency (OEE).

³⁸ Going beyond mandatory performance labelling, some jurisdictions, principally in Europe, have moved to mandatory energy efficiency retrofits, also known as mandatory upgrade policies. These mandatory retrofits can be tied to major renovations or other trigger points. Mandatory upgrade policies may become a useful option in the long term once performance labelling and other initiatives have raised the baseline.

CODES & STANDARDS POLICY

OVERVIEW: Building energy codes and product efficiency standards generally represent the lowest-cost and most effective approaches to addressing market-driven opportunities. Nova Scotia has recently upgraded its residential energy code. For commercial buildings, the National Model Building Energy Code is currently out for public consultation with expected implementation in 2012. Nova Scotia is participating in this national process, and currently anticipates adopting it as code sometime around 2012.

Products are largely addressed by federal standards. New federal standards on general purpose lighting are slated to come into effect beginning in 2012. The standards are largely similar to (though a slight improvement over) the US EISA 2007 standards, requiring an increase in efficiency of roughly 20%-30% from current levels. The full impact of federal standards will occur in 2013, as existing pre-standard stocks are depleted. New standards for refrigerators, expected in 2014, will also substantially raise the bar for this major end-use.

The province has also developed standards for certain products. Work is currently in progress by Conserve Nova Scotia and the Department of Energy to take T12 lighting product (Class 7) out of the marketplace, with a draft regulation expected in late 2010 for public review and comment and potential implementation by the second quarter of 2011. A draft specification making HPT8s the minimum standard for the province is expected in 2012, with regulation expected in 2012-2013 to eliminate Class 8 product from the market mix. More generally, ENSC and Conserve Nova Scotia have been discussing options for discouraging electric baseboard heating in residential new construction, which has been steadily growing and had achieved a 59% market share in 2008.

Ensuring code compliance is a municipal responsibility but also a potential area of contribution for ENSC. Experience from both the U.S. and Canada has shown that code compliance is often quite low – often below 50% – due to a lack of funds for inspections as well as competing priorities for municipal building inspectors. The complexity of CI building projects makes it particularly difficult for non-specialized building inspectors to adequately enforce energy codes.³⁹ Assisting in code compliance, potentially by funding stand-alone energy code inspections as is currently being rolled out in Maine, could be an important program strategy, but would require further investigation.⁴⁰

³⁹ For example, a recent informal survey of 150 commercial code inspectors in the Northeastern U.S., ostensibly responsible for enforcing existing energy codes, found that none had ever conducted a lighting power density calculation, nor did they ever intend to.

⁴⁰ In many jurisdictions (California, Arizona, etc.) program administrators can receive credit for incremental saving achieved through better code compliance, through such avenues as training of the regulated community and support for third party inspection services.

Regardless of the method employed, it would be reasonable to give energy-savings credit toward goals to ENSC for any savings achieved relative to actual baseline (not necessarily code), including bringing new construction from baseline up to code. Being engaged in the process could enable ENSC not only to capture these minimal savings, but to use the opportunity to encourage above-code investment.

To date, training to support new residential energy codes has been provided by the NS Homebuilders Association in advance of the new energy efficiency component of the building code coming into effect and training by the Department of Labour and Workforce Development subsequent to the new requirements being implemented:

- Approximately 150 building inspectors and others participated in 2 day training courses.
- Approximately 1500 builders, architects, building materials suppliers, insurance adjusters, etc, have taken a 2-2.5 hour training course.

ENSC reports that the transition to a more aggressive building code with respect to energy efficiency has gone very smoothly. Minimal situations with non-compliance or 'how-to' questions have been encountered to date, attributed in large part to the extensive training provided through these collaborations.

ASSESSMENT: ENSC has three potential roles in codes and standards policy. First, it can encourage and support provincial C&S development, by providing advocacy and technical support. Second, its programs can prepare the ground for more stringent requirements, by encouraging the development of expertise and markets. Third, it may have a role in supporting code compliance as described above. Among other initiatives, ENSC may want to encourage:

- **Automatic updating** of building codes, ideally with clear future targets (for example, Energuide 83 in 2015 for the residential market);
- **Banning of electric baseboard heating in new construction**, or more indirect discouragement, for example via tighter building codes for electrically heated homes or the requirement of distribution systems in new construction.
- **Conducting baseline studies** to determine an actual baseline for savings, including the savings from code compliance alone.

POTENTIAL TO CONTRIBUTE TO LONG TERM DSM TARGETS: Very significant. Timely, automatically updated and well-enforced codes and standards will have a deep impact on energy efficiency in the province over time. Evaluations of California's energy efficiency saving over the past decade have shown on the order of 1/3 of savings coming from code and standard activity, although not all of these savings are necessarily attributed to energy utility DSM efforts.

TRAINING POLICY

OVERVIEW/ASSESSMENT: Training must occur at many levels for many audiences in order to support ENSC programs. Architects and engineers need training on efficient design; contractors need to develop familiarity and expertise with building techniques and new technologies (including proper HVAC sizing and charging). Retailer sales staff need to understand efficient product options and their business cases; staff within many sizes of organizations need to understand energy management systems and energy efficient procurement options; and building operators need training in optimizing building operational efficiency. These training needs can range from informal information sessions to full certification programs.

Many of these activities can be addressed within single programs, and are detailed in our program-level recommendations. However, there is enough overlap between the needs of these programs to warrant an overriding training and certification strategy, which systematically identifies all program needs and streamlines the delivery of training to market actors. This can involve working with technical colleges and university programs on curriculum, encouraging the development of third-party certification systems such as the Building Performance Institute certification for home retrofit contractors, or offering specific training opportunities.

We particularly note the need to develop a stream of skilled technical and managerial professionals through the province's higher education system who can fulfill the requirements of the efficiency industry in the province – both from the program and the service provider sides – out into the future.

Initially, we recommend that ENSC put in place an overall training coordinator position to work with program managers on identifying current activities, program needs and potential delivery mechanisms.

POTENTIAL TO CONTRIBUTE TO LONG TERM DSM TARGETS: **Significant**, but savings attribution is less direct. Specific programs such as Building Operator Certification can yield easily-quantifiable savings, but more general training and certification activities are enabling activities that support both in-program and extra-program savings.

LEVERAGING GOVERNMENT

OVERVIEW/ASSESSMENT: Both the provincial and many municipal governments in Nova Scotia are setting ambitious goals related to energy efficiency, particularly in the context of climate change plans. Municipalities are a potentially powerful partner for ENSC in achieving energy efficiency goals.

There are myriad examples of municipal policies and initiatives from other jurisdictions that ENSC can showcase, support and encourage within the province. For example, municipal governments are natural early adopters of building energy labelling tools – many states and municipalities in the U.S. have mandated annual public disclosure of their buildings’ energy performance, and some have gone as far as mandating audits and efficiency retrofits for lower-performing buildings.

Municipalities have also shown leadership in spearheading public policies that have tremendous potential impact. In San Francisco, Berkeley, and several other California municipalities, some ordinances require that homes meet certain minimum energy efficiency standards at time of sale. The borough of Rosemont, in Montreal, Quebec, recently became the latest local “government” to adopt a ‘cool roof’ requirement for all roof resurfacing projects. Closer to home, ENSC is already working with the Halifax Regional Municipality to explore the possibility of a transferable PACE financing initiative for solar hot water systems, while the town of Clare has similarly expressed a clear intent to move to the forefront of energy efficiency.

POTENTIAL TO CONTRIBUTE TO LONG TERM DSM TARGETS: Very significant. Municipal level policies can lead the way by piloting innovative policies, in some areas going beyond what is feasible at a province-wide level.

RENEWABLE HEATING STRATEGY

OVERVIEW: Nova Scotia has access to a wide array of renewable heating systems, including solar thermal (hot water and hot air), biomass (wood pellets, cordwood, wood chips, agricultural waste) and, to some extent, ground-source heat pumps (GSHPs).⁴¹ ENSC currently does not offer incentives for fuel switching from electricity towards renewable heating; however, it is developing a pilot for residential buildings for launch in 2011 that will target wood pellets, wood and gas heating and hot water. ENSC also offers incentives for GSHP systems (\$2,500). Conserve Nova Scotia currently offers incentives for solar hot water and solar air heating systems for both residential and commercial markets.

ASSESSMENT: Solar and biomass heating systems are still relatively in their infancy in Nova Scotia, aside from traditional cordwood stoves and newer wood pellet stoves as secondary heating systems. The solar heating/hot water installer industry has begun to be developed but still faces a lack of consistency, and installation issues are common. Several wood pellet manufacturers are based in the province, which has abundant forest resources.

In other jurisdictions, such as Vermont, and in particular in some European jurisdictions such as the state of Upper Austria and much of Scandinavia, long-term government incentives and private entrepreneurship have created thriving renewable heating industries. For example, after more than twenty years of development, biomass now supplies 31% of thermal energy in Upper Austria, and the state government believes it is on target to obtain 100% of space heating and electricity from renewable sources by 2030. Upper Austria's renewable heating market consists of not only individual systems for buildings, but also district heating systems, often operated by farmer cooperatives using locally-grown biomass. A substantial percentage of homes use fully automated wood pellet boilers or furnaces, often in combination with solar hot water systems, and a wood pellet supply chain has emerged allowing home delivery and convenience levels essentially equivalent to oil and gas heating systems. Biomass heating systems for the commercial and industrial sector are also mature, and the state has a thriving biomass heating system manufacturing sector.

A handful of jurisdictions have begun to experiment with innovative ways to develop the GSHP market. Utilities such as Manitoba Hydro have invested in the professionalization of the installer industry by supporting industry organizations and requiring third-party installer certification, as well as offering substantial incentives, technical assistance and interest-free loans to building owners. At a deeper level, a few utilities have begun to consider and/or experiment with new business models, in which they build,

⁴¹ Ground-source heat pumps, also known as “geothermal” systems or “geoexchange” systems, often give way to semantic debates over their eligibility for the term “renewable” heat. In fact, ground source heat pumps are in essence hybrids – an *electrically-supported* source of renewable heat. In practice, air-source heat pumps may be considered in a similar light, only with lower efficiencies. Ultimately, wood pellets also require electricity to produce, and most furnaces now incorporate small electric motors as well. A more important concern with GSHPs, in particular for a region like Nova Scotia, is the question of whether or not they entice greater use of air conditioning loads, an issue that would certainly require more research than is provided here.

own and operate the ground loop portion of GSHPs systems – the most expensive, complex and long-term aspect of system. By owning the ground loops and selling the resulting heat to consumers, utilities add a renewable heating resource to their portfolio and bring the cost of GSHP systems for consumers in line with other options such as less-efficient air source heat pumps.⁴²

In the case of all three of these potential opportunities, broad market transformation strategies will be required to make serious inroads in the Nova Scotian market. For example, if the province wishes to establish a renewable heating market that goes beyond secondary heating installations such as pellet stoves, it will need to complement incentive programs with equipment and installer standards; distribution supply chain standards and incentives; and long-term work with installers and consumers to develop knowledge and comfort levels with larger, high-efficiency, whole-building heating systems. The cost, availability and quality of fuels and equipment must also improve. As the Austrian experience suggests, this involves a long-term, sustained effort that combines multiple strategies. The advantages of such a market transformation effort go well beyond electric energy efficiency, however, having great potential for non-electric efficiency programs, as well as positive impacts on the forestry industry, the agricultural sector, and potentially the manufacturing sector as well.

Should Nova Scotia wish to seriously transform its renewable heating market, collaboration between ENSC, the provincial government and private industry could be particularly fruitful. As an example, ENSC could lead and support a community pilot project to test heating systems, larger-scale systems such as district heating, and new supply chains and ownership models.

POTENTIAL TO CONTRIBUTE TO LONG TERM DSM TARGETS: Very significant. Success in certain regions of Europe suggests that an important percentage of total heating demand can be met by renewable heating systems in the medium term. For Nova Scotia, this could be particularly relevant in the residential new construction market, currently dominated by electric baseboard heating. Retrofits of hot water heating systems and (to a lesser degree) electric space heating could also be important. However, given the timelines associated with market transformation, we assume that a renewable heating strategy would contribute to electric DSM goals principally in the mid- to longer terms.

⁴² A small American electric cooperative, Delta-Monrose, pioneered this approach in the last ten years with great success. Terasen Gas, in British Columbia, is beginning to develop a similar approach.

MANAGEMENT, DELIVERY AND LOCAL CAPACITY

MANAGEMENT AND DELIVERY

INTRODUCTION

As ENSC takes on and expands existing DSM programs, it will be faced with decisions on its overall management and delivery structure. Indeed, these decisions may be critical to the costs and savings of program implementation. A key aspect of this is determining which functions should be performed by permanent, in-house staff, and which should be outsourced to DSM consultants, implementers, and other market actors. Below we highlight the options, their advantages and disadvantages, and principles and issues to keep in mind while deciding on a long-term M&D strategy.⁴³

WHAT IS PROGRAM MANAGEMENT AND DELIVERY?

Management and delivery (M&D) can be broken out into multiple tasks: administration, overall portfolio-level planning, program design, program implementation, program evaluation, and supportive tasks such as nurturing market actor infrastructure.

WHAT M&D OPTIONS CAN ENSC CONSIDER? The key choice in developing an M&D strategy is to identify where ENSC should aim for on the spectrum between full implementation by in-house staff on the one hand, and outsourcing of most functions (also known as the Program Management Contractor model, or PMC). This spectrum is of course a simplification, since even an entity such as Efficiency Vermont, closer to the in-house end of the spectrum, relies on market actors for many functions. Similarly, an entity such as Efficiency Maine Trust, mandated to rely largely on outside contractors, still maintains a core staff of managers. Essentially, there is a role for *all* players in managing and delivering ENSC programs; the challenge for the organization is to identify the optimal mix of actors.

MANAGEMENT & DELIVERY TASKS

- **Administration**
- **Planning**
- **Program design**
 - *Design*
 - *RFPs and selection*
 - *Program oversight/refinement/tracking*
- **Program Implementation**
 - *Program mgmt*
 - *Contractor mgmt*
 - *Outreach/mkting*
 - *Incentive Processing*
 - *Relationship / Acct mgmt*
(w/manuf/retailers; w/indiv. contractors;
w/large accounts)
 - *Audits/Evals*
 - *Actual projects (installing measures)*
 - *Tracking*
- **Building market actor supply**
 - *Training, Certification*
- **Quality Control**
- **M&V**
- **Evaluation**

⁴³ The analysis presented here was developed independently of past work in Nova Scotia on DSM management; however, the principles and issues we identify are largely in agreement with those identified in the 2008 'Wheeler Report', referenced earlier in this report.

ENSC Electricity DSM Review

The table below illustrates the approximate staffing levels for three of the entities most similar in design to ENSC: the Energy Trust of Oregon, the Wisconsin Energy Conservation Corporation (for the statewide Focus on Energy programs), and Efficiency Vermont. These three entities are selected for comparison as they are all non-profit organizations implementing statewide efficiency efforts very similar to the expectations of ENSC.

	Current Annual Budget	In-House Staff (FTEs)	Ratio of FTEs per M\$
Oregon	\$120M	75	0.6
Wisconsin	\$100M	89	0.9
Vermont	\$33M	160	4.8

As the reader will note, Vermont presents a substantially different staffing model, with roughly 5-8 times more staff on a pro-rated basis than its two counterparts. This should not be misread to suggest a problem at Efficiency Vermont, one of the most successful efficiency organizations on the continent; nor too should it be construed to suggest that more staffing is better. Rather, that different models can be equally relevant in different regions with different backgrounds, cultures and organizational limitations. Below we outline some key principles to adhere to, irrespective of specific ratios of staff and contractors.

PRINCIPLES AND ISSUES

- A. The Importance of In-House Culture: A performance-driven, market-focused culture is one the most frequently cited success factors for an energy efficiency utility, and helps ensure that programs actively seek out opportunities and adapt to changing market conditions. This is important regardless of the overall size of ENSC in-house staffing levels. It will be important for ENSC to avoid an overly bureaucratic and/or slow-moving culture if it is to go after aggressive savings levels. Similarly, ENSC will need to nurture innovation and risk taking if it is to meet its long term DSM goals. At the same time, a dynamic in-house culture that understands market-focused DSM will also help attract and retain high quality staff.

Developing the right in-house culture requires leadership; it can also benefit from exposure to the practices and environment of successful DSM organizations, particularly as ENSC develops over the next two years. Options to gain this exposure could involve hiring experienced staff from other jurisdictions, the ‘secondment’ of DSM consultants or contractors to act as long-term staff, or internships for new ENSC staff with sister organizations.

- B. The Viability of Both Models: It is worth underscoring that both the in-house and outsourced models for DSM can work effectively. In the last few years, some administrators have chosen to subcontract more services, while others have brought in-house roles that were previously performed by subcontractors.
- C. Valuing Management & Delivery: DSM program design and implementation are complex projects that require talented, quality staff. Quality staff are even more important for an organization such as ENSC, faced with challenging savings targets in a short time frame. Attracting and retaining the right people, whether as in-house staff or as contractors, requires not only a dynamic culture, but also a willingness to provide attractive levels of salary and benefits.
- D. The Need for A Long –Term Perspective: Initially, it may be difficult for ENSC to ramp up to necessary levels of expert staffing without relying on outside contractors or consultants. However, any such initial reliance should not become ENSC’s default position on the in-house versus outsourcing spectrum. ENSC should plan, from the outset, for the eventual mix of staffing it would like to have as a mature organization. If this involves substantial in-house staff, then preparation in the early years, particularly via mentoring/knowledge transfer from contracting organizations, must be integrated into management and delivery.
- E. The Impact of Nova Scotia’s DSM Ramp-Up: The steep ramp-up in DSM efforts planned for the next three to five years will likely also increase the need for outside contractors or consultants. It may also lengthen the amount of time needed to develop an effective in-house team, since even as staff expertise and experience increase, organizational goals will similarly be increasing. This has been

the experience of some DSM delivery organizations, such as NYSERDA (New York) and National Grid (Massachusetts), where continually expanding targets have increased the time required to move from an outsourcing model to an in-house staffing model.

- F. The Importance of Collaboration: In-house staff and delivery contractors need to collaborate closely in order to implement effective programs, acting as a single team. Experience with other jurisdictions suggests that care must be taken to avoid an overly arm's-length, adversarial relationship between in-house staff and delivery contractors, which can easily develop. ENSC leadership should emphasize a collaborative approach, particularly to allow knowledge transfer from contractors to in-house staff.
- G. The Need for Neutrality: While ENSC may develop fairly extensive in-house capacity, it should rely largely on the market for the actual installation of efficiency measures and product retailing. This allows it to retain the role of a credible, neutral promoter of energy efficiency in general, rather than as a vendor or contractor in the marketplace. It also avoids the issue of ratepayer-funded competition against the open market.

There are some exceptions to this general principle, where ENSC may wish to intervene to provide a service not offered by the market. A turnkey approach (in-house or contractor) is often appropriate for direct-install programs for hard-to-reach customers such as residential low-income households. Similarly, innovative approaches such as online catalogues offering specialty lighting products in rural markets may be appropriate where the market has not developed a similar offering.

ADVANTAGES, DISADVANTAGES AND ESSENTIAL INGREDIENTS

We present the advantages, disadvantages and essential ingredients for the effective use of in-house staff, DSM consultants and delivery contractors and market actors below.

IN-HOUSE STAFF

- **Advantages:** Reliance on in-house staff has several advantages. Firstly, in-house staff provide more long-term continuity than contractors, which facilitates developing and nurturing account relationships over time, especially with commercial and industrial participants. Similarly, in-house staffing can help to avoid (or minimize) the creation of silos, since all program staff are part of a single organization, and can therefore more easily be brought to work within a team-oriented structure and supportive environment, notably through closer coordination and physical proximity; internal arrangements to offer a single window/one-stop-shop to potential participants is also facilitated.

Importantly, particularly in a mission-driven non-profit organization like ENSC, in-house staff will tend to have strong mission alignment, dedication, and have minimal conflicting interests. The focus, and loyalty, of in-house staff will be primarily to the institution of Efficiency Nova Scotia and to its long term success. In house staff are also more likely to challenge program assumptions and delivery models and seek constant improvement, as that will be a pathway for them and their institution to succeed. Outside contractors have a vested interest in performing their contract well, but can be naturally reluctant to offer suggestions that they perceive will counter client expectations and/or will be more expensive for them to implement. Finally, in-house staff are generally less expensive than consultants or contractor staff.

- **Risks/Essential Ingredients:** As discussed earlier, it is vital that in-house leadership set the performance-driven tone for ENSC culture. In part, this requires attracting and retaining very skilled and talented staff, which can be challenging.

DSM CONSULTANTS AND DELIVERY CONTRACTORS

- **Advantages:** Both DSM consultants (providing specialized program design and evaluation services) and DSM delivery contractors (providing turnkey or relatively turnkey program implementation services) offer specific, high-value knowledge and skills. Their services may also be enhanced by extensive and ongoing knowledge and experience from other jurisdictions, which can be particularly useful toward learning lessons, adopting best practices, and not repeating errors. Because of their existing capacity, both groups can offer the capacity to move quickly, making them particularly useful in the context of ENSC's need for sharp expansion of program activities. This can make sub-contractors particularly useful for limited time functions

and turnkey programs in their initial phases. Similarly, as we discuss below, they can assist in the short and intermediate term in building the culture of the organization and in mentoring the initial ENSC staff.

- **Risks/Essential Ingredients:** Outside contractors are generally more expensive than in-house staff, and offer less long-term continuity, making it harder to build relationships with larger participants. A reliance on outside contractors can also create program silos, making it harder to offer one-stop-shop services or comprehensive approaches such as geographically-targeted or community-based strategies, since it is inherently harder for multiple contractors to collaborate than for in-house staff within a single organization. Another set of issues can develop from the fact that outside contractors have their own business objectives and brand that may be in some tension with the administrator's objectives. Also, while not inevitable, contractors may have a bias to "work to the contract" and provide the contracting party with those services explicitly listed, and not extend into areas, or suggest improvements, not spelled out by the terms.

Essential ingredients for the effective use of outside contractors include fostering collaborative relationships, encouraging innovation (by incentives and penalties, when possible), providing clear guidance on policies and communications with customers, and establishing clear mutual understanding on decision-making latitude.

MARKET ACTORS

- **Advantages:** market actors – retailers, manufacturers, trades and general contractors, architects and engineers – should provide the vast majority of customer services and measures. Relying on the open market for measure installation allows programs to take advantage of and support private-sector market development, competition and innovation. Market actors can also bring knowledge of non-program standard practice, due to their regular work outside of energy efficiency programs. Specialized market actors – for example, lighting designers or specialist in specific industrial processes – can complement in-house technical advisors by providing specific technical services.

Nurturing an independent, enlightened, competitive energy efficiency industry within the province is also an essential element in eventual market transformation – as enabling policies and program momentum bring energy efficiency into mainstream decision-making, a mature industry will be able to sustain itself independently rather than depend on program support. There are grey areas where program designs or market needs can make the use of in-house staff more appropriate. For example, in-house energy auditors or building performance raters may be used for some retrofit programs rather than relying on independent auditors. Similarly, major efficiency opportunities may make full time in-house technical staff worthwhile for some programs.

- **Disadvantages/Essential Ingredients:** A key issue for a relatively new entity such as ENSC is whether or not the local market is sufficiently prepared to offer energy efficiency services. Where there is a lack of qualified auditors, contractors, etc., ENSC may need to intervene more actively, particularly in the initial planning period (~2011-2015). This may involve using in-house staff, or simply strong encouragement of market development, for example via subsidized training and equipment purchase, or requirements for contractor certification.

It is also useful in the long term to keep mindful of the old adage that “trade allies are called trade allies because they are not your friends”. All but a minority of the trade allies in any program will assist the program only so far as it serves their immediate business interests. (In most areas an enlightened minority will appear who genuinely see the opportunity to grow their expertise and their businesses through a proactive alliance with the local program.) Especially in the early stages, the program will need to keep a vigilant watch on trade ally practices as abuses will occur – sometimes by omission, out of lack of knowledge of program requirements; sometimes out of commission. In key functional areas – analysis of complex technical projects, approval and verification of installed measures, verification of purchasing details – the program must maintain strong internal controls.

LOCAL CAPACITY DEVELOPMENT

As ENSC takes on leadership of DSM in the province, a key challenge will be developing local capacity, in terms of skilled in-house staff, locally based DSM consultants and delivery contractors, and skilled, competitive energy efficiency market actors. Developing local capacity in all of these areas will lower the cost of DSM for the province, increase the local economic benefits of DSM spending, and ensure successful market transformation in the long term. As Nova Scotia moves toward a leadership role in DSM programming, locally-based DSM industries may even expand to provide services in neighbouring jurisdictions.

Developing this local capacity requires strategic thinking and sustained effort. We identify eight key strategies below.

- A. Nurture In-House Staff:** Over the long term, in-house staff are a key form of local capacity, and a potential incubator for a local DSM industry. Successful energy efficiency deliverers in other jurisdictions, such as Vermont, have spawned multiple independent DSM providers, as in-house staff move on in their careers to become independent contractors, providing expertise both in province and as the basis for a Nova Scotia-based resource that can export its expertise to other jurisdictions in North America.
Aside from the cultural and compensation issues identified in our discussion of management and delivery decisions, nurturing in-house staff requires a dedication to ongoing investment in training and exposure to DSM peers and practices in other jurisdictions.
- B. Local Content Requirements for RFPs:** The use of local firms or capacity can be made either a requirement or criterion for RFPs for DSM consultants and delivery contractors. This is particularly useful for tasks with ubiquitous functions (relatively high volume of contracts), such as evaluation, measurement and verification (EM&V). It can also be relevant for more specialized, occasional functions (such as program review and program design), but care must be taken to balance an insistence on local content with the need for quality. For occasional needs where ENSC does not have sufficient need to stimulate deep local expertise, local content requirements may not be appropriate.
- C. Long-Term Commitments:** Relatively long-term contracts, where relevant/appropriate (for example, direct install programs) will make it more feasible for delivery contractors and others to invest in local capacity. Short-term contracts make this more difficult, and local content requirements may not be realistic for these contracts.
- D. Long-Term Predictability:** More broadly, market actors will be more willing to invest in certification, equipment purchases, and other costs if they are certain that program offerings are in place for a relatively long period of time. ENSC must retain flexibility in terms of its exact program offerings (incentive levels, strategies, etc.), but market actors must be reasonably sure that program-driven

demand will continue to exist. Experience from other jurisdictions shows how important it is to avoid interruptions in program delivery or year-to-year uncertainty about program existence.

- E. Market-Transformation Strategies:** Long-term enabling strategies such as mandatory building labelling and transferable financing will provide the permanent market signals needed to generate a self-sustaining energy efficiency industry.
- F. Reducing Barriers to Entry:** In the short and mid-term, when ENSC will need to nurture a nascent energy efficiency industry, reducing barriers to entry is a successful strategy. ENSC can subsidize elements such as training, certification and equipment costs for relevant markets such as energy auditing, weatherization retrofits and specialized submarkets, for example compressed air audits. It can also encourage and support efforts within the higher education sector to provide appropriate professional and paraprofessional tracks in energy engineering; efficiency/renewables program management, evaluation science, etc.
- G. Leveraging Certification:** Existing third-party certifications can be a low-cost path for increasing the quality of local market offerings. Examples include the Building Performance Institute's certifications for residential retrofit contractors and the Building Operator Certification program.
- H. Tracking Job Creation to Demonstrate Value:** Although we do not recommend using job creation metrics as part of ENSC's performance contract, it is clear from the majority of research that DSM programs stimulate local economies more than the importation of fossil fuels from outside of the province or the simple generation of electricity. Tracking, estimating and publicizing this job creation can be a highly effective demonstration of ENSC's added value beyond avoided generation costs.

Together, these approaches can enhance Nova Scotia's ability to develop local expertise and capacity, to serve the provincial DSM targets and, ultimately perhaps, to assist others as well.



Appendix D

Dunsky Energy Consulting Residential Fuel Substitution Pilot Program

FINAL REPORT

RESIDENTIAL FUEL SUBSTITUTION PILOT PROGRAM

Submitted to Charles Harrington
EFFICIENCY NOVA SCOTIA CORPORATION

December 16th, 2010



ABOUT DUNSKY ENERGY CONSULTING

Dunsky Energy Consulting is a Montreal-based firm specialized in the design, analysis and implementation of energy efficiency and renewable energy programs and policies. Our clients include leading utilities, government agencies, private firms and non-profit organizations throughout Canada and the U.S. To learn more, please visit us at www.dunsky.ca.

Our colleagues at Vermont Energy Investment Corporation, Energy and Resource Solutions, and North Atlantic Energy Advisors provided valuable assistance in this project.

Acknowledgments

In preparing this report, we benefitted from the collaboration, insights and experience of Efficiency Nova Scotia Corporation, Nova Scotia Power, Inc. and Conserve Nova Scotia staff.

We remain solely responsible for any errors or omissions in this report.

Residential Fuel Substitution Pilot Program

TABLE OF CONTENTS

CONTEXT AND SCOPE	1
Background	2
Objectives	3
DEC Program Design Methodology.....	4
Scope of Pilot	5
MEASURE CHARACTERIZATION.....	6
Approach.....	7
Key Inputs	8
Market Actor Research.....	9
Summary of Measures	10
Converting From Electric Baseboard Heating	11
<i>issues and Opportunities</i>	<i>11</i>
<i>Implications for the Pilot</i>	<i>12</i>
Measure Profiles	13
Wood Pellets	15
Overview.....	15
Pellet Stoves.....	15
Advanced Automatic Pellet Boilers and Furnaces	15
MARKET CHARACTERIZATION.....	17
Approach.....	18
Overall Market	19
Baseline Activity.....	21
Principal Heating Systems	21
Secondary Heating Systems.....	22
Domestic Hot Water.....	23
Encouraging Fuel Substitution	24
Factors Affecting Customer Interest.....	24
Interest in Natural Gas in Particular.....	25
Incentive Scenarios.....	25
Market Actor Reports.....	28
PROGRAM DESIGN.....	29
Barriers and Strategies	30
Recommended Strategies: Established Measures (Groups A, B)	33
Incentives.....	33
Financing	35
Installer Support.....	35
Other Strategies.....	36
Recommended Strategies – New Technologies (Group C)	37

Residential Fuel Substitution Pilot Program

<i>Incentives.....</i>	<i>37</i>
<i>Financing.....</i>	<i>38</i>
<i>Project Management.....</i>	<i>38</i>
<i>Installer Support.....</i>	<i>38</i>
<i>Other Strategies.....</i>	<i>38</i>
Eligibility.....	39
<i>Customer Eligibility – Space Heating.....</i>	<i>39</i>
<i>Customer Eligibility – Domestic Hot Water.....</i>	<i>39</i>
<i>Demonstration of Eligibility.....</i>	<i>39</i>
<i>Installer Eligibility.....</i>	<i>40</i>
Regions.....	41
Marketing.....	42
Participation Process.....	43
Non-Incentive Budget.....	45
EVALUATION, MEASUREMENT & VERIFICATION.....	46
Measuring Success.....	47
Measurement Plan.....	48
Evaluation Plan.....	49
RESULTS AND NEXT STEPS.....	50
Anticipated Results.....	51
<i>Measure Uptake.....</i>	<i>51</i>
<i>Anticipated Results.....</i>	<i>52</i>
Next Steps.....	53

CONTEXT AND SCOPE

*Residential Fuel Substitution Pilot Program***BACKGROUND**

As part of its 2011 DSM Closing Submission, NSPI recommended the inclusion of a Fuel Substitution pilot program, to be developed in late 2010 and implemented in 2011. Discussions during the 2011 DSM Plan hearings regarding this proposed pilot were in part inspired by a report on fuel substitution prepared by Dunskey Energy Consulting (DEC) and submitted as evidence by NSPI. This report included a proposed timeline for designing and implementing pilot programs.

In response to an information request, NSPI indicated that

It is expected that [a fuel switching pilot] would be developed in the last quarter of 2010 for implementation in 2011 under the oversight and direction of the Existing Houses program and funded through the Development and Research program. The pilot design would consider incentives and technical support for a limited number of retrofits, monitoring of costs, fuel requirements and electricity savings. It is expected that the PDWG would provide input and feedback on the pilot design and that the pilot results would help inform decisions on future fuel substitution programming.

In June 2010, Dunskey Energy Consulting was engaged to design the proposed fuel substitution pilot for existing homes.

OBJECTIVES

The objectives of this pilot are grouped into three categories:

1. **Understanding Measures**

- Discover customer interest levels for all eligible measures, and in particular, for converting away from electric baseboard (EBB) heating
- Confirm installation costs and issues, and in particular, those associated with conversions from EBB heating as well as with newer technologies (advanced automatic pellet boilers and furnaces)
- Confirm actual energy savings and non-electric energy consumption

2. **Testing Program Strategies**

- Discover free ridership levels by measure
- Test the impact of incentive levels on consumer interest and free ridership
- Test the effectiveness of other program strategies, including marketing, working upstream with interested installers, and financing (if possible).

3. **Achieving Savings** – although this is a pilot program, it is forecast to achieve roughly 2 GWh of net first year savings.

DEC PROGRAM DESIGN METHODOLOGY

DEC's methodology for this project consisted of six steps:

- A. DEFINING SCOPE, GOALS, OBJECTIVES AND POLICIES:** DEC and NSPI finalized the project's objectives, strategy options and policy decisions in July 2010.
- B. MEASURE CHARACTERIZATION:** DEC characterized potential measures, using data from the fuel substitution potential study conducted by Navigant Consulting for NSPI in February 2010. We updated numerous inputs to Navigant's measure characterization and added several new measures. We also interviewed over fifteen market actors for insight into measures and market conditions.
- C. MARKET CHARACTERIZATION:** DEC characterized the target market using information from Statistics Canada, past NSPI customer surveys, and a customer survey specifically commissioned to support this project.
- D. REVIEW OF EXPERIENCE:** DEC interviewed program staff from five jurisdictions with experience with fuel substitution programs targeting electric space and water heating.
- E. PROGRAM DESIGN:** DEC developed a pilot program design and forecast potential savings and costs. DEC also developed an evaluation, measurement and verification plan for the program. The proposed program design was reviewed and improved in collaboration with NSPI staff.
- F. PDWG REVIEW:** The proposed pilot design was presented to the Program Development Working Group for review and improvements were made based on their feedback.

This report presents our methodology and final results for steps B and C, and presents the final program design, informed by NSPI, ENSC and PDWG feedback.

*Residential Fuel Substitution Pilot Program***SCOPE OF PILOT**

The original scope of the pilot, as directed by NSPI in July 2010, was as follows:

- **Measures:** space heating and water heating equipment only.
- **Fuels:** conversions to natural gas, wood pellets, propane, and cordwood¹
- **Region:** To be determined based on further research. Given potential difficulties in obtaining sufficient participants, it was judged possible that the pilot should be province-wide.
- **Eligible building types:** Single-family existing homes were definitely to be included; the inclusion of small multi-unit residential buildings was to be determined based on further research.
- **Budget:** Total one year program budget for incentives will fall in the range of \$250,000 to \$1,000,000; the final estimate would depend on key design choices and assumed uptake.
- **Duration:** Nine to twelve months of implementation, with twelve months of follow-up monitoring regarding fuel use.

It is worth noting that this pilot does not target several markets, all of which are likely to be promising candidates for fuel substitution: residential publicly-owned housing, residential new construction, commercial/ industrial retrofits and commercial/industrial new construction. These tend to represent “easier” markets to penetrate than existing homes, where the presence of electric baseboards involves significant expense and disruption for full-scale conversions.

Finally, the reader will note that small multifamily buildings were excluded from the pilot. This was primarily a result of market actor feedback indicating that EBB conversions were not feasible except in cases where the building was completely gutted. Nonetheless, it may be worth revisiting this at a later stage, particularly if a turnkey approach is used and/or large multifamily buildings are simultaneously addressed.

¹ Heating oil was excluded as a target fuel, primarily because of its significant negative environmental and economic impacts for Nova Scotia relative to other fuel substitution options, as well as concerns around price volatility. Heating oil is also problematic for residential heating because of increasing issues with home insurance policies due to potential soil contamination from fuel leaks.

MEASURE CHARACTERIZATION

APPROACH

Our approach built upon measure data used for Navigant Consulting's 2010 Fuel Substitution Potential Study. In reviewing and updating Navigant's potential study, we brought a series of changes to the initial data. Specifically, we:

- **Adjusted avoided costs** and gas connection costs as follows:
 - use of escalators to reflect likely increases beyond inflation in future prices for non-electric fuels
 - use of a utility perspective for gas costs;
 - adjusted costs for wood and wood pellets based on market actor inputs
- **Updated measure costs** to reflect information from interviews with Nova Scotian market actors
- **Broke out key measures** according to baseline housing (presence of distribution system)
- **Identified participant simple payback** to inform estimates of participant interest.
- **Added several measures** encountered during market actor research:
 - Integrated gas combo boilers as a full heating system
 - Wood pellet boilers and furnaces, including advanced automatic European-style systems; and
- **Adjusted savings assumptions** substantially for three measures: cordwood stoves, wood pellet stoves and integrated natural gas hot water/boiler systems.

We also screened non-electric fuels for environmental impacts based on common efficiencies.

With these updated values, we proceeded to screen measures and exclude those that had TRC benefit-cost ratios below 0.8. One exception to this approach was the inclusion of advanced automatic pellet boiler conversions for EBB homes (TRC ratio of 0.73); this technology is included in the pilot as a demonstration project rather than a high-uptake measure. A separate Excel file has been provided to ENSC containing measure data and screening results for the program.

Residential Fuel Substitution Pilot Program

KEY INPUTS

The tables below provide key inputs used in our analysis; more detailed inputs can also be found in the Excel file provided with this report.

1 Avoided Costs

Input	Assumed Value (\$2010, pre-tax)	Source/approach	Assumed future price changes
Heritage Gas avoided costs (\$/GJ)	\$8.93	Average historical gas recovery rate +10% adder	Based on confidential internal price increase forecasts provided by NSPI
Cordwood avoided cost (\$/GJ)	\$268/cord	Average stove installer reported retail prices	0% real escalator, given long-term stability of cordwood prices to date.
Wood pellets avoided cost (\$/GJ)	\$330/metric ton; \$18.52/GJ	Retail prices reported by Shaw Resources, averaged with price ranges reported by stove installers	1% real escalator, given past trends of increased prices in the last 4 years.
Propane avoided cost (\$/GJ)	\$0.79/liter	Current CNS space heat survey	Based on confidential internal gas price increase forecasts provided by NSPI

2 Discount Rates

Fuel/Perspective	Real Discount Rate	Source
Electricity	6.81%	NSPI
Capacity	6.81%	NSPI
Natural Gas	8.49%	Heritage Gas
Propane	8.00%	Working assumption
Cord Wood	10.00%	Working assumption
Wood pellets	8.00%	Working assumption
Participant	4.71%	Working assumption (currently available 5-year fixed mortgage rates)

MARKET ACTOR RESEARCH

We interviewed the following market actors regarding measure costs, recommended measures, and existing customer interest:

INSTALLERS

- Chase Foren, Rood and Rose Plumbing and Heating, Dartmouth
- Mickey Withrow, Barracuda Heating Services, Dartmouth
- Pat Croucher, All Green Mechanical, Wellington
- Geoff Manson, Andrew, Total Gas/The Fireplace, Dartmouth
- Cindy McDow, Atlantic Stove and Fireplace, Dartmouth
- Nick Hill, Nat Gas Pro, Pictou
- Ye Olde Chimney Sweep, Yarmouth
- Royal Propane and Hearth, Digby
- Dale Jolimore, Greenlaw Construction, Lawrencetown

MANUFACTURERS AND WHOLESALERS

- Jason Thompson, NTI Thermal (New Brunswick)
- Greg Boudreau, Source Atlantic (Distributor)
- Chris Haskin, Tarm Biomass (New Hampshire)
- Tony Comeau, Newmac Furnaces and Boilers, Debart
- Charmaster Products, Minnesota
- Harman Stove Company, Pennsylvania
- Kerr Energy Systems, Parrsboro

PROGRAM ADMINISTRATORS

- Sara Mudge, Efficiency New Brunswick
- Luke Dugas, Enbridge Gas (New Brunswick)

TECHNICAL EXPERTS

- John Gusdorf, NRCAN (Ottawa)
- Bruce McCullum, Ensign Consulting (PEI)
- Kamallesh Doshi, Biomass Energy Resource Center, Vermont

OTHERS

- Duncan MacAdam, Halifax (property manager)
- George Van den Brook, Cardigan Feeds, PEI (wood pellet delivery)

Residential Fuel Substitution Pilot Program

SUMMARY OF MEASURES

Our measure screening resulted in five categories of measures being included in the program:

- Wood and wood pellet stoves
- Wood heating systems (boilers and furnaces)
- Gas heating systems (boilers and furnaces)
- Gas domestic hot water systems
- Wood pellet heating systems (boilers and furnaces)

We categorized these measures based on two factors: whether or not the technology in question was established in Nova Scotia, and the presence or not of significant installation issues associated with the measure. In most cases, installation issues involved the conversion of electric baseboard heating to central heating. The table below presents how these factors resulted in three groups of measures:

- Established technology with no installation issues
- Established technology facing EBB conversion issues
- New technology with installation issues (pellet systems)

3 Measure Categories

	INSTALLER BASE	NO INSTALLER BASE
NO INSTALLATION ISSUES	 • Wood stoves • Pellet stoves • Wood or gas boilers/furnaces for ECH homes • Gas water heaters	
INSTALLATION ISSUES	 • Wood or gas boilers/furnaces for EBB homes	 • Wood pellet boilers/furnaces

These three categories require different program strategies and will likely have different uptake rates. Group A measures will be relatively straightforward for customers to adopt and should be readily encouraged by program incentives. Group B measures require converting EBB heated homes to central heating, which is likely to be one of the biggest challenges for this pilot program. Meanwhile, Group C measures are currently virtually unknown in Nova Scotia and will require work with installers to develop a supply base, as well as educational efforts with customers.

CONVERTING FROM ELECTRIC BASEBOARD HEATING

ISSUES AND OPPORTUNITIES

Electric-baseboard (EBB) heating is by far the most common electric heating in Nova Scotia, with 72% of electrically-heated homes. This creates a problem for fuel substitution programs because of the lack of a heating distribution system. When asked about their recommended options for the conversion of electric baseboard (EBB) heated homes, market actors were fairly unanimous on several points.

- 1) **Segments:** Market actors differentiated between bungalows with unfinished basements (which allow easy installation of a forced-air duct system), and other homes (multi-storey and/or finished basements), which do not allow for easy installation of forced-air ducting.
- 2) **Air-source heat pumps (ASHPs):** All market actors recommended ducted ASHPs for bungalow/unfinished basement homes, and ductless mini-split air-source heat pumps for all other homes, as the simplest and most logical option for EBB-heated homes, despite the fact that we were specifically asking about non-electric measures. Ductless mini-splits are clearly the most common conversion for EBB-heated homes in the market currently.
- 3) **Non-ASHPs Options:** If air-source heat pumps are explicitly excluded, as is the assumption for the fuel switching program, market actors identified several priority areas:
 - ▶ **Bungalows with unfinished basements:** Forced air furnaces with ductwork are the first, most practical opportunity for fuel switching from existing homes.
 - ▶ **Multi –storey with finished basements:** Boilers with radiators are the simplest solution for this market. Specifically:
 - **Boilers with radiators are the simplest solution:** *Despite a higher cost for boilers relative to furnaces, a boiler/radiator combination is preferred because of the low profile and minimum disruption caused by the distribution system, ¾ inch PEX tubing that can be installed in walls with little need for post-installation refinishing. Boiler systems can also provide indirect storage high-efficiency hot water heating at little additional cost. The only disadvantage to this system for consumers is that it does not allow the installation of central air conditioning, but market actors indicated that this*

Residential Fuel Substitution Pilot Program

was not an issue for most customers². From a DSM perspective, the inability to add central air conditioning is a clear advantage of this measure.

- ***Forced air furnaces can be installed at an overall cost similar to boilers/radiators, but with significant additional disruption and renovation time.*** *The additional refinishing cost (~\$5,000) brings the cost of a forced air conversion in line with a boiler conversion, but can take several weeks and involve extensive disruption. It is generally very difficult to convince customers to make this conversion unless major renovations are occurring. Standard ductwork, involving 10-12 inch chases, require either adding unsightly bulkheads or opening up walls to run ducts. Ducts can be run through the attic when possible, with air registers in the ceiling, but this will still require a central chase from the basement, and in a two storey home with a finished basement, will still require bulkheads on the basement ceiling.*

IMPLICATIONS FOR THE PILOT

The pilot project will clearly need to provide additional incentives to cover the cost of installing distribution systems in order to make fuel substitution attractive. It will also need to prepare specific marketing messages for customers with EBB heated homes. A key outcome of the pilot will be learning about the degree to which incentives and target marketing alone will be enough to reach this market. If not, ENSC may want to explore the use of a turnkey installation option in the future.

Given that boiler conversions will be preferable for most homes from both a program and a participant perspective (aside from bungalows with unfinished basements), the distribution system incentive should be set at a level close to 100% of the cost of installing a hydronic distribution system. This is equivalent to roughly 60% of the cost of installing forced air ductwork (100% for bungalows with unfinished basements).

² On the other hand, Enbridge Gas in New Brunswick indicated that they were focusing on forced-air conversions due to customer demand for air conditioning

Residential Fuel Substitution Pilot Program

MEASURE PROFILES

The table below provides a brief profile of each of the key measures or systems considered for this pilot.

SYSTEMS	PROFILES
WOOD STOVES	Eligibility: EPA-certified stoves in homes with no existing non-electric secondary heating system Installed Costs: \$3,000-\$5,000 including chimney installation Notes: Very popular measure, in rural and urban areas, as reported by all market actors. This may potentially cause high free ridership rates. Requires significant customer operations & maintenance effort.
PELLET STOVES	Eligibility: EPA or ULC-certified stoves in homes with no existing non-electric secondary heating system Installed Costs: \$4,000-\$5,500 including ventilation installation Notes: Most market actors reported little demand, especially relative to wood stoves, due perhaps to consumer concerns about pellet availability (one exception in HRM reported good sales). However, customer surveys reported installation intentions at a level similar to wood stoves. All market actors agreed that pellet availability is actually no longer an issue.
WOOD BOILERS/ FURNACES	Eligibility: ULC-certified boilers or furnaces, including those with electric back-up heating elements. Installed Costs: boilers - \$7,000 to \$9,000; furnaces \$5,000 to \$7,000 Notes: Prices quoted are for conventional (non-gasifying) systems, which dominate the market. Higher-cost but higher efficiency gasifying models greatly reduce emissions, but are not widely adopted. In all cases, wood heating systems require back-up heat, either integrated into the unit ('hybrid' systems) or in parallel (in the case of the program, accomplished by leaving the existing electric heating in place). Market actors report little/no penetration in urban areas, but significant interest in rural areas.

Residential Fuel Substitution Pilot Program

GAS BOILERS/ FURNACES	Eligibility: Energy Star boilers or furnaces with an AFUE above 92%, including ‘combo’ boilers (which provide both space heating and domestic hot water). Installed Costs: combo boilers - \$8,000 to \$11,000; boilers - \$7,000-\$10,000; furnaces - \$4,000 - \$7,000. Notes: combo boilers are the preferred option for EBB conversions, given the potential to additionally reduce DHW load for little cost.
GAS HOT WATER	Eligibility: Conventional storage-tank heaters with an EF of 0.67 or higher; tankless water heaters with an EF of 0.82 or higher. Installed Costs: storage-tank heaters EF 0.67 - \$1,700; Energy Star condensing storage-tank heaters, EF >0.77 - \$2,200 or higher; tankless heaters EF 0.82 - \$2,500; tankless heaters EF 0.95 - \$4,000 . Notes: Energy Star is finalizing a specification for conventional storage-tank heaters with an EF of 0.77 (based on condensing technology); however, no models are currently on the market.
PELLET BOILERS/ FURNACES	Eligibility: ULC-certified boilers or furnaces, including ‘combo’ boilers. Installed Costs: standard (not fully automatic) furnaces and boilers - \$12,000. Advanced automatic combo boiler systems - \$20,000 - \$40,000. All prices include \$2,000 for a one to two-tonne capacity pellet storage system with automatic feeding mechanism. Notes: standard models, for example Harman brand models, are designed to work with non-pellet back-up heat and require frequent (2X/week) maintenance. Advanced automatic systems, developed in Europe, are designed to function with only seasonal maintenance and do not require back up heating. Advanced automatic brands available in Canada include Woodpecker and Fröling. Market actors indicate that there are few or no pellet boilers or furnaces installed in Nova Scotia, and that interest to date has been minimal. Standard systems are in theory available via pellet stove dealers with existing relationships with North American manufacturers such as Harman. Advanced automatic systems can be imported to Nova Scotia, but require trained installers. At least one trained installer is present in Atlantic Canada for each of two brands (Woodpecker and Fröling).

WOOD PELLETS

OVERVIEW

Wood pellets are potentially a very interesting fuel for Nova Scotia and of particular interest for electric fuel substitution. Aside from cord wood heating, which requires back-up heat and significant operations and maintenance effort, pellets are the only cost-effective and environmentally acceptable fuel currently available province-wide for residential space heating. With European-style advanced automatic furnaces and boilers, pellets could become a real alternative to electric space heating. From a broader perspective, pellets have the advantage of being produced in Nova Scotia (the province currently produces over 10 times domestic demand), providing significant economic development opportunities for the province. A further advantage is that pellets are both a renewable and carbon-neutral resource.

Presently, pellets are a relatively marginal fuel for residential heating, used almost exclusively via pellet stoves. At current pellet prices, fuel substitution towards pellets is only borderline cost-effective, and pre-incentive payback periods on equipment are very long (20 years or more). We recommend including pellet stoves, boilers and furnaces in the pilot program despite these factors, for several reasons. In the short term, the pilot will allow ENSC to confirm cost-effectiveness and actual energy savings, and develop experience with new technologies (advanced automatic systems). In the medium term, ENSC and the provincial government may wish to explore a broader renewable heating strategy for the province, in which wood pellets may play a key role. Experience from the pilot program will feed into this exploration should it occur.

Below we summarize the key technologies and the approach planned for each one.

PELLET STOVES

Pellet stoves are an established technology in Nova Scotia. The pilot program will incent them in a similar fashion to other established measures.

ADVANCED AUTOMATIC PELLET BOILERS AND FURNACES

Advanced automatic pellet boilers and furnaces are essentially unknown in Nova Scotia, although they are an established technology in large parts of Europe.

Residential Fuel Substitution Pilot Program

Several key success factors are present in regions such as Austria and Sweden, where pellets and other biomass sources make up a significant portion of residential heating fuels. Firstly, advanced automatic furnaces and boilers are available and understood by consumers and installers. These systems do not require back-up heat, can operate safely without supervision for weeks at a time, and require little maintenance. Secondly, bulk pellet delivery is widespread and regulated to eliminate quality issues. Pellets are delivered to the home once or twice per heating season, and pumped into the home's storage system pneumatically. This reduces homeowner efforts and also reduces pellet costs by a third or more.

At current pellet prices (based on 40 kg bags purchased individually), European pellet boilers and furnaces are not cost-effective as DSM retrofit measures, and have pre-incentive customer payback periods beyond the life of the equipment. If Nova Scotia could develop a critical mass of pellet furnace and boilers, however, this picture would change. Once a bulk delivery system was in place, and assuming that equipment prices are reduced due to economies of scale, advanced pellet boilers and furnaces become cost-effective, and have reasonable customer payback periods.

This scenario, combined with the GHG emissions reduction and economic development potential of wood pellets as a heating fuel, suggests that a wood pellet market transformation effort is worth considering, both for ENSC and for the provincial government itself. Although such a strategy cannot begin within a relatively narrow pilot program, the pilot program can incent the installation of a few systems by early adopters, allowing installers and ENSC to become more familiar with the equipment and its' potential.

MARKET CHARACTERIZATION

*Residential Fuel Substitution Pilot Program***APPROACH**

In characterizing the potential market for fuel substitution measures, we relied on three principal data sources:

- The Nova Scotia Statistical Review 2007
- Two online surveys conducted by NSPI among its Customer Online Advisory Panel
 - The Energy Usage Study, (EUS) conducted in November 2009
 - The 2010 Fuel Switching Study (FSS), conducted in September 2010 and specifically conducted to inform this pilot program.

Our market characterization was also informed by interviews with market actors (see complete list on page 9).

Note that the EUS polled ~2,000 participants from all heating sources, and covered many topics beyond space and DHW heating. The FSS polled 484 participants, all of whom reported electricity as their principal heating fuel.

We have principally relied on the EUS and FSS results in characterizing the market for this program. Where both surveys asked the same question, we have used the average of the two surveys. We note where survey results differ from those reported in the 2007 NS Statistical Review.

Note on Limitations: *The EUS and FSS results are limiting in several ways:*

- *Responses are not broken out by housing type for electrically heated homes.*
- *There is ambiguity in some survey responses – for example, it is unclear if respondents who indicated plans to convert their principal heating system to wood pellets were planning to install wood pellet stoves or central heating systems.*
- *Data on baseline activity is based on intentions to convert, not actual historical data.*
- *The sample size for many questions was very small – under 30 respondents in some cases.*

*Residential Fuel Substitution Pilot Program***OVERALL MARKET**

Based on the results of the EUS and FSS surveys, approximately 37% of existing homes report electricity as their principal heating fuel in Nova Scotia.³ Among electrically-heated homes, 77% use electric baseboards (EBB) as their principal heating system, and 11% use furnaces or boilers. The remaining 12% use either heat pumps or electric thermal storage (ETS). For the purposes of the program, this latter group is ineligible.

The 2007 Statistical Review reports 293,000 single-family homes in the province, including attached and semi-detached homes. According to Heritage Gas, 1,500 single-family homes are currently connected to the gas network, and a further 6,000 homes have road access to gas (i.e. are eligible for conversion).

Using these figures, we have estimated the potential market for this program, as presented in the table below. The table breaks the market out by two key factors: access to gas, and the type of heating system in place – electric base boards (EBB) or electric central heating (ECH). The table also provides our estimate of homes currently with access to gas and electric hot water tanks in place.

Note that 41% of FSS respondents indicated that they have some form of non-electric secondary heating system. As discussed further under Eligibility on page 39, homes that obtain a significant portion of their heating from non-electric sources should likely be excluded from the program. It is unknown at this point what percentage of homes with non-electric secondary heating would be excluded, but it will generally reduce the market numbers presented below.

4 Fuel Substitution Market in Single Family Homes

Current Equipment	Access to Gas	Potential Market Size
EBB HEAT	Gas	~2,000
	No Gas	~80,000
ECH HEAT	Gas	~500 SF
	No Gas	~11,000
HOT WATER	Gas	~500

³ Note that this is substantially higher than the 23.1% reported for Nova Scotia in 2006 by the 2007 NS Statistical Review.

Residential Fuel Substitution Pilot Program

This data illustrate clearly that EBB homes without access to gas makes up by far the largest market for the pilot program, followed distantly by ECH homes without access to gas. This accentuates the importance of wood and wood pellet measures, and of successfully overcoming the difficulties associated with converting EBB homes. Gas conversions will be drawn from an extremely small market, although that market will grow over time.⁴

⁴ The future growth rate of existing homes with access to the gas network is highly uncertain. Growth to date suggests that an average annual 20% growth rate is one reasonable scenario. At this rate, the potential market with access to gas could grow to 17,000 homes by 2020.

BASELINE ACTIVITY

We developed assumptions regarding baseline activity using a combination of survey results, market actor responses and working assumptions. These assumptions were used to forecast program free ridership as well as to understand how well established each technology is in the province. Note that these are approximate assumptions and that actual free ridership rates will be determined by the post-pilot evaluation.

PRINCIPAL HEATING SYSTEMS

Respondents to the EUS and FSS were asked about intentions to convert their principal heating source in the next three years. 3.5% responded that they were ‘definitely’ converting and 7.5% reported that they were ‘probably’ converting. We have assumed that roughly 80% of ‘definite’ respondents and 20% of ‘probable’ respondents will actually convert over the next three years. This implies that approximately 1600 electrically-heated single family homes will convert each year.

‘Definite’ and ‘probable’ respondents were also asked about their fuel choice. 21% reported planning a conversion to wood, 17% to wood pellets, and 7% to gas.⁵ We have adjusted these numbers downwards in all cases for the following reasons:

- **Wood/wood pellets:** Based on market actor feedback and responses to questions about secondary heating systems, we assume that most wood conversions and all wood pellet conversions will actually consist of adding a stove to the existing electric heating system – i.e., will not involve converting the home’s full heating system. For wood conversions, market actors report that full wood boilers or furnaces are a niche market. For wood pellet conversions, market actors report zero installations to date in Nova Scotia, making a sudden upswing in pellet boiler and furnace conversions unlikely. This assumption is supported by the fact that when we analyze intentions to add a secondary heating system, the resulting annual conversion levels for wood and pellet stoves are similar to those reported for main system conversions, which we suggest is likely principally due to respondents reporting the same intention for both questions.
- **Gas:** Roughly 7% of homes reported access to gas, which is more than three times more than those with actual access according to Heritage Gas. Heritage Gas also reports that most if not all of existing homes converting to gas have central heating. Because of these combined factors, we

⁵ The remaining 55% were divided among electricity (presumably ASHPs or ETS), solar, oil, propane, wind and ‘unknown’.

Residential Fuel Substitution Pilot Program

have assumed that, of the roughly 150 existing homes converting to gas each year, the only conversions from electric heat will be from ECH homes – under ten homes/ year.

The table below presents the breakout of conversions by fuel source according to survey results, and our final, adjusted assumptions about baseline conversions.

5 Baseline Annual Conversions of Principal Heating Systems

Fuel	Survey Implications*	Final Adjusted Assumption for <u>boilers or furnaces</u>	Notes
Wood	330	30	Survey results appear unlikely to involve conversions to boilers/furnaces, assume 90% are actually reporting wood stoves
Wood Pellets	260	0	Assume reporting 100% pellet stoves
Gas	110	6	Adjusted assumption extrapolates from past conversion rates rather than surveyed intentions

**from FSS questions re principal systems*

SECONDARY HEATING SYSTEMS

FSS respondents were asked about their intentions to add or replace a secondary heating system in the next three years, with 4% indicating definitely, and 10% indicating probably. Of these, 23% indicated they were planning to replace an existing system rather than add a new system. Using the same '80-20' assumption used for principal heating systems, this suggests that roughly 1400 households will add secondary heating systems per year.

Of those likely planning on *adding* systems, 27% were interested in wood pellets and 15% in wood stoves.⁶ Applying these interest levels to the projected number of additions per year results in baseline numbers broadly similar to those for primary heating systems. We have assumed that respondent's reported intentions to convert principal heating systems and intentions to add secondary heating systems substantially overlap. To be conservative in our free ridership assumptions, we have used the larger projection in each case. The table below presents results implied by survey responses and our final adjusted assumptions.

⁶ The remainder were divided between natural gas, propane and 'other/don't know'.

*Residential Fuel Substitution Pilot Program***6 Baseline Annual Conversions of Secondary Heating Systems**

Fuel	Survey Implications*	Final Adjusted Assumption for <u>stoves</u>	Notes
Wood	200	295	Adjusted assumption uses 90% of projected wood conversions reported for principal systems
Wood Pellets	320	320	

**from FSS questions re secondary systems*

A key implication of the table above is that it will be difficult for the pilot program to offer significant incentives province-wide for wood and wood pellet stoves without risking very high free ridership rates. For example, assuming a (relatively low) \$500 incentive, free riders alone would consume \$540,000 in incentives, over half the available budget.

DOMESTIC HOT WATER

No survey results were available for intentions to convert domestic hot water (DHW) to natural gas (the only standalone cost-effective DHW fuel). Instead, we relied upon information from Heritage Gas. Heritage Gas estimates that 90% of its new residential customers converting from other fuels choose to convert their DHW supply to natural gas. Heritage Gas also estimates that over 90% of conversions are from oil heating, and EUS survey data indicates that 36% of oil heated homes have electric DHW.

Assuming that conversions in 2011 are close to the average over 2007-2009 of 160 homes/year, this implies a baseline of 50 conversions/year. We add to this an estimated 3-10 conversions of electric DHW to gas by existing gas customers at the end of the equipment's life, for a baseline conversion assumption of 60 conversions/year.

Residential Fuel Substitution Pilot Program

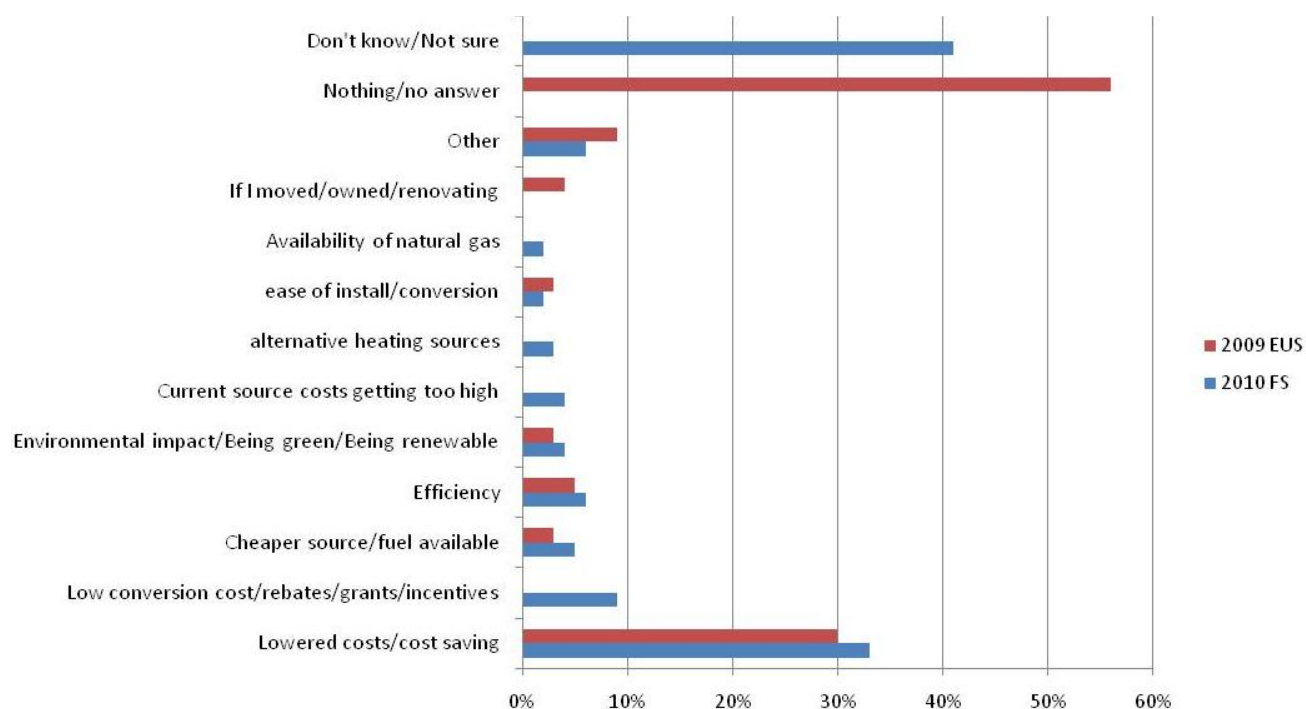
ENCOURAGING FUEL SUBSTITUTION

Participant surveys revealed valuable information on both market interest in – and/or openness to – fuel switching, and the levels of incentives that could move decisions.

FACTORS AFFECTING CUSTOMER INTEREST

Both EUS and FSS respondents were asked “What, if anything, would cause you to change your main heating source?”. The chart below summarizes answers from both surveys (note that respondents could choose more than one answer).

7 Potential Factors Encouraging Fuel Substitution



Over half of EUS respondents did not answer or said nothing would cause a change, while 40% of FSS respondents answered ‘don’t know/not sure’. Beyond this group, the largest response by far was lowered costs and cost savings, at 30%, with conversion incentives encouraging at least 10% of FSS respondents. Multiple other factors generated minor interest.

*Residential Fuel Substitution Pilot Program***INTEREST IN NATURAL GAS IN PARTICULAR**

Respondents were also asked about their likelihood of converting to natural gas. Among 26 respondents reporting access to gas, *none* indicated that they would ‘definitely’ or ‘probably’ be interested. Among a larger sample without current access, 40% indicated that they were ‘definitely’ or ‘probably’ interested. Those indicating ‘definitely not’ or ‘probably not’ were asked about reasons why, with safety concerns receiving the most responses (33%) and cost concerns the second most responses (18%). Similarly, when asked what would encourage conversion interest levels, ‘nothing’ was the most common response (33%), along with ‘don’t know’ (36%) and cost factors (22%). Incentives were cited by only 4%.

This suggests that electrically heated homes with current access to gas will be a particularly difficult market to reach. Heritage Gas reports that safety concerns continue to be an issue for a percentage of the public, despite education campaigns re natural gas’ safety record. On the other hand, responses to incentive scenarios suggest that most would in fact be open to incentives (see below).

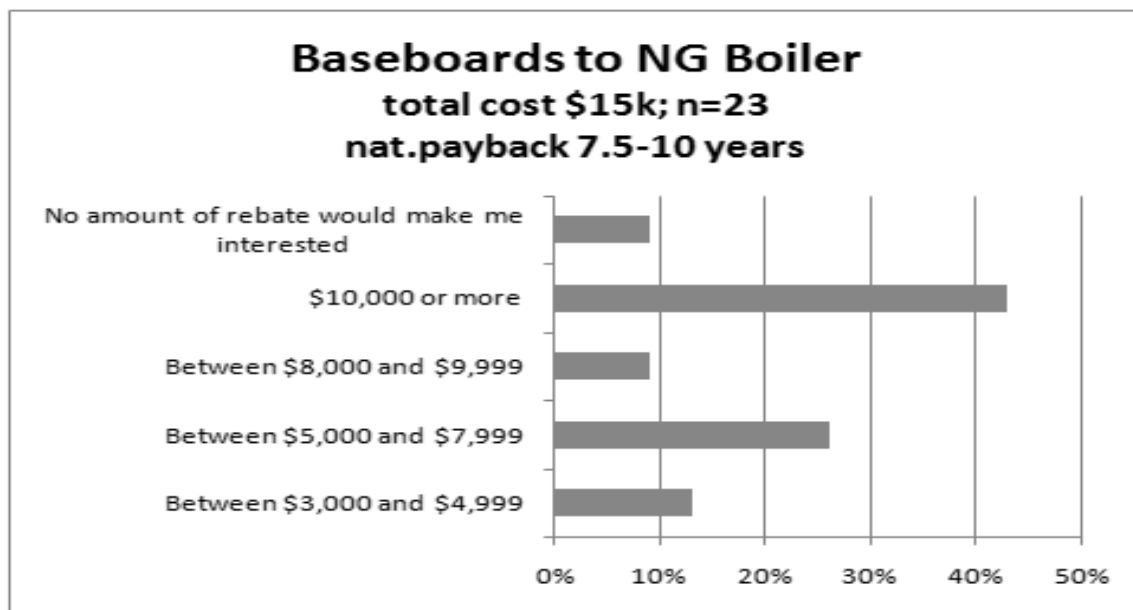
INCENTIVE SCENARIOS

FSS respondents were provided information regarding the conversion cost and annual energy cost savings for four different fuel substitution scenarios, and asked to indicate the level of incentive that would be required to interest them in conversion. All respondents were asked about scenarios re wood and pellet stove additions. Respondents reporting access to natural gas were asked about converting an EBB home to a ‘combo’ boiler system, and about converting electric DHW to a tankless gas heater. Note that the latter group was relatively small (23-26 respondents).

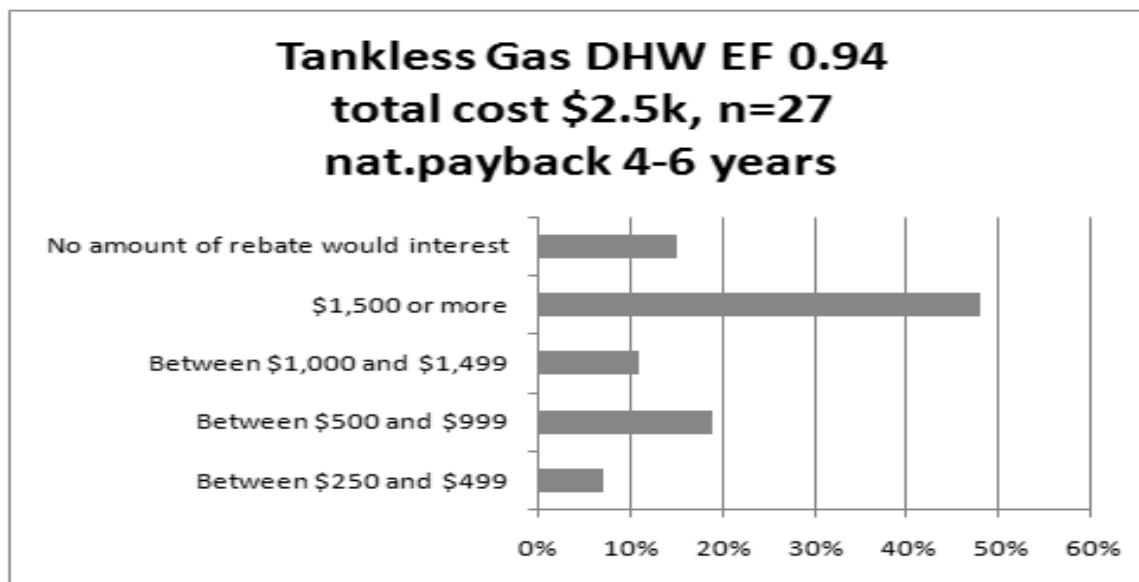
The four graphs below summarize respondent feedback. Graph headings indicate total conversion costs, the sample size (“n”), and the pre-incentive simple payback period for the customer.

Residential Fuel Substitution Pilot Program

8 Incentive Rates and Interest Levels for Gas Boilers

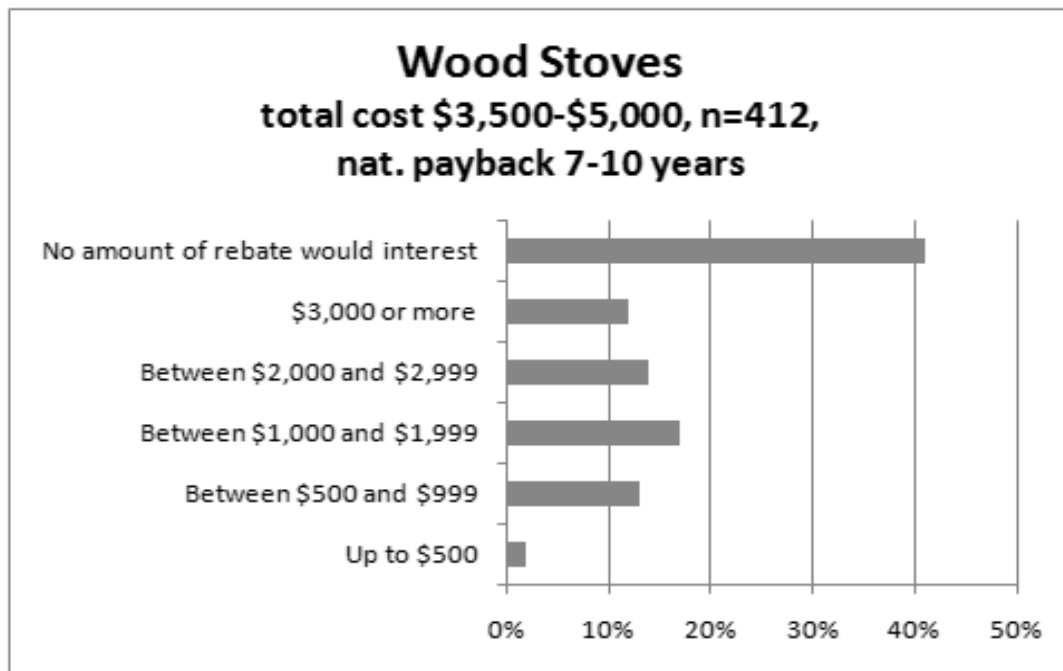


9 Incentive Rates and Interest Levels for Tankless DHW

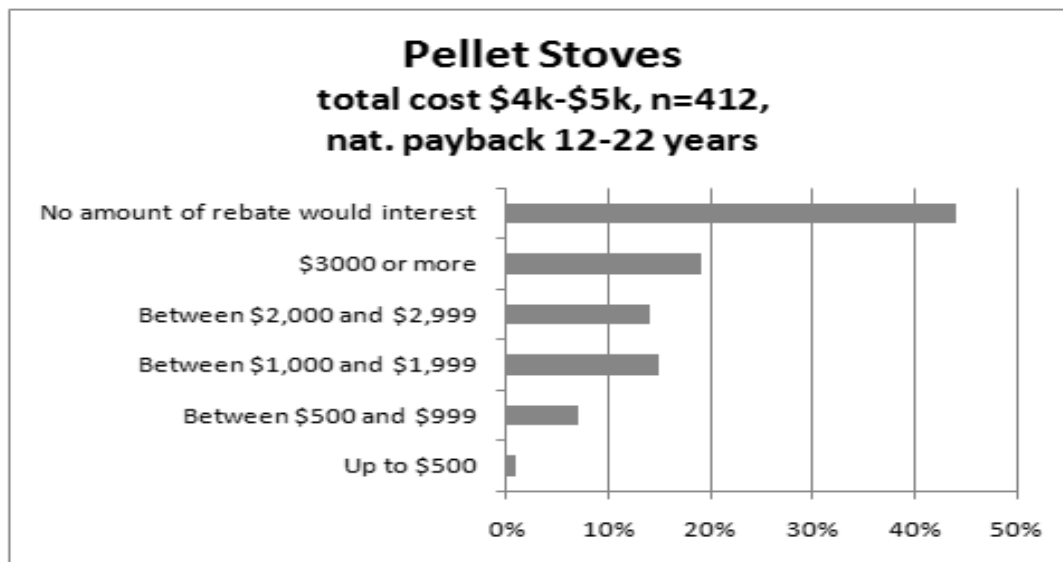


Residential Fuel Substitution Pilot Program

10 Incentive Rates and Interest Levels for Wood Stoves



11 Incentive Rates and Interest Levels for Pellet Stoves



A key finding from these results is that most respondents reporting access to gas would be interested by some level of incentive – less than 15% of respondents indicated that no amount of incentive would interest them. In contrast, over 40% of respondents would not be interested in wood or pellet stoves regardless of incentive levels.

We used responses to incentive level questions to build out our expected uptake rates, discussed in the results section.

MARKET ACTOR REPORTS

Market actors (HVAC contractors and equipment retailers) contacted as part of measure characterization were also asked their sense of current levels of interest in fuel substitution.

- ▶ **Wood Stoves** were reported to be a longstanding popular measure by all market actors.
- ▶ **Wood Pellet Stoves:** Market actors indicated that interest in pellet stoves had peaked in 2008 during sharp increases in heating oil prices, but had dropped substantially since then. Factors cited were a perception of pellet shortages lingering after temporary pellet availability issues experienced during the 2008 boom and a gradual increase in pellet prices to levels currently on par with oil (although substantially lower than electricity). Market actors consistently indicated that pellet supply had not been an issue since 2008.
- ▶ **Gas Heating Systems:** Market actors reported that virtually all of the residences that they have converted to gas heating were oil-heated homes with central heating, and few reported working on EBB conversions (two out of six, each of whom mentioned one EBB conversion).
- ▶ **Gas Domestic Hot Water:** Market actors indicated that both conventional storage tanks and tankless DHW were popular conversions, with conventional tanks more common.
- ▶ **Wood Pellet Boilers/Furnaces:** Market actors indicated zero experience with full boiler or furnace systems. Several pellet stove dealers indicated that they had access to wood pellet furnaces or boilers from their stove suppliers, but all of these were from North American manufacturers of standard pellet systems, not the advanced automatic systems discussed earlier. There are at least two representatives in Atlantic Canada of advanced automatic European-style systems, a representative of Tarm Biomass based in Lawrencetown and a representative of Ireland-based Woodpecker Energy Systems based in PEI.

In summary, all proposed measures, with the exception of pellet boilers and furnaces, are well established in Nova Scotia. The key issue for established measures will be the ability to penetrate the EBB market and ensure that market actors will support EBB conversions.

PROGRAM DESIGN

BARRIERS AND STRATEGIES

Experience from many jurisdictions allows us to identify several specific barriers to energy efficiency retrofits by homeowners, including to fuel substitution retrofits. We discuss these barriers, and general options for overcoming them, below. We then discuss the specific strategies recommended for the fuel substitution pilot.

Barriers faced by homeowners include:

- **Lack of Information:** lack of information on the costs, benefits and appropriateness of efficiency measures for their building. Owners may also be ill-informed about the dangers or convenience of certain fuels (for example, gas safety concerns). The primary areas where information may be needed for the pilot program are on EBB conversions and advanced pellet systems, as well as general information on costs and payback periods.
- **Access to capital:** Owners often do not have the cash, or access to low-cost financing, needed to pay for efficiency measures. This is clearly emphasized as a factor in the survey results for all measures, as discussed under Market Characterization.
- **Split-incentive with future owners:** Many efficiency measures have long payback periods (5 years or more), creating a split incentive between current owners and future owners should the home be sold before the end of the payback period. This is particularly the case for most pilot measures: most measures have pre-incentive simple payback periods over 10 years, with the exception of gas conversions for ECH homes and gas DHW conversions.
- **Inertia:** Owners often choose not to focus on efficiency retrofits since savings are too incremental or other projects are seen as a bigger priority. Small annual savings are likely not a contributing factor for most measures, which see net savings of \$600 or more per year. Wood pellet stoves, at \$80/year, are a notable exception.
- **Hassle/disruption:** Retrofits take time and effort to organize and can cause significant disruption. This is particularly the case for EBB conversions, where contractors need to work in every room of the home over several days. Wood stoves may also be disruptive due to the need to install a chimney.
- **Lack of qualified contractors:** Qualified contractors can be difficult to find for some measures. In the case of fuel substitution, this is principally an issue for advanced wood pellet boilers and furnaces; and
- **Unavailable equipment:** This is principally an issue for the pilot for advanced wood pellet boilers and furnaces.

Residential Fuel Substitution Pilot Program

Contractors also face barriers that may impede program success. Particularly relevant for fuel substitution are:

- **Conservative bidding:** Contractors are naturally interested in obtaining contracts from potential clients. To minimize the risk of losing contracts, contractors will generally propose the most well established and least disruptive solution. However, several of our measures involve more disruptive and/or innovative solutions, namely EBB conversions to gas, wood or wood pellets rather than conversions to air source heat pumps (ASHPs). Contractors have been unanimous in indicating that they will generally propose ductless minisplit ASHPs to customers with EBB heating. Similarly, contractors will be reluctant to propose an untried technology such as advanced automatic wood pellet systems.
- **Program transaction costs:** Program participation can be onerous for contractors. If the payoff to contractors, in terms of increased contracts or contract size, is smaller than the effort involved in participation, contractors may not wish to promote the program.
- **Investment costs:** Contractors may be reluctant to invest time and resources into the training and equipment required to offer new measures, which for this pilot are advanced pellet systems.

Voluntary DSM programs have developed numerous strategies to overcome these barriers, summarized in the table below. Note that many barriers can be addressed by the same strategies.

Residential Fuel Substitution Pilot Program

12 Standard Solutions to Retrofit Barriers

	BARRIER	STRATEGIES
HOMEOWNERS	Lack of Information	• Information campaigns – information on costs, savings and selection issues can be included in marketing campaigns and distributed via installers
	Access to Capital	• Incentives are the most direct option • Financing, particularly low-interest and minimum effort financing, can complement incentives at a lower cost.
	Split Incentive	• Incentives and financing reduce payoff periods. • Transferable financing eliminates the split incentive issue but will not be available during the pilot.
	Inertia	• Incentives and financing can increase customer payoff and interest.
	Hassle/Disruption	• Incentives and financing can compensate homeowners indirectly • Project management assistance can reduce homeowner effort. At a minimum, this can consist of approved contractor lists. It can also involve technical support, contractor selection support, contractor oversight, or simply a full turnkey retrofit service (aka 'direct install').
	Lack of Contractors	• Pre-approved contractor lists can at least direct homeowners to qualified contractors • Contractor training/certification support can resolve this issue in the long term
	Unavailable Equipment	• Work with contractors and wholesalers can ensure that equipment is available in province.
CONTRACTORS	Conservative Bidding	• Sufficiently high incentives can ensure that program options are at least as attractive as standard approaches. • Customer education can encourage customers to specifically request program measures • Contractor incentives can encourage the promotion of specific equipment (although this may be difficult for high-cost items in a reputation-driven market such as HVAC installation)
	Program Transaction Costs	• Sufficiently high incentives can ensure that additional business generated by the program makes promotion worthwhile for contractors • Contractor support, in the form of administrative support for filling out forms, etc. can reduce participation costs.
	Investment Costs	• Training and equipment subsidies can reduce initial investment costs • Program installation contracts or preferential treatment can guarantee minimum payoffs for initial investments

We recommend different approaches for established measures (groups A and B) and new measures (group C).

RECOMMENDED STRATEGIES: ESTABLISHED MEASURES (GROUPS A, B)

For the established measures – stoves, wood boilers and furnaces, gas boilers and furnaces, and gas DHW - we recommend a combination of incentives, financing, information and outreach to contractors. Given that these are established measures with a wide contractor base, and given the short-term nature of the pilot, we do not recommend any project management assistance for these measures. However, depending on the results of the pilot, project management may be worth exploring for a future full program, particularly for EBB conversions, which involve the most hassle and disruption.

We discuss specific strategies below. Note that general marketing is also discussed separately.

INCENTIVES

We propose two sets of incentives for the program. Equipment-specific incentives are set at 20%-40% of total installed equipment cost, depending on the measure. Distribution system incentives are available for EBB heated homes, and are set at 100% of the typical cost of installing hydronic distribution, the preferred system for DSM purposes. This is roughly equivalent to 100% of the cost of installing forced air ductwork in a bungalow with an unfinished basement, and 60% of the cost of ductwork for a two-story home with a finished basement.

Incentive levels for equipment were set to ensure a customer simple payback under six years for most preferred measures. The tables below present proposed equipment incentives and resulting customer paybacks.

As the tables show, payback periods for several measures go beyond 5 years. Lower stove paybacks reflect the substantial non-energy benefits that draw consumers to these products (wood heat 'lifestyle' and emergency back-up heating). Wood boiler and furnace incentives are set to reflect payback periods when cordwood replaces 90% or more of heating load (rather than 70% in the case of hybrid systems). Gas tankless DHW incentives are set to encourage lower efficiency devices, since ENSC does not obtain any additional benefit for incenting a higher efficiency system.

*Residential Fuel Substitution Pilot Program***13 Incentive Levels - Group A Measures**

Category	Measure	Baseline Home	Equipment Incentive \$	Distribution Incentive	Incentive % distribution system	Incentive % installed equipment	participant remaining capital cost	participant simple payback
STOVES	Wood Stove	NA	\$800	\$0	NA	20%	\$3,200	6.7
	Pellet Stove	NA	\$950	\$0	NA	20%	\$3,800	negative
WOOD HEATING SYSTEMS	Wood Boiler	ECH	\$2,500	\$0	NA	33%	\$5,000	4.7
	Wood Furnace	ECH	\$2,500	\$0	NA	42%	\$3,500	5.3
	Wood Boiler (Hybrid)	ECH	\$2,500	\$0	NA	33%	\$5,000	7.0
	Wood Furnace (Hybrid)	ECH	\$2,500	\$0	NA	42%	\$3,500	8.4
GAS HEATING SYSTEMS	Gas Combo Boiler Condensing 95%	ECH	\$2,250	\$0	NA	30%	\$5,250	4.1
	Gas Furnace Condensing 94%	ECH	\$0	\$0	NA	0%	\$3,500	4.1
	Gas Boiler Condensing 95%	ECH	\$1,950	\$0	NA	30%	\$4,550	5.3
GAS DHW	Gas Storage High-Efficiency (EF 0.67)	NA	\$500	\$0	NA	29%	\$1,200	4.5
	Gas Condensing Storage (EF 0.8)	NA	\$500	\$0	NA	23%	\$1,700	5.2
	Gas Condensing Tankless (EF 0.95)	NA	\$750	\$0	NA	19%	\$3,250	8.6
	Gas Tankless High-Efficiency (EF 0.82)	NA	\$750	\$0	NA	30%	\$1,750	5.2

14 Incentive Levels - Group B Measures

Category	Measure	baseline home	Equipment Incentive \$	Distribution Incentive	Incentive % distribution system	Incentive % installed equipment	participant remaining capital cost	participant simple payback
WOOD HEATING SYSTEMS	Wood Boiler	EBB	\$2,500	\$6,500	100%	33%	\$5,000	4.7
	Wood Furnace	EBB	\$2,500	\$6,500	62%	42%	\$7,500	11.3
	Wood Boiler (Hybrid)	EBB	\$2,500	\$6,500	100%	33%	\$5,000	7.0
	Wood Furnace (Hybrid)	EBB	\$2,500	\$6,500	62%	42%	\$7,500	18.0
GAS HEATING SYSTEMS	Gas Combo Boiler Condensing 90%	EBB	\$2,250	\$6,500	100%	30%	\$5,250	4.1
	Gas Furnace Condensing 94%	EBB	\$0	\$6,500	62%	0%	\$7,500	8.9
	Gas Boiler Condensing 95%	EBB	\$1,950	\$6,500	100%	30%	\$4,550	5.3

Residential Fuel Substitution Pilot Program

We propose that incentives are advertised as the set dollar amounts indicated in the tables above, with a cap equivalent to a percentage of total installation costs. For example, wood stoves incentives would be advertised as “\$800 or 20% of total installed cost, whichever is lower”.

FINANCING

Ideally, the pilot program would offer low-interest, five-year term financing to further reduce the access to capital barrier for participants. ENSC will need to work further with NSPI and/or Conserve Nova Scotia to develop a financing offer for the program. Our understanding is that NSPI and ENSC may extend the on-bill financing option currently offered to commercial customers to the residential sector for all ENSC programs, in which case it would be an ideal mechanism for the pilot. If this is not available, Conserve Nova Scotia currently offers a \$5,000 zero-interest loan to participants in the Energuide for Existing Homes program. Conserve Nova Scotia staff have indicated that it should be feasible to allow fuel substitution measures to qualify for this loan, but that participants would likely have to participate in Energuide in order to become eligible. This represents a good option if on-bill financing cannot be arranged.

INSTALLER SUPPORT

ENSC will need to work with installers to make sure they are aware of the program, understand the incentive application process, and will promote the program to their customers. Given the high absolute incentives offered under the program, it is very likely that installers will be interested in promoting the program. This was certainly the general consensus among market actors contacted.

The only area of uncertainty is whether or not installers will accept to actively promote EBB conversions rather than the ductless air source heat pump systems generally promoted. Given that incentive levels will make a conversion more attractive than ASHPs for the customer, and given that EBB conversions represent more income for installers per contract, it is hoped that this will be the case. On the other hand, EBB conversions don't offer air conditioning, and may be less appreciated by homeowners. We envision that installers will end up presenting both options to customers; however, this should be verified in the pilot evaluation.

ENSC should also provide free marketing materials (program brochures, including examples of potential cost savings and other advantages) to installers. We also recommend a small co-marketing fund (\$30,000) be made available to installers. Installers would be offered marketing incentives to cost-share materials designed to specifically promote the program. The fund would use a request for proposals approach, where installers propose specific initiatives which are assessed by the program manager on a first come, first served basis. Installer marketing materials would have to include the ENSC and program logo and meet other basic criteria.

OTHER STRATEGIES

We considered – but do not propose – providing project management support for homeowners during the pilot program. Similarly, we do not propose installer incentives for promoting equipment or participating in the program, or installer support for training or equipment purchases. The value of such additional support for a full program should be evaluated during the process evaluation.

Residential Fuel Substitution Pilot Program

RECOMMENDED STRATEGIES – NEW TECHNOLOGIES (GROUP C)

For pellet boilers and furnaces, we propose two approaches. For standard pellet boilers and furnaces (non-automatic systems requiring weekly maintenance), we propose the same incentives + installer outreach approach described for established technologies. This should be sufficient given that installers already have relationships with manufacturers and do not require specific training. For advanced automatic systems, we propose that the program work directly with one or two installers and offer a turnkey approach to customers. This latter approach will simplify customer adoption and encourage selected installers to invest in the knowledge and training required to become installers for advanced automatic systems.

In both cases, the program goal is to encourage 5-10 demonstration projects by early adopters, as an opportunity to test the viability of these technologies for Nova Scotia.

We discuss specific strategies below. Note that general marketing is also discussed separately.

INCENTIVES

We propose relatively high incentive levels – 60% for advanced systems and 50% for standard systems. In both cases, however, customer simple payback periods remain well above 10 years.

The table below presents proposed incentive levels. As with established technologies, the incentive offering would include a cap based on a percentage of total installed cost.

15 Incentive Levels - Group C Measures

Category	Measure	Baseline Home	Equipment Incentive \$	Distribution Incentive	Incentive % Distribution System	Incentive % Installed Equipment	Participant Remaining Capital Cost	Participant Simple Payback
PELLET SYSTEMS FOR ECH	Advanced Pellet Combo Boiler 85%	ECH	\$16,000	\$0	NA	58%	\$11,500	17.4
	Standard Pellet Boiler 80%	ECH	\$6,000	\$0	NA	50%	\$6,000	21.0
	Standard Pellet Furnace 80%	ECH	\$4,500	\$0	NA	50%	\$4,500	11.3
PELLET SYSTEMS EBB CONV.	Advanced Pellet Combo Boiler 85%	EBB	\$16,000	\$6,500	100%	58%	\$11,500	17.4
	Standard Pellet Boiler 80%	EBB	\$6,000	\$6,500	100%	50%	\$6,000	21.0
	Standard Pellet Furnace 80%	EBB	\$4,500	\$6,500	62%	50%	\$8,500	21.3

*Residential Fuel Substitution Pilot Program***FINANCING**

As with established technologies, a financing offer is preferred if feasible.

PROJECT MANAGEMENT

For advanced automatic systems, ENSC should offer turnkey installation with its preselected contractors.

INSTALLER SUPPORT

Work with installers for standard pellet boilers and furnaces should mirror that for established technologies (essentially awareness and outreach). For advanced automatic systems, ENSC should select one to three contractors for a turnkey offering to customers; details of the arrangement (pricing and/or other support) should be negotiated directly.

Installer marketing support for standard pellet boilers and furnaces should mirror that for established technologies. The contract for turnkey installers may consider co-marketing or other support as agreed to with the participating installers.

OTHER STRATEGIES

We considered – but do not recommend – that the pilot offer homeowner project management support, installer incentives or installer training support for standard pellet boilers and furnaces. The potential value of these strategies should be considered during the program evaluation.

ELIGIBILITY

We discuss customer and installer eligibility in this section. Eligibility criteria for measures are discussed under Measure Profiles on page 13.

CUSTOMER ELIGIBILITY – SPACE HEATING

Customers should be principally heated by either electric baseboards or electric resistance central heating. Customers heated with air source heat pumps or using electric thermal storage (ETS) will not be eligible. Customers applying for stove incentives should demonstrate that the home does not have an existing, non-electric secondary heating source.

For full heating system conversions (boilers or furnaces), customers with no non-electric secondary heating system will automatically qualify, while customers reporting non-electric secondary heating will need to meet a minimum average annual consumption figure. This can be determined during the pre-approval process by obtaining data from NSPI. The exact cut-off figure and approach for determining it will need to be developed in collaboration with NSPI. As an example only, weather normalized annual consumption of 20,500 kWh/year would reflect 80% of typical provincial consumption.⁷

CUSTOMER ELIGIBILITY – DOMESTIC HOT WATER

Customers should have electric DHW in place.

DEMONSTRATION OF ELIGIBILITY

The program will use a pre-approval process where customers fax or email an application form. The form should include a customer attestation that the home uses electric resistance heat and describing any non-electric secondary heating. It should also include customer permission for NSPI to share their past billing data with ENSC, which will allow ENSC to verify if participants meet the kWh/year cutoff and also conduct quality control by analyzing annual consumption and kW demand by season to identify homes with unusually low consumption. These homes can be visited by ENSC representatives for verification. ENSC will also conduct random pre-project verification of 10% of homes via site visit, which should be arranged at the time of approval.

⁷ Based on 16,801 kWh/year heating load (NSPI data) and 8760 kWh/year baseload consumption (HOT2000 modelling assumption).

*Residential Fuel Substitution Pilot Program***INSTALLER ELIGIBILITY**

The program should be open to any qualified installer. In the case of wood and pellet stoves, installers should hold Wood Energy Technology Transfer (WETT) certification. Gas measures should be installed by a member of Heritage Gas' Authorized Dealer Network. Advanced wood pellet system installers should include manufacturer training on equipment installation.

REGIONS

With the exception of wood and pellet stoves, we anticipate relatively low uptake for most measures in the program, with one of the primary risks of the pilot being a lack of sufficient participants. For this reason, most measures should be offered province wide.

Wood and pellet stoves, on the other hand, are likely to experience substantial demand. As discussed under Baseline Activity on page 21, existing province-wide baseline activity could cause the program to exceed its incentive budget for these two measures alone. The pilot should therefore offer wood and pellet stove incentives for only a small portion of the province. We recommend Cape Breton Regional Municipality and Queens Regional Municipality, which together make up roughly 12% of the population. These two pilot areas will allow the pilot to test uptake in both rural and urban areas.

MARKETING

The pilot program will rely on a combination of installer marketing, free media coverage, and cross-marketing with other programs to increase customer awareness and encourage participation. We detail these strategies below.

Installer Marketing: It is anticipated that installers will use the program's incentives as a marketing tool to reach new customers. To facilitate this, the program will provide free marketing materials (brochures) to installers across the province, as well as a small co-marketing fund (see program strategies on page 33.) The program administrator should also conduct extensive outreach to installers to ensure that they are aware of the program, understand the application process and can make the case for fuel substitution. To the extent possible, the program administrator should also ensure that installers will promote EBB conversions as much as or more than ductless minisplit air source heat pumps.

Free Media Coverage: Given the high incentive levels of the program, the fact that fuel substitution is a relatively new and unusual measure, and the environmental benefits associated with many of the measures, we anticipate significant potential media coverage of the program. The program administrator will seek out and encourage this coverage in collaboration with ENSC's marketing team.

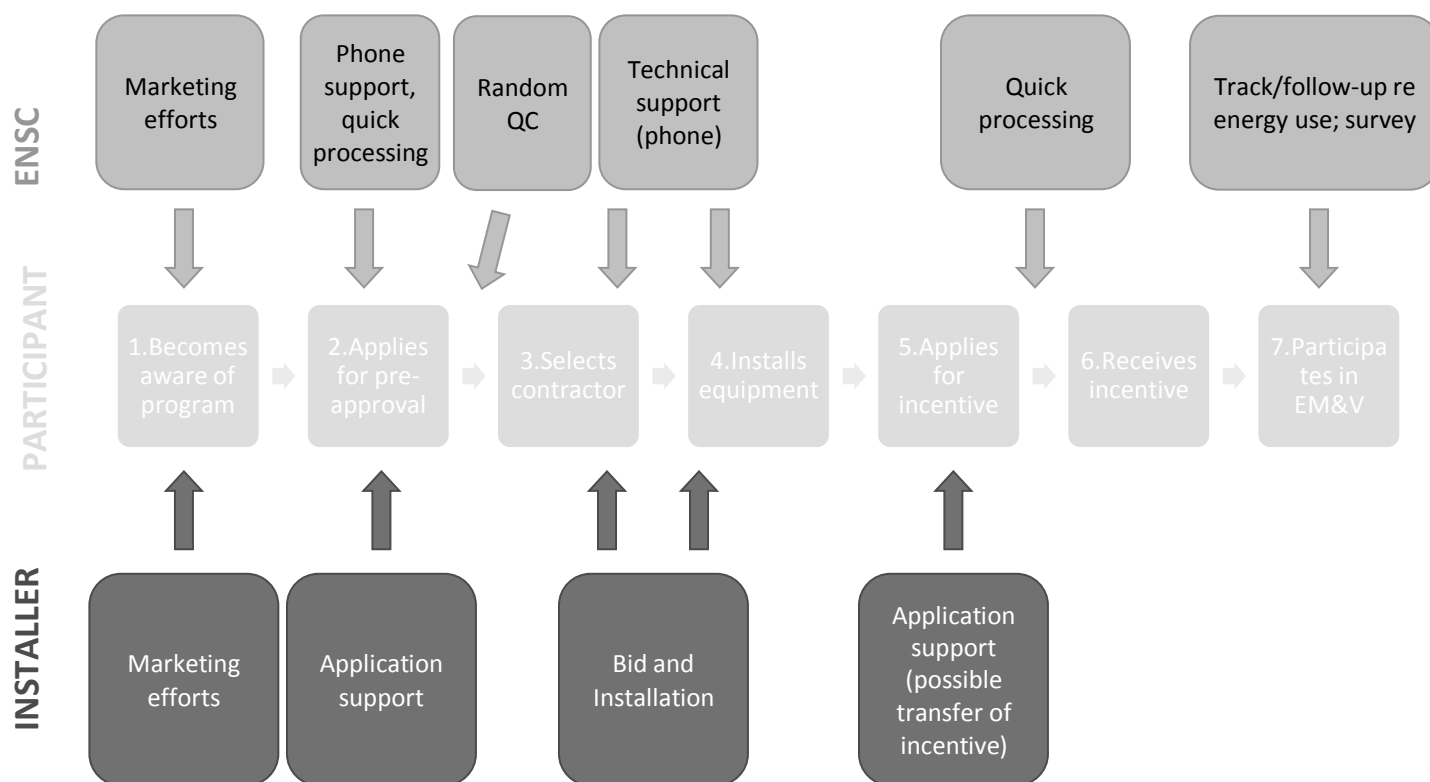
Cross-Marketing: The pilot can be marketed as part of ENSC's general marketing efforts, and in particular as part of the Energuide for Homes program. It will also be able to take advantage of Heritage Gas' existing annual direct mail campaign to all homes with gas access.

Residential Fuel Substitution Pilot Program

PARTICIPATION PROCESS

The diagram below summarizes the participation process, including participant, installer and administrator actions.

16 Participation Process



As the diagram illustrates, the participation process can be divided into seven steps.

- 1. Becoming Aware of Program:** Participants will find out about the program via ENSC and installer marketing efforts. Knowledgeable ENSC staff should be available to explain the program and eligible equipment by phone. Installers should have a clear understanding of the program and be able and interested in marketing it.
- 2. Pre-Approval:** The participant should apply for pre-approval via a short form available from installers or ENSC's website. The participant sends in a signed form attesting to their home's eligibility and planned replacement equipment. ENSC staff should process this pre-approval form within 24 hours, which will depend in many cases on receiving timely data on consumption from NSPI. Installers should be able to provide the form and assist in filling it out if need be. Random

Residential Fuel Substitution Pilot Program

verification of baseline equipment should happen as soon as possible for those homes selected, and should occur before contractors install measures.

3. **Selection of Contractor:** The participant may already have chosen an installer, or may at this point begin soliciting bids. ENSC should be available to provide technical support by phone (principally confirming whether or not specific equipment models are eligible for the program).
4. **Installation:** Contractor installs equipment.
5. **Incentive Application:** The participant applies for an incentive, faxing or emailing a signed application form and a copy of the installation receipt. The participant should have the option of transferring the incentive directly to the contractor.
6. **Reception of Incentive.**
7. **Participation in Evaluation, Measurement & Verification:** NSPI has expressed interest in installing smart meters in participating homes. Should this become a part of the program, ENSC should coordinate the installation of a smart meter with NSPI and the participant. In either case, ENSC should organize access to electricity billing data with NSPI. For gas conversions, ENSC should confirm access to gas billing data with Heritage Gas. For wood and wood pellet conversions, ENSC should contact the participant with reminder calls at the beginning of the heating season, once during the heating season and once at the end of the heating season, collecting purchase data during calls if possible. Once the evaluation is organized, evaluators will survey the participant as well.

*Residential Fuel Substitution Pilot Program***NON-INCENTIVE BUDGET**

The budget below provides our estimate of likely administrative and implementation costs, including evaluation costs, for the pilot program.

17 Non-Incentive Budget

Element	Cost	Notes
Program Development	\$32,500	0.15 ENSC FTEs: developing incentive forms, etc.
Program Administration	\$130,000	1 ENSC FTE: participant intake, installer outreach, budget tracking, media outreach, organization of eval., review of comarketing RFP, etc.
Marketing (materials)	\$35,000	3rd party: material design and print-up, distribution to installers
Baseline home verification	\$20,000	3rd party: on-site verification of 10% of <u>applicant</u> homes (heating system, presence of secondary system)
Evaluation	\$65,000	3rd party: Participant survey, basic billing analysis, and process evaluation
Non-Incentive Subtotal	\$282,500	

Notes:

- **Program Development:** We estimate that it will require the equivalent of 0.25 full-time equivalent (FTE) of effort (we assume from ENSC staff) to accomplish the remaining tasks discussed under Next Steps on page 53. This is roughly equivalent to 12 weeks of work.
- **Program Administration:** We estimate that program administration will require the equivalent of 1 FTE of effort from ENSC staff. Principal tasks would include participant pre-approval and incentive processing, installer outreach, marketing, data tracking, liaising with NSPI and Heritage Gas, and overseeing contractors for advanced pellet systems and quality control.
- **Marketing:** We estimate a budget of \$35,000 for the design and printing of marketing materials.
- **Baseline Home Verification:** We estimate a budget of \$20,000 for a third party contractor to conduct site visits to 10% of program applicants (budget assumes an application to participation ratio of 3 to 1).
- **Evaluation:** We estimate a cost of \$65,000 for a basic impact evaluation (billing analysis) and a more detailed process evaluation.

EVALUATION, MEASUREMENT & VERIFICATION

Residential Fuel Substitution Pilot Program

MEASURING SUCCESS

The success of the pilot program should ultimately be judged against the program objectives described on page 3. All of these objectives relate to discovering more information about the target market, measures and the effectiveness of program design. In this sense, the program's success should be judged by the quality of the program evaluation, monitoring and verification itself. The central question becomes: do the program process evaluation and (informal) impact evaluation provide sufficient information about measures and about the effectiveness of program strategies to allow ENSC to make decisions about a future full program?

In order for these evaluations to accomplish this, however, the program needs to effectively implement all program strategies. Therefore, a second measure of success is whether or not the program was implemented as it was designed. Beyond these two questions, the program can be measured in terms of the net energy savings it achieves, but this is a secondary objective.

The table below summarizes how the evaluation can gather data relevant to each of the pilot program's objectives. The table addresses five types of data: pilot uptake rates, customer survey, installer interviews, NSPI and Heritage Gas billing data, and customer reports on wood and pellet consumption.

	Objective	Primary Tools
MEASURES	Discover customer interest levels	Pilot uptake rates Customer survey
	Installation costs	Incentive applications
	Installation issues	Customer surveys Installer interviews
	Actual energy savings and non-electric consumption	NSPI Billing Data/smart meter data Heritage Gas Billing Data Customer reports re wood and pellet consumption
PROGRAM	Free ridership levels	Customer survey
	Impact of incentive levels	Pilot uptake rates Customer survey
	Marketing effectiveness	Customer survey Installer interviews
	Work with installers	Installer interviews
	Financing	Customer Survey
SAVINGS		Impact Evaluation based on billing data and customer survey results

MEASUREMENT PLAN

The program administrator will need to track basic information on pilot program participants, notably:

- customer applications, broken out by presence of secondary heating system, size of home, associated NSPI billing data, how the customer became aware of the program, and basic socioeconomic data
- customer participation, broken out as per applications
- equipment installation costs

This information can be gathered during the processing of applications and incentive delivery.

The administrator will also need to gather data on installers, notably:

- marketing efforts
- level of customer interest
- number of installations participating in program

This information can be gathered via periodic surveys of installers during installer outreach.

The administrator will also need to gather information on post-participation energy consumption. Electricity consumption data can be obtained from NSPI, who will install smart meters in all participating homes. Gas data can be obtained from Heritage Gas. Wood and wood pellet consumption data will need to be requested from participants via periodic phone calls during the heating season.

EVALUATION PLAN

We recommend that ENSC conduct an impact evaluation and a process evaluation for the pilot program, both conducted by an independent third party.

The impact assessment should be relatively straightforward, using weather-normalized pre and post participation energy consumption. It should be complemented by information on free ridership and changes in occupancy derived from a participant survey.

The process evaluation itself should include a participant survey aimed at understanding free ridership, the effectiveness of program strategies, and any unanticipated issues with program participation. It should also include a non-participant survey aimed at exploring awareness of the program, factors in non-participation, and the potential impact of more aggressive program strategies (for example, higher incentive levels and more project management assistance). It should include interviews with program staff and in particular with installers, to understand program efficiency and effectiveness.

ENSC will need to determine if the evaluation will need to go to RFP or if it can be included in current evaluator contracts for 2011.

We provide a preliminary estimated budget for evaluation activities on page 45.

RESULTS AND NEXT STEPS

*Residential Fuel Substitution Pilot Program***ANTICIPATED RESULTS****MEASURE UPTAKE**

We have estimated measure uptake using a combination of FSS survey responses regarding incentive levels and working assumptions to prepare a very approximate estimate of measure uptake. The table below presents anticipated uptake and net to gross rates, with the latter based on the baseline activity described on page 21.

18 Measure Uptake Forecasts

Measure	Incented Units	NTG	Total Incentive Spending
Wood stoves	100	63%	\$80,000
Pellet stoves	50	25%	\$48,000
Wood boilers/furnaces ECH	70	60%	\$175,000
Wood boilers/furnaces EBB	5	33%	\$36,000
Gas boilers/furnaces ECH	20	76%	\$31,000
Gas boilers/furnaces EBB	10	100%	\$82,000
Gas DHW	80	23%	\$46,000
Pellet boilers/furnaces all	5	100%	\$73,000
TOTAL	340	-	\$570,000

Where survey results were available, (wood and pellet stoves, EBB conversions to gas, and gas DHW), we assumed that a percentage of those indicating an interest corresponding to proposed incentive levels would actually participate during the pilot period. For example, 15% of FSS respondents said they would be interested by an incentive up to \$999. We assumed that 10% of this group would actually participate during the pilot period. Out of 6500 eligible homes in the pilot regions, this leads to total participation of 100 homes (15% X 10% X 6500).

For pellet stoves, 8% indicated interest and 10% were assumed to actually participate. For gas furnaces/boilers, 48% expressed interest (in incentives for EBB conversions), and we assumed that 10% of ECH homes and 3% of EBB homes would participate. The percentage for EBB homes was set particularly low in part because of the experience of Enbridge Gas in New Brunswick, which hoped to attract 300 homes with a similar pilot offering a \$10,000 incentive and succeeded in attracting only 13. For gas DHW, 26% indicated an interest (for tankless hot water) and we assumed that 14% of eligible homes would participate.

Residential Fuel Substitution Pilot Program

For wood boilers and furnaces, where no survey data was available, we assumed that the presence of incentives would increase installations over baseline activity by 150% for ECH homes and 50% for EBB homes. Finally, for pellet systems, given that the focus will be on demonstration projects, we have assumed 5 systems will be installed.

Note that these are very approximate forecasts and we have no doubt that actual uptake rates will vary for many measures. In particular, we note that our assumptions for wood boilers and furnaces, which make up more than a third of incentive budgets, are highly speculative.

ANTICIPATED RESULTS

The table below presents our forecast of program costs and benefits, based on the non-incentive budget presented on page 45 and the uptake rates presented above.

19 Forecast Pilot Project Results

Program Costs	
<i>Incentive budget</i>	\$570,000
<i>Non-incentive budget</i>	\$282,500
Total	\$852,500
Program Benefits	
<i>1st year GWh savings net @generator</i>	2.1
<i>kW savings net @ generator</i>	961
Total Resource Cost Test	
<i>Ratio</i>	1.40
<i>Levelized net benefits, 2010\$</i>	\$990,000
Program Administrator Cost Test	
<i>Ratio</i>	4.06
<i>Levelized net benefits, 2010\$</i>	\$2,608,000
Cost of Conserved Energy	
<i>\$/1st year kWh@gen</i>	\$0.40

As the table shows, the program is forecast to save over 2 net first year annual GWh of electricity and is TRC positive. The cost of conserved energy is in-line with overall costs for the Energuide for Existing Houses program as presented in the 2011 DSM Plan. Again, as indicated earlier, these are highly approximate forecasts.

*Residential Fuel Substitution Pilot Program***NEXT STEPS**

Several key steps will need to be taken by ENSC staff in order to move the proposed pilot program towards implementation in Q2, Q3 and in particular Q4 of 2011. We detail these steps below, presented in checklist format. Note that many tasks will need to be conducted in parallel.

INCENTIVES

- ☐ Develop incentive processing protocol

FINANCING

- ☐ Confirm financing options with NSPI and Conserve Nova Scotia and prepare financing offering

INSTALLER OUTREACH

- ☐ Prepare installer outreach plan
- ☐ Develop contact list of eligible installers
- ☐ Identify and initiate discussions with potential advanced pellet system select contractor(s)
- ☐ Pre-program launch installer outreach

ELIGIBILITY

- ☐ Develop kWh/year cut-off for participants with secondary heat, in consultation with NSPI
- ☐ Develop pre-approval kWh/year screening protocol with NSPI, aimed at quick turnaround
- ☐ Develop pre-approval application form
- ☐ Select contractor(s) for verification of baseline equipment

MARKETING

- ☐ Prepare content and commission design of marketing materials (principally brochures)
- ☐ Prepare co-marketing RFP for installers
- ☐ Prepare free media strategy
- ☐ Liaise with Heritage Gas re. direct mailing
- ☐ Coordinate cross-marketing with ConserveNS (Energuide for Houses) and include in ENSC materials

EVALUATION

- ☐ Prepare program database
- ☐ Discuss smart meter installation and data sharing with NSPI
- ☐ Discuss data sharing with Heritage Gas
- ☐ Prepare RFP and select evaluator (if necessary)
- ☐ Liaise with evaluator re. data requirements



Appendix E

Clean Nova Scotia Green Schools Pilot

Green Schools Nova Scotia: Facilitating a Culture of Environmental Sustainability

Prepared by Wanda Baxter, M. Environmental Design,
for Clean Nova Scotia,
October, 2010

Proposal: A Green Schools Program for Nova Scotia

Outline

- 1. Executive Summary**
- 2. Contextual Issues affecting the Implementation of Green Schools Nova Scotia**
 - a. Building on Previous Efforts
 - b. Alignment with Relevant Education and Environmental Policy
- 3. How do Green Schools work?**
 - a. The Partnership Model
 - b. A Whole School Approach
 - c. Support to Operations Management
 - d. Support of Student Engagement and Learning
 - e. A Phased Implementation
- 4. Notable Green School s Programs: Management and Characteristics**
- 5. Recommendations for Implementing the program**
- 6. Conclusion**
- 7. References and Key Resources**
- 8. Appendices**

Appendices:

- A. Green Schools Contacts and Interview Notes
- B. Policy Alignment Table
- C. Steps to Becoming a Green School: The Process
- D. Branding the Program and 'Name' Considerations
- E. Assessment Framework for Green Schools Learning Activities to Support ESD

I. Executive Summary: A Green Schools Program for Nova Scotia

This report was commissioned by Nova Scotia Power (NSPI), in the role of interim Demand Side Management (DSM) Administrator, to provide guidance on selecting an environmental education program that would be a beneficial component of their demand-side management strategy. The 2011 *Conservation and Energy Efficiency Plan*¹ expands on programs that have been offered since 2008, with a new focus on efficiency, upgrades, and education. Previous plans have focussed on enabling energy savings for home owners, renters, small business owners, landlords, contractors, and commercial/industrial/institutional customers². The introduction of this program would extend energy efficiency management - and positive change - to schools.

A Green Schools program is proposed as the best option to fulfill the educational requirements of the *Conservation and Energy Efficiency Plan* for the following reasons:

- its implementation has helped schools to reduce their energy use from 10 to 15%;
- the action-oriented, environmental learning component supports the Department of Education's goals for Education for Sustainable Development objectives;
- it is the only environmental education program that engages whole school communities in long-term, quantifiable, environmental stewardship.

Versions of the Green Schools model are applied across North America, Europe, and internationally. The term Green Schools is interchangeable with "EcoSchools" (or Eco-Schools), "Sustainable Schools", "Go Green Schools" and other program names. The basic 'green schools' model is a two-pronged program that is intended to promote teaching and practicing environmental sustainability in schools. The two prongs of the program address environmental sustainability through facilitating:

- adaptations and improvements to the operations and practices of facility management and use; and
- stewardship learning and whole school involvement.

This document introduces the philosophy and process of Green Schools programs, provides an assessment of a number of existing models that have been selected for their distinct and successful delivery, and the applicability of their resources and methods to Nova Scotia's school system. After researching a range of environmental education programs and approaches, and considering the need for practical energy reduction, Green Schools programs are considered singular for what they offer. Programs we reviewed that are considered particularly relevant for developing a Nova Scotia program include:

¹ Nova Scotia Power Inc. *Conservation and Energy Efficiency Plan*, 2011. <http://www.nspower.ca/en/home/energysavings/>

² <http://www.nspower.ca/en/home/energysavings/default.aspx>

Ontario EcoSchools³, Toronto EcoSchools⁴, B.C. Green Schools⁵, EcoSource⁶, the International Eco-Schools network⁷, Ireland's Green Schools⁸, the Green Schools Initiative⁹ (U.S.), the States of Kansas¹⁰ and Michigan Green Schools¹¹ (U.S.) programs, and The Alliance for Energy's Green Schools¹² network.

The organizing process that is characteristic of all "Green Schools" programs is a whole school approach. This approach engenders a school-wide sense of inclusion and shared responsibility, and is the most effective way to implement positive change rapidly and permanently in a school setting. Essentially, Green Schools programs provide the support and direction necessary for schools to become models of environmental sustainability and training grounds for stewardship learning.

This research paper describes what Green Schools are and how they work in practice; how Green Schools Nova Scotia (GSNS) can fulfill the environmental policies and practical needs of the education system in this province; and it provides recommendations for implementing the program. Green Schools Nova Scotia has the potential to engage schools and students in positive environmental action and learning while reducing energy and resource use at the same time. The model is having great success in other provinces and countries in meeting educational and operational needs, and there is every reason to expect that Green Schools Nova Scotia will have the same success here.

³ www.ontarioecoschools.org

⁴ www.ecoschools.tdsb.ca

⁵ www.bced.gov.bc.ca/greenschools

⁶ www.ecosource.ca

⁷ www.ecoschools.org

⁸ www.greenschoolsireland.org

⁹ www.greenschools.net

¹⁰ www.kansasgreenschools.org

¹¹ <http://www.michigangreenschools.us>

¹² www.ase.org/greenschool

II Contextual Issues for Introducing a Green Schools Program in Nova Scotia

Early applications of the model appeared in the 1970s, but it was not until the last ten years that it began to proliferate at a staggering rate. Variations of the model are applied in a number of provinces¹³, and it is very likely that the remaining provinces will follow suit in the near future.

The proposed program is based on a general model that is being implemented in varying forms in more than 40 countries internationally, and in the provinces of British Columbia, Manitoba, Ontario and Quebec. The model is holistic, and applies the theory that teaching is more effective when direct experience is a facet of learning.

Students are the core of Green Schools programs; they are given opportunities to learn *by doing*, and are provided leadership opportunities and support in order to make positive changes in their school and community.

Green Schools programs are improving morale, and helping schools to become more environmentally sustainable. The program that is described in this document is intended to help establish a culture of environmental sustainability in our schools, and to help develop a sense of responsibility for one's own environment. Green Schools Nova Scotia (GSNS) is a method and process that will engage students in environmental learning and stewardship activities at their schools and in their communities.

The reason that schools, districts and countries are instituting a form of the model is because it has been shown to successfully reduce operations costs (energy savings are typically between 10% and 15% in the first year¹⁴; and enhance learning opportunities. The program model is specifically designed to bring awareness to the monetary and environmental costs of operating a school to the whole school population. Once schools are aware of their 'spending', they explore options for improvement, and are guided through a process to manage their resources and behaviours more sustainably. Ireland's long-established Eco-Schools network uses the catch-phrase "*what we can measure, we can change*", and this is a succinct description of a main component of the green schools approach. The other part of the equation is equally important to the Green Schools Nova Scotia program: *what we understand, we can change*.

While there are a range of environmental practices, policies and programs currently in place in schools in Nova Scotia, there is no effort that brings entire schools together to learn about and engage in stewardship activities. Green Schools Nova Scotia is envisioned as a facilitating program that will help to promote pre-existing resources, and act as an umbrella program that coordinates a range of other initiatives. It is also envisioned as the main environmental education program operating in Nova Scotia's schools. As such, the success of the program depends on a number of contextual variables, including:

¹³ B.C., Manitoba, Ontario, and Quebec all have established Green Schools programs

¹⁴ *Students Leading the Way. 2008-2009: Energy Saving Success Stories from California*. Alliance to Save Energy. <http://ase.org>

- it serves a specific educational purpose and fills an obvious need;
- it is aligned with relevant education and environmental policies;
- it has the support of Nova Scotia's environmental education community (see *Appendix A*).

These requisite variables are discussed in the following pages. The information provided in this section is informed by a series of interviews and meetings¹⁵ held to discuss the idea of Green Schools, N.S., and an intensive research process undertaken from May through October, 2010.

2a Contextual Issues: Building on Previous Efforts

"The program is streamlined to appeal to busy administrators and teachers who know the value of student involvement ... It is designed for success, encouraging participants to prioritize actions based on the Board's and its schools' needs and resources."

- *Ontario EcoSchools Program Guide, September 2007*

The Halifax Regional School Board (HRSB) launched *Energy Matters* in 2003, a program proposed to take on many of the issues that Green Schools Nova Scotia will address. *Energy Matters* applied a comprehensive approach to dealing with energy use in the district's schools. The program had much potential, but the district did not have the capacity at the time to carry out the full program on its own. The HRSB worked with Clean Nova Scotia to deliver the environmental education component of the *Energy Matters* program (the program was *Towards a Brighter Future*).

Greens Schools Nova Scotia (GSNS) would be able to build on the excellent work done by *Energy Matters* and *Towards a Brighter Future*, and it will improve on the program effectiveness by combining both operations and student engagement components in a single, integrated delivery package. GSNS would also focus more on facilitation and management than on direct delivery, which is a major distinction from the previous programs. In other words, GSNS will act like a central coordinator of a wide range of resources and opportunities that are available to schools, but are rarely accessed. The program is, in a sense, a sustainability enabler and mentor. GSNS will guide schools through a process of learning how to become more environmentally sustainable, and it will also provide ongoing support and motivation to participating schools.

The program is designed to be viable over the long term because it promotes leadership and ownership of the program within each school, and learning experiences will be linked to Nova Scotia curriculum outcomes. It can essentially pay for itself, as part of the savings that result from its implementation can be funnelled back to pay for the ongoing management of the program.

The Halifax Regional School Board continues to fulfill part of the *Energy Matters* mandate: focussing primarily on infrastructure retrofits and energy efficiency initiatives¹⁶. The province is

¹⁵ *Appendix A: Green Schools Contacts.* This document provides the names, contacts and descriptions of the interviews and meetings that were part of the information gathering component of this research. *Appendix A* also indicates individuals who are willing to serve as advisors to the program.

also focussed on investing in energy efficiency retrofits and alternative energy sourcing. GSNS could effectively implement the remaining aspects of improving environmental performance in schools, such as: how waste and resources are managed and monitored school by school, and how student learning is made an essential component of a school's environmental management program.

The new Nova Scotia Climate Change Policy, 2009, requires that Nova Scotians use less power in every sector. To achieve this will require that we are able and willing to reduce our consumption levels. A Green Schools program for Nova Scotia will need to provide tools to help track energy (and other resources) so that schools are able to measure – and reduce – how much they are using. Students will be involved in this tracking directly, which can provide them with an awareness of the impacts of their shared consumption; the first step toward making change.

2b The Program is in Alignment with Relevant Education and Environmental Policies

The Education for Sustainable Development (ESD) working group of the Council of Ministers of Education, Canada, released the important guidance document, *“Background – Developing a Pan-Canadian ESD Framework for Collaboration and Action”*¹⁷ in January, 2010. The purpose of the document is to spur the implementation of ESD forward in all jurisdictions across Canada. The United Nations proclaimed this the decade of Education for Sustainable Development (2005-2014), which has put renewed focus on the need to develop and actualize teaching and learning for sustainable development throughout school systems around the world (the Nova Scotia Environmental Network is the lead organization for ESD delivery in N.S.).

Previous environmental education delivery methods, tools, and approaches are shifting and expanding in form and function in direct response to the needs of implementing ESD. The Green Schools Nova Scotia (GSNS) program is designed to support the delivery of education for sustainable development in Nova Scotia.

While Canada has already shown leadership in this area, Education for Sustainable Development has not been implemented in a consistent or deliberate manner across the country. A number of provinces have jumped ahead in the delivery of ESD (i.e. Manitoba, British Columbia, Ontario, Quebec), while other provinces lag behind. The government of Nova Scotia has identified the implementation of ESD as a priority, and the Department of Education has begun to incorporate ESD outcomes within the provincial curriculum.

¹⁶Personal conversation between Wanda Baxter and HRSB Operations Manager & Special Projects, Earl McMullen, October, 2010. Also, see *Energy Matters* reference materials: “Energy Matters, Helping students Learn”, and “The Business Case for Cutting Greenhouse Gas Emissions from School Board Operations ‘Energy Matters’”.

¹⁷ Council of Ministers of Education, Canada. January 12, 2010. Education for Sustainable Development Working Group. www.cmec.ca

What this means for the delivery of environmental education in Nova Scotia (and for a Green Schools program) is a transformation of environmental learning and teaching. *“Education for Sustainable Development entails a reorienting of education to guide and motivate people to become responsible citizens of the planet. It addresses the interrelationships among the environment, the economy, and society.”*¹⁸

The Green Schools program proposed for delivery in Nova Scotia supports the delivery of Education for Sustainable Development in Nova Scotia by incorporating ESD theory and practical application criteria into the program design itself. Activities and approaches that the program delivers and promotes would also be designed to support the delivery of ESD. GSNS will enhance the delivery of ESD in the province by engaging students directly in hands-on environmental learning activities, while the Department of Education focuses on teacher training and developing ESD curriculum outcomes and new teaching methods.

The Green Schools program can also support teachers as they adjust to meet these new outcomes, and support their delivery of issues-based learning. Environmental problems are not single issue or discipline specific, and the Green Schools program enables cross-disciplinary learning; promotes an awareness of complexity and critical thinking; and provides opportunities for action-oriented learning. The program will, in fact, offer diversity to current teaching methods, increase experiential learning opportunities, and give teachers, students and administrators an opportunity to consider and apply more holistic approaches to teaching and behaving.

The following diagram outlines the policy context for implementing Education for Sustainable Development in Nova Scotia, beginning with the first CMEC agreement supporting the implementation of ESD in 1999, through subsequent relevant Nova Scotia policies, further CMEC agreements, and the *Department of Education’s Business Plan, 2009-2010*, which identifies ESD as one of the department’s current and developing priorities.

¹⁸ Council of Ministers of Education, Canada. www.cmec.ca.

Policy Context for Education for Sustainable Development and Green Schools Nova Scotia

Council of Ministers of Education: “Educating for Sustainability”, 1999

Agenda 21 and UN Decade of Education for Sustainability

Nova Scotia Environmental Goals and Prosperity Act, 2007

A Framework for Environmental Learning and Sustainability in Canada, 2002

Toward a Greener Future – Nova Scotia’s Climate Change Action Plan (2009)

Learn Canada 2020 – Joint Declaration of Council of Ministers of Education, Canada, 2008

Department of Education, Nova Scotia Business Plan 2009-2010

Background – Developing a Pan-Canadian ESD Framework for Collaboration and Action
Education for Sustainable Development Working Group CMEC, 2010

Nova Scotia has recently introduced new Climate Change Policy requiring that energy use across the province is reduced significantly – to 20% below 1990 levels by 2020 (See “Toward a Greener Future” in the table above). Conservation measures are part of the solution, and this program will help schools to reduce energy use and save money at the same time. Green Schools have been shown to substantially reduce energy use in schools by identifying inefficient practices, offering teacher and operations training, and promoting behavioural changes¹⁹.

GSNS is a program that integrates a range of policy objectives. Specifics of how the program aligns with these policies and the objectives of related organizations are charted in *Appendix B*.

¹⁹ B.C. Green Schools Newsletter, Alliance for Energy Organization “Success Stories in California”

3a How do Green Schools Work? A Two Pronged Approach

“As places of learning, they can help pupils understand our impact on the planet and encourage them to weigh up the evidence themselves. As models of good practice, they can offer young people the chance to contribute to sustainable living, and demonstrate good practices to others.”²⁰

– Sustainable Schools, UK

Environmental education programs in Nova Scotia have typically required a high level of facilitation and supervision, and have usually been delivered by an external agency. These programs are usually delivered on a short-term or annual basis, and are restricted by short-term funding.

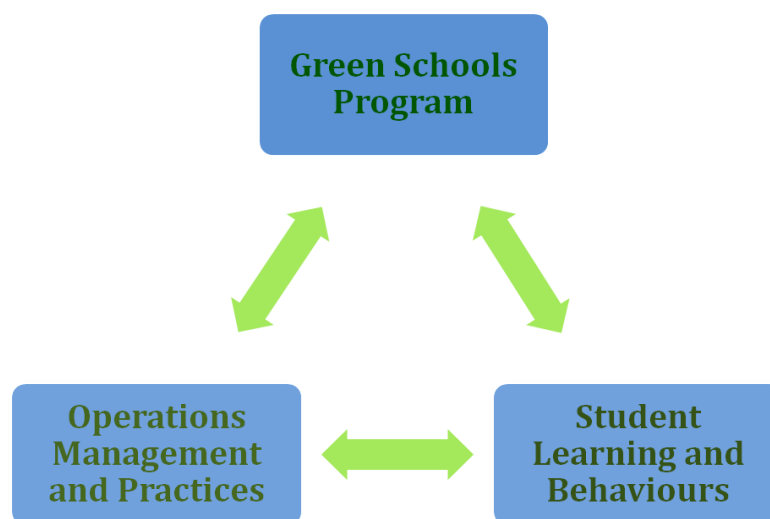
This pattern is inherently limited as it makes it impossible to promote or evaluate long-term environmental change. It also makes it impossible to track improvement or the impact of environmental education initiatives over time. Instead, programs are usually introduced, delivered to ‘x’ number of classes or schools, and are wrapped up with no real follow-through or discernible impact (and then another new program is developed and delivered, and so on).

The Green Schools model responds to this issue directly, by requiring that participating schools and School Boards make a formal commitment to the program and to a long-term vision for environmental sustainability. Environmental monitoring is also a component of the program, which is introduced as a permanent feature – something schools will adopt as a new normal.

From the outset, then, a Green Schools program is implemented as a long-term commitment. It is a program that sets out to establish a culture of environmental sustainability in the school over time. Green Schools delivers a step-by-step, incremental process, where environmental improvement is prioritized. The long-term commitment increases the potential that schools will move beyond piecemeal environmental learning and improvement to improving their whole school’s environment and environmental teaching for the long-term.

Green Schools programs apply a two-pronged approach, addressing both learning and operations in a holistic program of environmental education and action.

²⁰ www.teachernet.gov.uk/sustainableschools

Table 2: The Two Prongs of Green Schools Nova Scotia

The program specifics vary in different provinces, states and countries - and the name applied to the model also varies - but a number of **common features are consistent to the successful application of the Green Schools model**. Typically, Green Schools programs:

- Are championed by the school principal, and are usually supported and promoted by the School Board;
- Aim to reduce energy and water use, the production of waste, and CO₂ emissions. Green Schools also set other environmental improvement and learning goals, depending on the needs and priorities of the school;
- Apply a whole-school approach - the entire school community works together to improve environmental learning, behaviours and practices;
- Incorporate stewardship learning- students learn to become aware of, and take responsibility for their individual and shared environmental behaviours and actions. By learning *why* to care, students and school communities are more likely to adopt stewardship behaviours that last.
- Require the direct participation of operations, grounds, and facilities managers to improve, champion, and communicate environmental practices and projects at the school.
- Strive to meet a set of established goals and are recognized for their achievements.

3b How do Green Schools Work? The Partnership Model

Implementing a Green Schools program takes time, effort, and a firm commitment that engenders environmental sustainability as a 'norm' of daily school life. Tools, resources, ongoing support and recognition of achievements are important for sustaining environmental objectives. This support usually comes from an external body; typically a non-profit organization.

The partnership of an external partner with the in-school leadership teams is essential to maintaining energy and motivation for the program over time. The success of the green schools model is dependent on this partnership, and on having a direct relationship with either the Department of Education and/or School Boards.

The active participation of School Boards and Departments of Education (especially in the Canadian context) in helping to design and implement green schools programs enhances the success of the initiative. In some cases, a non-profit organization and a regional or district school board form a partnership to deliver the program. These are effective delivery options, especially over the long term²¹. A non-profit organization is the primary delivery agent and facilitator of the program, and School Boards or Departments of Education manage quality control, oversee the implementation of policy and practices; and formally endorse and promote the program to principals, teachers, and facilities managers.

3c How do Green Schools Work? A Whole-School Approach

"Using a whole school approach in this program, schools begin a transformation – from conductors of information to active agents of change. Values and attitudes advocated in the classroom are reflected in the day to day actions of teachers, pupils and support staff. Thus, schools practice what they teach."²²

Ecosource, Ontario

A key element of Green Schools Nova Scotia is the creation of in-school green leadership teams. These teams are the core of the Green Schools program, and are composed of representatives of different sectors of the school including teachers, students, administrators, operations managers, community members, and groundskeepers. A whole school approach is directed outward via the direction of this microcosm team. The commitment, energy and motivation of the leadership teams spread, by intention, throughout the entire school community.

A whole school approach engenders a school-wide sense of inclusion and shared responsibility, and it has been shown to be the most effective way to implement positive change rapidly and permanently in a school setting.

²¹ Ecoschools Ontario is a highly successful program that is delivered in 33 Districts in Ontario. It was developed by School Boards (for school boards), and it is the program GSNS looks to as an exemplar approach.

²² www.ecosource.ca/thewholeschoolsapproach

The whole-school approach is a distinctive feature of the Green Schools model. Children and adults work together to achieve their goals, and this shared effort establishes a new model of responsibility and authority. Students are seen as partners in a Green School, and they are included in decision-making, strategy creation, and problem solving.

The whole-school approach is fundamental to delivering Green Schools theory and practice. Stewardship learning is achieved when learners are shown that their actions and school activities contribute to the betterment of their shared environment. Stewardship learning comes from knowing that the idea of shared responsibility is enforced and promoted by their principal, their teachers, and the school community. It is the foundation for building a culture of environmental sustainability in Nova Scotia schools.

3d How do Green Schools Work? Support to Operations

Green Schools Nova Scotia, should be designed to provide direct support and tools to operations and grounds managers for assessing and improving environmental practices under their charge. The tools of the program are designed in recognition of current practices that operations and grounds managers currently apply, and are designed with input and feedback from the School Board and school facilities' staff.

Training in school energy reduction is offered to Operations staff at in-service days and at workshops. It is important that this training be developed to meet the needs of operations managers; and updated on a regular basis to keep up with environmental standards, policies, and available products.

The main objective is to give support and resources to operations and grounds managers for improving their current environmental practices and standards. No school will be in the same 'place' when the program is implemented, and the tools and training provided are designed to adapt to the level of environmental management expertise and practice that is in place at each school.

Another element of Green Schools' operations support is to provide operations staff tools and ideas for involving students in environmental management activities. Too often waste, energy, litter clean-up, grounds improvement etc. are managed without students even being aware of the work being done. Awareness is essential for developing a culture of care and responsibility. The program involves students directly in such activities as energy monitoring, resource use reduction, shared waste management, litter and grounds clean-up, assessing and reducing the ecological footprint of their school. Through this process students will become aware of, and learn to care about their shared resources and environment. There is an opportunity and a need for motivated caretakers and operations managers to set an example for students and staff, and to involve students in learning and stewardship activities.

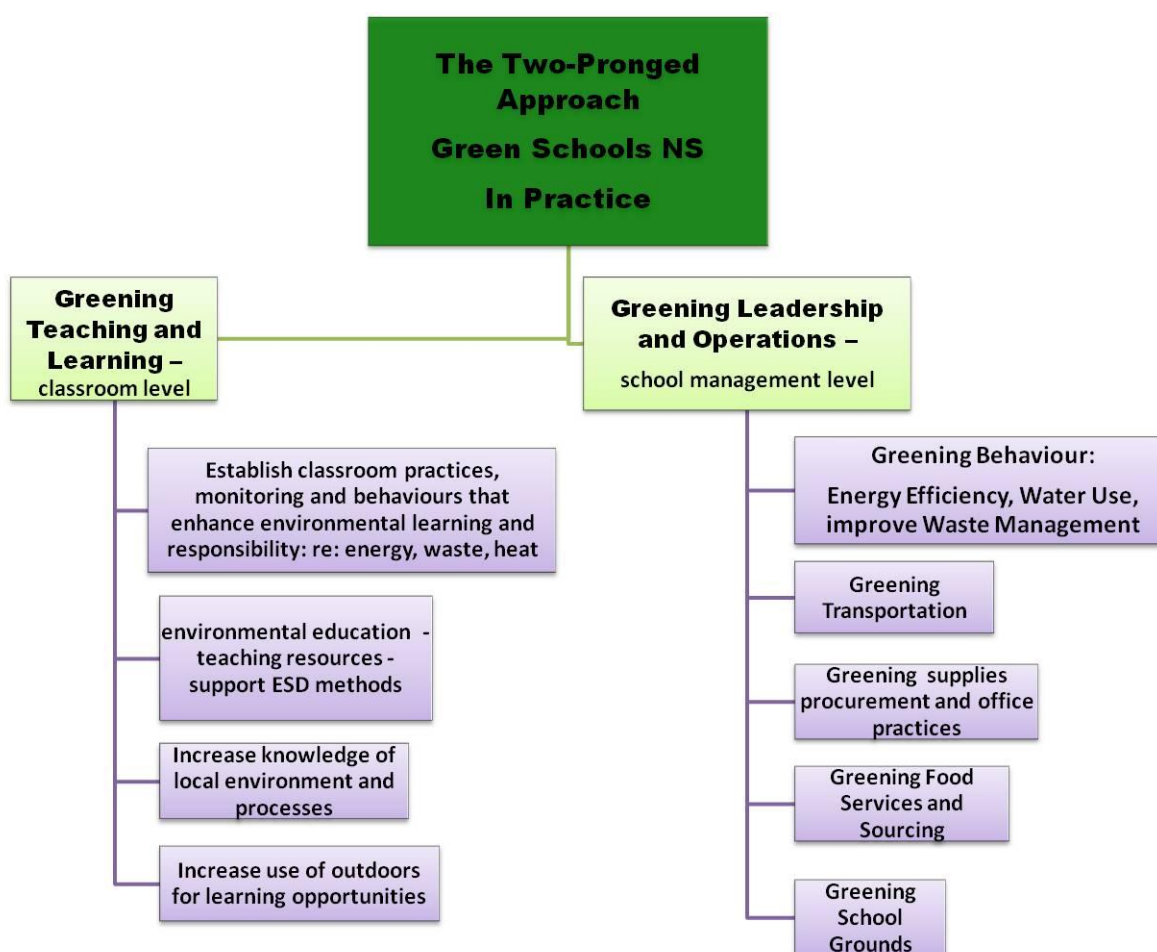
Ultimately, responsibility for our shared communities and environment is what we all need to be learning and practicing. In the school setting, however, we have an opportunity to groom and encourage a whole generation of ecologically-minded, responsible citizens. Green Schools Nova

Scotia is a practical, process-oriented program that will support and guide this kind of learning, caring, and behaving.

3e How do Green Schools Work? Support to Teaching and Learning

In addition to providing support to Operations managers and staff, the second prong of the Green Schools program is providing support to teachers and students. The following table illustrates the specifics of how the two-pronged feature of Green Schools Nova Scotia is intended to be applied.

**Table 3: Specifics of the Two-Pronged Approach
Applied Over Time**



The Department of Education in Nova Scotia reports that Education for Sustainable Development (ESD) is a priority²³, and curriculum that supports this priority is in development. Green Schools Nova Scotia can support this direction by developing and facilitating action-oriented, place-based learning tools and resources. Most of the teaching activities are proposed to be sourced from existing resources (environmental education curriculum developers and other Green Schools programs that have already designed many useable resources). It will be important to work directly with the Nova Scotia Department of Education, however, to ensure that the resources Green Schools Nova Scotia promotes and/or develops are in line with provincial curriculum outcomes, and are deemed appropriate for delivery in our schools.

These teaching tools and resources will not make extra work for teachers. Instead, the Green Schools program will support teachers, and provide them with tools, activities, and resources that will make the implementation of new ESD curriculum outcomes less daunting than it otherwise might be (especially for teachers with little experience in the area of environmental sustainability²⁴). Further, the program will enhance their teaching by providing opportunities for working with other teachers and classes, the community, and toward a common purpose.

3f How Does Green Schools Work? A Phased Implementation of the Comprehensive Model

Green Schools Nova Scotia is a comprehensive model, and can be adapted and applied to different schools according to their current scenario, capacity, and leadership. It is comprehensive in that it addresses the school and its occupants as a shared and interconnected ecosystem or living thing. The program addresses all areas of the school environment; and it provides audit checklists, tools, and participatory activities that assist in the sustainable management of the resource or behaviour in question.

The Green Schools Nova Scotia program is proposed to address eight components, beginning with energy (which is the first phase and priority of the Green Schools Nova Scotia program implementation):

²³ NS Department of Education business plan 2010-11.

²⁴ see *Appendix E*, which outlines the Green Schools framework for designing learning activities to support ESD

1. Energy use (heat and lights)
2. Learning opportunities and student engagement
3. Transportation
4. Water and waste,
5. Operations and grounds management
6. Sustainable procurement
7. Grounds and natural areas
8. Food choices and provision

The concept map, “A Comprehensive Green Schools Approach” depicts the eight components of the proposed program as an interconnected visual. While ‘greening’ operations and energy are the first priorities of implementing the program in Nova Scotia, the remaining components - and the Green Schools approach in general - is not single focus, but is a holistic program that considers the complex interrelationships that are inherent to environmental sustainability.

Table 4: A Comprehensive Green Schools Approach to Implementing Environmental Sustainability



It is advisable to apply the program incrementally, and to address priority issues first. This phased-in approach moderates the potential complexity and range of issues, and enables funding for different purposes to be managed and applied for by the same program. In other words, where other environmental education programs can be limited from funding opportunities by having a very specific scope of interest and purpose, the Green Schools program is broad in scope which opens the door to more funding sources. By maintaining the program over a longer period of time, momentum has the chance to build, achievements in one area can affect continued achievement in another, and a culture of sustainability has time to establish. The first two phases of the Green Schools Nova Scotia, Energy and Transportation, are proposed as follows.

PHASE 1: Energy Conservation (Years 1 and 2)

Energy accounts for 46% of Greenhouse Gas Emissions in the province of Nova Scotia. Reducing energy is the first priority of the Green Schools program, and is the main area in which schools can achieve measureable dollar savings. Heat and lighting costs can be substantially cut by making practicable behavioural and operations changes, and the first goal of the Green Schools program is to enable significant reductions in energy use by offering clear steps, learning tools, and practices to help cut these costs.

A Green Schools Nova Scotia Energy Guide can be developed to assist schools to reduce their energy use in practical ways that involve students directly, and engage the school as a whole. Ontario EcoSchools has an excellent Energy Guide²⁵ that is already developed and in use, and GSNS would be able to adapt and utilize a version of their guide for use in schools²⁶. In the case that the guide is adapted for Nova Scotia, learning activities would need to be linked to Nova Scotia's curriculum, and place-based learning that is specific to Nova Scotia would also need to be incorporated.

Some Green Schools programs return a portion of a school's energy savings back to the schools to spend on other priorities. Green Schools Nova Scotia is encouraged to negotiate with School Boards involved to discuss this kind of arrangement.

²⁵ Ontario EcoSchool's Energy Guide can be downloaded at:
http://www.ontarioecoschools.org/program_guides/downloads/Energy_Cons_Sept_2010.pdf.

²⁶ This option was cleared through personal communication with Richard Christie, Toronto EcoSchools, and Catherine Mahler, previous coordinator of Ontario EcoSchools. It is necessary to cite EcoSchools, where applicable, if and whenever their materials are adapted. Their program graphics are not to be used.

PHASE 2: Transportation (Proposed to Introduce in Year 3)

Transportation is the second largest emitter of Greenhouse Gases in Nova Scotia (at 13% of total GHGs), and is promoted as the second priority of Green Schools Environment Improvement Plans.

Green Schools Nova Scotia proposes to facilitate a *Smart Driver for School Bus* program for participating schools, which will help schools to reduce fuel costs by implementing school bus vehicle upgrades, improving maintenance, and enhancing driving practices. GSNS may also promote and actively assess: carpooling programs, alternatives to driving children to and from school, anti-idling (on and off school grounds for pick-ups and drop-offs), and transportation policies for sports teams, field trips, etc.

Program considerations may also include active transportation routes, biking infrastructure and other non-vehicular travel options, according to the priorities and needs of each school.

IV Notable Green Schools Programs

The Green Schools model is widely established across Europe, the United States, Canada, and elsewhere. It goes by a variety of names, the most common of which are Green Schools, Sustainable Schools, Eco-Schools, Go Green Schools, the Green Schools Alliance, and the Green Schools Initiative. Early applications of the model appeared in the 1970s, but it wasn't until the last ten years that it began to proliferate at a staggering rate. In Canada, different variations of the model are applied in different provinces, and the likelihood is that the provinces that do not yet have a Green Schools program will have one in place in the near future.

The distinguishing features of notable Canadian programs, along with a number of outstanding and/or unique international programs are summarized in the following table and explanatory section. The table depicts the management structures and key characteristics of the programs, while the explanatory section describes elements of programs that are unique and worthy of revisiting when developing program materials.

Administrative Structure and Key Characteristics of Select Green Schools Programs

Green Schools Program website	Administrative Structure	Key Characteristics
B.C. Green (Sustainable) Schools www.bced.gov.bc.ca	The Department of Education, B.C., coordinates the program. They work with <u>funding partners</u> (primarily B.C. power companies) and environmental education organizations to deliver the program. B.C. Green Schools is the student engagement element of the strategy to deliver <u>Education for Sustainable Development</u> in B.C.	B.C. Green Schools has two flagship programs that are unique to their program: 1) <u>B.C. Green Games</u> – an annual, juried environmental projects competition. 2) <u>Energy Ambassadors</u>. Energy Ambassadors is a successful energy efficiency program funded by the power company.
Ontario EcoSchools www.ontarioecoschools.org	A non-profit organization coordinates the program in <u>partnership with School Boards</u>. Funding for the program comes from a variety of sources, including the Department of Education. The Sustainability and Education Academy (SEdA) at York University delivers a number of ESD training workshops developed in part to support the work of EcoSchools operations and teaching components. http://www.schulich.yorku.ca/ssb-extra/sea.nsf/docs/SEdA	This program is distinct for its <u>excellent guidance material and policy alignment</u> features (with a more pointed focus on environmental education than on Education for Sustainable Development). The program's <u>Energy Guide</u> is excellent and is suggested as the example GSNS could follow. A unique and exemplar aspect of the program is its <u>certification process</u>. Becoming certified is a key incentive for the success of the program.
Manitoba EcoGlobe Schools www.edu.gov.mb.ca/k12/esd/eco.globe/index	The program is coordinated by the Department of Education and is integrated fully in the delivery of Education for Sustainable Development. The <u>annual grants program</u> (that schools can apply for) is funded by <u>Manitoba Hydro</u>, and the focus of the grant varies from year to year (e.g. one year could be energy efficiency; the next could be school ground greening, etc.).	EcoGlobe Schools has hosted operations and teaching <u>workshops put on by SEdA</u> (as does EcoSchools Ontario), and the coordinator of the program has related that the quality and usefulness of the workshop permeates through the school system all year and beyond. The program has three levels of recognition: Awareness, Action, and Transformation. The government of Manitoba is in full support of Eco-Globe schools. As a result, the program has maximum influence in the province's schools.

Quebec's Bruntland Green Establishment (BGE) http://evb.csq.qc.net/index	Established and managed by the 100 local representatives of the <u>Teacher's Union</u> of Quebec. This program applies the theory and practical application of <u>Education for Sustainable Development</u>. For instance, if environmental projects are carried out, there is also a social and economic element to the learning.	At least one third of Quebec's 3700 schools are involved with the BGE. The program is learner-focused, and the strong support of the Teacher's Union is the key to its longevity and success (the program was first established in 1993).
Eco-Schools International www.eco-schools.org Eco-Schools is active in over 40 countries, most in Europe, and there are also a number in the U.S.	Eco-Schools International was developed specifically to support the implementation of <u>Education for Sustainable Development</u>. It began as an initiative of the United Nations in partnership with the Foundation for Environmental Education (Denmark) and there are now more than <u>40 countries</u> with Eco-Schools programs. http://www.fee-international.org/en	The recognition element of the program is a <u>Green Flag program</u>. It is a well-regarded symbol of pride, a good motivator, and is internationally recognized. <u>Certification is a key incentive</u> for ongoing environmental programming and learning. One of the stand-out Eco-Schools programs is (<u>Eco-Schools</u>) <u>Green Schools Ireland</u> which has been active for 13 years, and seems an impressive example of school-community cooperation.
Green Schools Initiative www.greenschool.net California	A parent-initiated and led, non-profit, charitable organization with some celebrity involvement (e.g. Jack Johnson).	The program's <u>website, newsletter</u>, and focus on student learning and wellness are notable features. GSNS could take a lead from the GSI by enlisting a local celebrity to launch and/or champion the program.
Alliance to Save Energy www.ase.org California, Washington, Other U.S. States	The program was developed and is managed by a <u>collaboration of corporate agencies and interests</u>. Like other Green Schools programs, its application typically saves schools 10-15 percent on their energy bills in the first year of application.	This Green Schools program is <u>singularly focused on reducing energy use</u> in schools, and teaching about energy efficiency. The ASE Green Schools program operates at an arms-length from the school system. <u>The approach is more corporate</u> and perhaps more business-oriented in nature than the other programs described here, but is a valuable source for ideas. The limited scope on energy efficiency and education does not encompass the approach or goals of Education for Sustainable Development. Like the other Green Schools programs in Canada, it would be prudent to develop a program that is in keeping with the direction that the Canadian Ministers of Education and the N.S. Department of Education is going.

Kansas Green Schools http://www.kansasgreen.schools.org/	The program is coordinated by non-profit environmental organization in partnership with the State Energy Office and the Kansas Corporate Commission (similar to Nova Scotia’s Utilities Review Board).	The program is widespread in Kansas, and addresses a full range of environmental issues in the school environment. <u>Grants can be applied for on an annual basis</u> , and the theme changes from year to year (for instance: grants for this year are for water projects, last year they were for energy).

IV Notable Green Schools Programs: Exemplar Aspects

The distinguishing features of notable Canadian programs, along with a number of outstanding and/or unique international programs are summarized in the following section. The common and essential feature of Green Schools programs across the board is the process followed to becoming a Green School. Green Schools Nova Scotia will apply a 7-step version²⁷ that is an adaptation from Eco Schools International (www.eco-schools.org). Eco Schools international is a program that is applied in more than 40 countries, and was developed as an educational arm of the United Nation’s effort to establish Education for Sustainable Development in schools across the world.

An obvious question arises here: why not become a member of Eco Schools international? Answer: The Eco Schools program has been established for the longest of any of the Green Schools programs, and there have been advancements since its development. In order to become a member of the network, countries – or organizations – need to join the FEE, the coordinating body, and apply a standard program that is not as suitable for provincial jurisdictions as it is for country-wide programs. Like other provinces, Nova Scotia will apply a program that incorporates good ideas from other programs, and develops new ones that are specific to Nova Scotia’s unique and diverse population, setting, and education system.

The Green Schools Initiative is based out of Berkeley, California, and is a parent-driven, non-profit organization. Their mandate is to improve the health and environment of schools involved in the program, and to promote environmental and health improvements. Their focus is the whole school environment, and they apply the comprehensive model that considers all aspects of school functioning including procurement, food choices, waste and energy reduction, school grounds naturalization, etc. www.greenschools.net

Brundtland Green Schools are the application of the Green Schools model in Quebec. More than 800 schools in Quebec are part of the program, which was launched in the early 1990s. The program is designed to support Education for a Sustainable Future. The program has a certification aspect and obtaining and renewing GBS status is promoted as “one way of identifying,

²⁷ See Appendix D: The Steps to Becoming a Green School.

highlighting, and gaining exposure and recognition for the daily efforts that your school is making to improve society.” <http://www.evb.csq.qc.net>

The Manitoba Eco Globe Schools Program is funded by the provincial government in partnership with Manitoba Hydro, and grants are accessible by school divisions. In a press release in May of 2008, Science, Technology, energy and Mines Minister Jim Rondeau stated that “this program will complement other provincially supported initiatives such as Manitoba Hydro’s energy efficiency programs and Education for Sustainable Development grants. The program is well-established and is integrated directly with ESD curriculum development and provincial educational policy, and was established to enhance ESD implementation. www.greenschoolsmb.ca.

Earthcare: An Environmental Education Partnership. Earthcare is a second non-profit organization Green Schools program operating in Ontario. It was launched in the Ottawa-Carleton School Board region in 2003, and the Hastings and Prince Edward District School Board in 2005. The program is intended to expand to other School Boards. The program addresses occupant behaviours, with attention to energy reduction and improved energy efficiency. Components of the program: in-school program, Building operators training program, incentive and recognition plan, quality assurance plan, communications plan. The partnership system of Earthcare is a notable aspect of the program and it has been adapted for Green Schools Nova Scotia. www.earthcarecanada.com

In British Columbia: Green (Sustainable) Schools are a component of the Department of Education’s efforts to implement Education for Sustainable Development, and the initiative is supported by both B.C. Power and the B.C. Department of Education. B.C. Green Schools have a primary focus of energy reduction – though their program is comprehensive and strives to implement environmental sustainability throughout the school. Schools that have implemented the model have had an average of 12% in energy reductions at schools that have implemented the model. A unique aspect of the B.C. model is the additional provision of ‘Energy Ambassadors’. http://www.bced.gov.bc.ca/greenschools/sustainability_ed.htm

Employees of B.C. Hydro, “Energy Ambassadors” visit schools to motivate and monitor reduced energy use, and to communicate positive results. They train student ambassadors who continue the outreach and action efforts within schools. Their motivating tag line is: *“The simple actions we do every day add up to make a big difference!”* The B.C. program is one of the key examples for the development of Green Schools Nova Scotia, and is the model advocated by the Department of Education in Nova Scotia (at least at this time).

<http://www.bced.gov.bc.ca/greenschools/newsletters.htm>

In Ontario: EcoSchools. The Ontario Ecoschools program was first developed by the Toronto School Board to address the lack of standardized environmental practices and teaching in the schools in its district. The program is run by a non-profit organization, and it is extremely successful²⁸. It is a primary resource for the development of Green Schools Nova Scotia, and the organization is open to sharing their information, expertise and materials.²⁹ A distinct trait of the

²⁸ The Ontario Ecoschools program began with 13 schools in one board in 2003, and there are now over 1300 certified Ecoschools in Ontario in 40 School Boards.

²⁹ Personal communication between Wanda Baxter and Catherine Mahler, June 2010.

Ecoschools program is their formalized, certification process. There are three full-time employees, and a much larger number of casual staff hired to assist with the certification process. Ontario EcoSchools has been formally supported by the Association of School Boards in Ontario, and the program purposely helps to implement Ontario education policy. The program was developed by School Boards for School Boards, and they have developed many excellent resources and activities for use by schools participating in the program. The Toronto and Ontario EcoSchools programs can share experiences and resources with Nova Scotia as we work to develop our own version of Green Schools for Nova Scotia. www.ontarioecoschools.org

The New Brunswick Sustainable School Challenge: Falls Brook Centre is a non-profit organization with an environmental sustainability focus. One of their programs is the NB Sustainable School Challenge, which is facilitated by an employee of the centre, but can also be taken on by teachers on their own. The program has a full workbook of suggested activities, and it is delivered at the classroom level. The program is designed to meet N.B. curriculum outcomes for social studies and science for grades 6-8, and addresses the whole school as system. Student leadership and action-oriented learning is prioritized. The downside of the program is that it relies on direct facilitation, is not long-term in focus, and has limited reach as much of the program is managed by the employees of the Falls Brook Centre. www.fallsbrookcentre.ca

Alliance to Save Energy. The Alliance to Save Energy (ASE) is a collaboration of corporate and government interests originating out of Washington, D.C. Green Schools is one of their energy conservation and demand-side management programs. The organization is a consortium of energy companies and other supporters, with a mandate to 'create an energy efficient world'. It is a high profile organization, and the Green Schools program is successful and widespread, with particular success in California. <http://ase.org/content/article/detail/3984>

Green Schools Alliance: This Green Schools program has an exceptional website and tools, and should be looked to for example when developing resources and the website. The program was: "First envisioned on World Environment Day, June 5, 2007, the GSA was created in response to Mayor Bloomberg's challenge to New York City institutions to reduce their carbon footprint 30% by 2030 ... with support from The Mayor's Office of Long Term Planning and Sustainability, the National Association of Independent Schools (NAIS), the National Business Officers Association (NBOA), and other national, state and local resource partners, the GSA was launched." www.greenschoolsalliance.org

Green Schools Initiative: A non-profit organization based in California, the Green Schools initiative is a parent-led, grassroots organization. The program has a clear approach, and student wellness and learning is the main focus. It is not as useful an example as other sources, but their process and student engagement approach have influenced the development of this proposal. <http://www.greenschools.net>

Other notable applications of the model that have been assessed for the development of Green Schools Nova Scotia are: **Eco-Schools Ireland, Eco-Schools International, Kansas Green Schools, Michigan Green Schools, Sustainable Schools UK, The Cloud Institute, and the Cool School Challenge** (the website links for these programs are included in section IX: *Resources and Research Notes*).

V Recommendations for Program Development and Implementation

1. **Continue to work with the Department of Education to develop** curriculum-linked program activities, an implementation strategy, and policy templates. In June and August, 2010, Clean Nova Scotia staff met with Marilyn Webster and Jennifer Burke of the Department of Education regarding the development of this program. It is important to continue to work with the Department of Education to coordinate efforts, link the program to curriculum outcomes, and develop a strategy for delivering a Green Schools program that meets the learning needs of students. The Department of Education has a vested interest in developing a Green Schools model in Nova Scotia, and they are an important stakeholder and partner.

Nova Scotia is in a rare position in that the strategy for implementing Education for Sustainable Development and a possible Green Schools program may develop at the same time. There is a unique opportunity, here, to intentionally coordinate shared objectives, and work together in partnership to deliver a new era of education for sustainability in Nova Scotia.

2. **Deliver Energy Management Training to Operations Managers and Teachers (at in-service days or workshops):** One of the two prongs suggested for the Green Schools Nova Scotia program is the provision of support and tools to operations staff. Training workshops and school environmental assessment training (on site, as part of the assessment process) should be delivered to staff in charge of energy management at schools participating in the program. An option for training delivery is working with the Nova Scotia Community College to deliver a workshop on energy reduction and environmental management for schools, as based on the policies and practices that have been put in place at the NSCC Dartmouth Waterfront 'green' campus.

A second option for training is working with the federal Office of Energy Efficiency or the National Research Council to develop and deliver updated training for public schools energy management. Green Schools Nova Scotia could also promote and support the use of other resources³⁰ that can assist facility managers to implement energy efficiency measures and tools. The training should be developed in consultation with facility managers, and with input from the Halifax Regional School Board "Energy Matters"³¹ program officers.

3. **Access or develop tools to track energy use and classroom monitoring data in schools.** The Green Schools Nova Scotia program requires schools to track their own energy use and behavioural practices in order that they can recognize and change their energy use patterns

³⁰ Example Resources include: *Energy Management in Schools*, Canadian School Trustees Association, *the Benchmarking Guide for School Facility Managers*, and the *Best Practices Guide for School Facility Managers*, both developed by the Office of Energy Efficiency (www.oeenrcan.gc.ca)

³¹ "Energy Matters Update". Halifax Regional School Board, September 24, 2008.

over time. Some schools may already have energy monitoring and efficiency measures in place, and these existing tools can be used to track the information. Other schools and districts will not have tracking tools, and it will be necessary to supply schools with the tools they need to assess and monitor their patterns over time.

There are a wide range of energy use tracking tools available through the EnergyStar program, other Green Schools programs³², and government initiatives. These tools may be adapted or accessed to meet the needs of GSNS. Nova Scotia Power has a simple calculator on their website to calculate home energy use, and this is the kind of tool that should be developed for the school setting. Schools would require a more complex set of input variables, but the basic concept is the same.

The second part of this recommendation is the need for data tracking tools that are required for recording classroom monitoring data and other monitoring activities (e.g. that doors are closed, lighting in un-used areas is off, etc.) which can be simple excel spreadsheets or online data tracking system. There are a many available tools and templates that can be utilized for this purpose (suggested options: tables and tools from *Toward a Brighter Future*, *Green Schools B.C.*, *Ontario Ecoschools*).

4. Develop a Green Schools Nova Scotia Website, Social Networking tools, and Graphic Image or 'Brand'.

Communicating results, best practices, ideas, successful energy efficiency projects, curriculum resources, tools and opportunities, external links, and establishing a common hub for green schools in Nova Scotia is essential to the success of this program. It is important that the program gains momentum over the long term, and is able to sustain itself at minimal cost and with minimal external facilitation. The Green Schools Nova Scotia website would ideally communicate results, inspire action, share information, update participants and supply a constant source of information and progress reporting. Other Green Schools programs upload videos of school projects which are often made by students themselves. A website helps to establish the legitimacy of the program quickly, and is can be a constant source of low environmental impact Public Relations.

The website can also be used as a source of topical, current events which can be accessed by teachers and schools for potential use in their teaching and Green Schools activities. Essentially, the Green Schools Nova Scotia website would be a virtual network for teachers, principals, parents, students and schools who are interested in: learning about school greening, celebrating their own successes and learning about others', accessing tools and resources that they can use to help improve the culture and environment of their schools.

The image or 'brand' of the program: It is important to create an image that will resonate with students and Nova Scotia's school community. The program will be most effective if it is adopted and implemented in a large number of schools across the province. If the image of the program visually represents the ideas of environmental stewardship, community,

³² Green-Schools Ireland uses a Climate Change Carbon Calculator that is in Word or Excel format, and they have a new calculator developed by Repak. www.greenschoolsireland.org. Ontario EcoSchools also has a number of tracking tools. www.ontarioecoschools.org

and shared achievement and pride, it will spur interest and participation in the program. The image needs to be something that students and schools will want to have on the wall of their school, and have to work toward.

5. **Create a Green Schools Advisory Group** of key stakeholders and practicing teachers to oversee the program over time. A Green Schools program is a comprehensive and ambitious program that will require establishing a network of support and expertise in order for it to succeed over the long term. There are many different stakeholders with an interest in establishing a program of this kind: educators, school boards, non-profit organizations, corporate interests, government departments, and parents, all of whom have priorities and programs that involve the public school system. By establishing an advisory group for Green Schools Nova Scotia, the program can serve to coordinate a variety of interests, create a network of collaboration, establish long-term goals and funding plans, and help to deliver environmental education in an organized and logical fashion.

A Green Schools Advisory Group can guide the program over time, provide consistency and expertise, bring knowledge of grants and new programming, and give ongoing energy and permanence to the program. While the program may begin with funding from one source, it will likely need to access different pockets of funding over time. An advisory group can help to seek out or identify funding sources, spur new ideas and direction for the program, provide resources and support, and bring what might be competing interests under the same umbrella of shared purpose. Over time, as the program broadens across the province, an advisory group can include regional representation and serve to communicate issues and ideas from different areas and situations.

Members of this recommended group may include: representatives from different government departments (energy, environment, education); School Board members, representatives of relevant non-profit organizations (e.g. NSEN, ACSI, Clean Nova Scotia); local university sustainability coordinators, funders, etc. Individuals and groups who were contacted as part of the information gathering process for this research, and whom expressed an interest in serving on a potential advisory board for the program are identified as such in *Appendix A : Green School Contacts and Interview Notes*.

6. **Develop a School Environmental Assessment Process (Energy) and train Green School Energy Assessment officers:** Schools need to assess their baseline energy use scenario in order to track improvement and set goals. The non-profit organization that manages and facilitates the program will assist schools to assess their energy management approach, and suggest facility improvements and student engagement opportunities that will improve conservation measures and behaviours.

School Energy Assessment officers will need to undergo specialized training in order to provide relevant advice to facility managers, and to facilitate whole school involvement in the assessment and environmental improvement planning process.

7. **Develop a Green Schools Energy Conservation Guide**: Green Schools Nova Scotia will address the complete range of environmental issues in schools over time, but the first stage of the program is to implement energy conservation measures. Green Leadership Teams need a step-by-step guide to address energy use reduction in their schools, and the development of the guide is a priority. Ontario EcoSchools has an excellent Energy Guide that can be adapted for Nova Scotia, and B.C. Green Schools has a Best Practices Guide that can also be considered for additional ideas. Curriculum-linked activities (re: energy) developed by Green Learning may be promoted by Green Schools Nova Scotia.
8. **Regional approach**: Green Schools Nova Scotia is proposed to be launched in no more than two school districts in the first year. The initial year is likely to be somewhat experimental: specifics of the program will be reviewed; challenges and glitches that occur will be ironed out; and improvements to program delivery will be incorporated as they are identified. In the second and third years of program implementation, the process and resources will have been streamlined and improved upon, thereby enabling a more extensive distribution of the program to more school districts, and more schools.

The regional approach needs to respond to the distinctiveness of different parts of the province, cultural and demographic issues (e.g. urban vs. rural application), and environmental impact. The recommended approach is to deliver the program on a regional basis by hiring a Green Schools coordinator for each school district in the province (as per the interest and support of individual school boards, as they sign on to the program). The coordinators will be capable of carrying out School Energy Assessments and managing the overall delivery of GSNS per district. Ideally, regional coordinators will work out of the School Board office in each district, but if this option is not possible, non-governmental organizations or educational institutions in the different regions may house the Green Schools coordinator in their area (e.g. universities, NSCC campuses, Atlantic Conservation Action Plan offices, etc.). This idea has been explored³³ and there is evidence that the program would be supported by other institutions in this manner.

9. **Promote and integrate other learning resources and programs**: Green Schools Nova Scotia has a goal to enhance environmental practices and learning, and resources to support teaching and learning will need to be provided. Instead of producing new resources specifically for this program (at least in the early stages) it is recommended that appropriate curriculum-linked teaching tools that are designed by external organizations and sources be promoted. The Green Schools program has a framework for assessing and developing resources, and this framework will be applied to any resource that the program promotes in schools. In

³³ Source: Personal communications and interviews between Wanda Baxter, Clean Nova Scotia and Green Schools Contacts. See Appendix A.

particular, Green Learning (the energy education arm of the Pembina Institute³⁴ produces excellent curriculum-linked, peer reviewed learning activities and projects. They are promoted by B.C.'s Green Schools program, and they also work in collaboration with Learning for a Sustainable Future and Ontario EcoSchools.

The SEEDS foundation is another program that develops teaching tools to encourage student engagement and environmental sustainability in schools. The program is well-established and is applied widely in Nova Scotia and across the country, and it is recommended that Green Schools Nova Scotia partner with SEEDS to coordinate efforts, share information and resources, and develop a mutually beneficial approach to enhancing environmental learning and action in the Nova Scotia schools system.³⁵

10. Introduce *SmartDriver for School Bus* in the third year of the Green Schools program as an initiative to reduce fuel consumption, greenhouse gases and fuel costs. *SmartDriver for School Bus* is a Natural Resources Canada program and is similar in approach to Clean Nova Scotia's *DriveWiser* and *FleetWiser* programs. The program will help schools and school boards to reduce their carbon footprint; save on fuel costs; engage students and the whole school community in learning about transportation costs; and introduce efficiency options and tools.

This program will be introduced as part of the second phase of implementing the Green Schools program (the first phase is energy conservation and efficiency, as discussed).

11. **Develop and Introduce a Green Schools Environmental Achievement Awards.** It is important to establish a process to assess and reward schools that implement the Green Schools steps and training, and improve their environmental performance and learning. Virginia Olsen, who used to work for the Ontario EcoSchools program, shared her perspective that public recognition of achievement was a very important incentive, especially for students, teachers, and the school principal.

Other Green Schools programs apply a variety of reward systems which include: holding competitions between schools and other classrooms; being able to apply for Green Schools grants and funding; applying a full certification process; returning energy and other cost savings back to the schools; acquiring different levels achievement awards that are hung visibly in successful schools, and communicating achievement on the Green Schools website and in the media.

It is recommended that Green Schools Nova Scotia adopt a number of integrated reward systems. The focus should be on recognizing exceptional achievement in a number of areas including:

³⁴ The Pembina Institute is an Alberta based energy and environmental education and research organization with an excellent reputation. www.pembina.org

³⁵ Green Learning and the SEEDS foundation have both been approached about potential partnering with the Green Schools program, and both organizations are very interested to work with GSNS to participate and assist in what ways they can. www.greenlearning.ca, www.seeds.ca

- conservation savings
- student engagement
- school-community involvement
- teaching environmental sustainability
- student and/or staff leadership recognition
- operations staff recognition

It is also recommended that GSNS develops a savings return fund or a system of school performance bonds as the program becomes established. School Boards, the Department of Education, program funders etc. will be able to contribute to the Green Schools fund. Providers of energy, water and other provisions to schools may develop agreements with schools to return their savings to the schools for other purposes (note: Dartmouth High School arranged such an agreement with the School Board last winter to have energy savings returned to their school).³⁶ The recognition of achievement is a key element for inspiring leadership, action, and enthusiastic involvement in the Green Schools program.

Schools that have successfully implemented the process of becoming a Green School will be able to apply to the fund to finance sustainability projects, environmental field trips, teacher and operations training, etc. (see *ESD Grant Application*, Manitoba Eco-Globe Schools, *Appendix H*).

Recommendation for Regional and Long-Term Implementation of Green Schools **Nova Scotia**

The findings of this research suggest that a full-scale pilot of the program be carried out beginning in 2011 and deliver the program to a selection of schools in one or two School Board districts in Nova Scotia. Schools selected for inclusion in the pilot will depend on two main factors:

- 1) The principal is in full support of the program and will lead its delivery in his/her school.
- 2) The school is in need of the program and is a relatively high consumer of energy (as compared to other schools in the district).

³⁶ www.gov.ns.ca/news. "Province, Students Saving Energy in Schools." The Department of Education, April 22, 2010.

Pilot Program: Year 1

The Green Schools program will be delivered initially to a maximum of 30 schools, and staffing resources will be highest per school in this pilot year. The first series of Green School environmental audits will be carried out by school Green Leadership Teams (with support of program support staff and community specialists), and the goal for this first year is that all of the schools in the pilot program will have: completed their environmental audits, written their Environmental Improvement Plans³⁷, implemented energy savings behaviours and practices with full participation of all members of the school community.

The success of the first year pilot will be determined both by assessing quantitative benefits – how much energy has been saved, for instance, and by assessing for qualitative results pertaining to student learning and participation.

The key objective is to bring energy use and costs down, and to involve students directly in doing it. Many green schools programs achieve substantial reductions in the first year of program delivery, and it is expected that the Green Schools Nova Scotia program will achieve similar success.

Qualitative results of the program will be assessed by acquiring feedback from participating students, teachers, principals, operations staff and the Green Leadership Teams.

A Green Schools certification program will not be in place for the pilot, and may not be established as a feature of Green Schools Nova Scotia, but it is important that there be school assessment reports given to the participating schools that evaluate how well they are performing according to their student-participatory environmental audits, in addition to the operations management audits. However delivered, public recognition of achievement is an important incentive and motivator for all involved in the Green Schools Nova Scotia Program.

³⁷ See Appendix C:: *How to Become a Green School – The Process* for more information on the audit and environmental improvement plans.

VI Conclusion

The need to prepare for climate change impacts and environmental change is no longer a future-oriented issue. Today's students will need to be able to understand, respond to, and manage conditions that we cannot yet fully comprehend. It is imperative, then, to prepare young people with the tools and knowledge to be able to adapt to changing scenarios, and to conserve limited resources.

While there are a range of environmental practices, policies and programs already established in Nova Scotia's schools, there is no provision of a program that brings the entire school together to learn about and engage in stewardship activities as a community. There is no program that coordinates environmental education in schools and promotes long-term change and achievement. Green Schools Nova Scotia will facilitate all of these things. It will promote environmental action and a sense of hope in the doing.

Essentially, Green Schools Nova Scotia is proposed as a comprehensive program of support mechanisms and tools that can leverage a schools ability to implement and sustain improved environmental behaviours, learning, and practices over time. Beginning with a focus on reducing energy use, the whole school community will learn to become aware of their school environment in a new way. They will shift from being passive consumer/learners to active stewards of their schools.

There is an urgent need to provide young people the skills and thought processes that will enable them to deal with the problems that climate change will bring. Ultimately, responsibility for our shared communities and environment is what we all need to be learning and practicing. In the school setting, however, we have an opportunity to groom and encourage a whole generation of ecologically-minded, responsible citizens.

Green Schools Nova Scotia is a practical, process-oriented program that will support and guide this kind of learning, caring, and behaving. It is an important program that can help schools to cut costs; to conserve energy and improve other environmental conditions; and to engage students directly in learning to care for their school, their community, and their world.

This program can help meet Nova Scotia Power's need to increase conservation and energy efficiency in Nova Scotia by increasing the capacity of schools throughout the province to reduce their energy use. As proven in other areas that have implemented similar programs, Green Schools Nova Scotia can enhance environmental learning and doing, and facilitate a culture of sustainability in our school system.

IX References and Key Resources

Main Green Schools Programs

Canadian:

B.C. Green Schools: www.bced.gov.bc.ca/greenschools

Quebec's Green Brundtland Schools: <http://evb.csq.qc.net>

Manitoba Eco-Globe Schools: http://www.edu.gov.mb.ca/k12/esd/eco_globe/support.html

Ontario Eco-Schools: www.ontarioecoschools.org

Toronto Eco-Schools: www.ecoschools.hrsb.ca

EcoSource (Ontario): www.ecosource.ca

Earthcare (Ontario) www.earthcarecanada.com/EarthCARE

American and UK Green Schools programs:

The Green Schools Alliance, New York, U.S.A. : www.greenschoolsalliance.org/schools

The Cool School Challenge is a challenge-based, green schools type program that is delivered in a number of different States in the U.S.: <http://www.coolschoolchallenge.org/contact-us.aspx>

The **Green Schools Initiative** is a Berkeley, California based program that was developed by parents and is essentially run by parents in collaboration with schools. It is run by a charitable organization: <http://www.greenschools.net/article.php?id=188>

Kansas Green Schools is one of the Green Schools programs that stands out for its direct community involvement, for promoting student involvement, and for the its diverse partnership structure for funding and management, and it is proudly place-based and a notable program: www.kansasgreenschools.org/school-green-team-guide-0

Sustainable Schools, UK. www.teachnet.gov.uk/sustainableschools

Green Schools, Ireland. <http://www.greenschoolsireland.org>

EcoSchools, U.S.: <http://www.nwf.org/Global-Warming/School-Solutions/Eco-Schools-USA/>

Go Green Initiative: <http://gogreeninitiative.org/PDF/PlanningGuide.pdf>

Michigan Green Schools: <http://www.michiangreenschools.us>

Alliance for Saving Energy, U.S.: www.ase.org/greenschool

Key Curriculum and Engagement Resources

Green Learning Canada. The education arm of the Pembina Institute, GreenLearning is a good source for **Energy** curriculum. <http://www.greenlearning.ca/>

Sample Grant Application, Kansas Green Schools: www.kansasgreenschools.org/kansas-green-schools-grant-program
- sample grant application

Atlantic Canada Sustainability Initiative: www.atlanticsustainability.ca/resources

Learning for Sustainable Futures. This is Canada's umbrella, non-profit organization for Education for Sustainable Development. This website contains extensive materials on ESD, curriculum development for ESD, links, tools, policies, etc. <http://www.lsf-lst.ca>

Engel, John P. and Daniel Sturgis. *Green Teacher* 78. "Ethics in Action: Adopting an Environmental Practice."
<http://www.greenteacher.com/>

Toronto District School Board. *Certification Guide and Planner 2009/2010*. www.ecoschools.ca

Environmental Education Materials: *Guidelines for Excellence*. www.naaee.org/npeee

The Sierra Club's Sustainable High School Initiative: http://www.sierraclub.bc.ca/education/ed_students/secondary-students/shs-project/sustainable-high-schools-shs-project

The Cloud Institute for Sustainability Education: The Cloud Institute is an amazing resource for new curriculum, learning activities, graphics and ideas about sustainability education in general.
<http://www.sustainabilityed.org/about/>

Relevant Policy

Toward a Greener Future: Nova Scotia's Climate Action Plan: <http://www.climatechange.gov.ns.ca/doc/ccap.pdf>

The EGSPA site (Nova Scotia Environmental Goals and Prosperity Act). <http://www.secondnature.gov.ns.ca/>

Environmental Education Ontario. *A Public Strategic Plan for Environmental and Sustainability Education*.
<http://www.eeon.org/plan/index.php>

Update report on the Nova Scotia Environmental Goals and Sustainable Prosperity Act.
<http://www.gov.ns.ca/nse/egspa/docs/EGSPA.2010.Annual.Report.pdf>

Council of Ministers of Education, Canada. January 12, 2010. "*Background – Developing a Pan-Canadian ESD Framework for Collaboration and Action*". Education for Sustainable Development Working Group. (currently only available on hard copy). www.cmec.ca

Nova Scotia Power Incorporated. *Conservation and Energy Efficiency Plan, 2010*. www.nspower.ca

Useful Resources and Links

Palm Beach Green Schools Recognition Program: <http://www.ourgreenschools.com/congratulations-green-schools/>

Green Schools Resources, Northeast Sustainable Energy Association. This is a useful site for a wide range of resources for any Green Schools program. <http://www.nesea.org/k-12/greenschoolshealthyschools/greenschoolsresources/>

Conserve Nova Scotia, Energy Meters: <http://www.conservens.ca/education/energy-meters.asp>

EcoEfficiency Office Dalhousie: <http://ecoefficiency.management.dal.ca> (a potential source for assessment training or volunteer assessment work in schools)

Office of Energy Efficiency, Natural Resources Canada: <http://oee.nrcan.gc.ca/residential/energystar-portal.cfm>
Energy Star portal and many other resources, including energy efficiency training options.

Anti-idling campaign and tools, EPA, U.S.: <http://epa.gov/cleanschoolbus/antiidling.htm>

Learning for a Sustainable future: This site contains just about everything one needs to know about Education for Sustainable Development in Canada, or it has the link to what you need to know. <http://www.lsf-ist.ca/en>

GGs magazine: This is an excellent source of environmental education information, current events, teaching tools, etc. etc. <http://www.ggs magazine.org/articles/spotlight/students-rethink-oil-use>

The Nova Scotia Environmental Network: The NSEN is in charge of promoting ESD in Nova Scotia from the non-profit organization perspective. www.nsen.ca

CELF is a Green Schools-style consulting service: A consulting service that provides a range of Green Schools style programming. The CELF organization is an excellent resource for GSNS. <http://celfeducation.org/WhatWeDo-coordination.html>

Benchmarking Calculators and Energy Tracking Tools

EnergyStar calculators: http://www.energystar.gov/index.cfm?c=kids.kids_index

Zerofootprint Benchmarking Software and Zerofootprint Challenge: www.zerofootprint.net

“The CHPS Operations Report Card (ORC – U.S.) is a new program that benchmarks the current performance of existing schools, provides a report card of results and makes suggestions for improvement. The ORC program advances the standard for the maintenance, operation, and improvement of all school buildings – high performance and otherwise.

These assessments take place in five categories: energy efficiency, thermal comfort, visual comfort, indoor air quality, and acoustics. The ORC is an interactive online tool. While designed for district-wide deployment over multiple school sites, it is also useful to single public schools, charter schools and private schools. The ORC provides schools with a simple, understandable score to communicate where their school currently stands on the spectrum of high-performance.” <http://www.chps.net/dev/Drupal/node/44>

<http://oregon.gov/ENERGY/CONS/SB1149/Schools/EUI.html> Oregon Department of Energy – Conservation Division Collecting Data for Energy Usage Index. This link describes how schools need to gather utility bills before audits can be performed, and before they can use the state Energy Usage Index which is then entered into the School Interactive Database.

<http://legacy.wesd.org/sid/> School Interactive Database (SID) Improvements to the SID video. Informative, with different table and ideas for calculating energy use.

Videos

Implementing Acting Today, Shaping Tomorrow in our Schools is a video made by the Ontario Principals Council in partnership with EcoSource. This video is an excellent overview of the importance of Principals recognizing their role as examples and leaders of Green Schools programs and environmental sustainability in their schools. While it is a bit long (and it meanders), the video may be useful for doing presentations and introducing the topic of Green Schools and ESD education. <http://principals.ca/stream/atst/actingtoday.html>

Best Practices video, EcoSchools, Ontario. “Nobody can be green”: the video introduces a school that uses a theme and puppet to promote ownership of the program each year.

http://www.ontarioecoschools.org/best_practices/videos.html

Articles and Press about Green Schools programs (or similar initiatives)

August 2010. Toronto Sun. ***Teaching kids to be green: Canadian schools are set on instilling students with a green philosophy.*** By SUZANNE ELSTON, SPECIAL TO QMI AGENCY.

<http://www.torontosun.com/life/2010/08/12/15006421.html>

Leading Sustainable Schools: Why should we? www.ncsl.org.uk

“Students Celebrate Renewable Energy Projects”. Education/Energy, June 7, 2010. www.gov.ns.ca/news

“Province, Students Saving Energy in Schools.” Department of Education, April 22, 2010. Re: Dartmouth High School’s Philosophy 12 class, their program – as designed by the students themselves: *Schools Appreciating Valuable Energy*. “They (the Halifax School Board) agreed to give us half the money our school saved on power, so it’s a win-win situation.” www.gov.ns.ca/news

Appendix A: Green Schools Contacts, and Direct Information Gathering

The research process that was carried out to explore the plausibility of implementing a comprehensive Green Schools program in Nova Scotia (and whether there was an identified need for such a program) included gathering input from experts and practitioners in the environmental education field in N.S. and elsewhere. This component of the research included holding a focus group with practicing teachers and carrying out a series of interviews with people working in the field.

The research process also included attending regional workshops and conferences to become informed of other initiatives and perspectives; and to assess the current administrative and pedagogical scenarios behind delivering environmental education in this province. I attended (and presented at) the Spring Symposium of the Sustainability Education in Nova Scotia for Everyone (SENSE) network, an NSEN (Nova Scotia Environmental Network) workshop on sustainability education in Shelburne County, and the 2010 Atlantic Canada Association of Science Educators conference at UPEI (the focus of the conference was Education for Sustainable Development). These networking and information gathering opportunities were useful for obtaining direct input, and for determining that there is a need for a Green Schools program. The impression definitive: there is a need for a long-term, consistent effort to more effectively deliver environmental education (and practice) in Nova Scotia.

It was important to speak to other organizations and government agencies that deliver environmental education programs in Nova Scotia for their perspective and experience, and to assess their level of support for a Green Schools program. The research that went into the document: *A Green Schools Program for Nova Scotia: Facilitating a Culture of Sustainability* was informed by theory, policy, research into other programs, and by assessing a current scenario of environmental education delivery in Nova Scotia. The following table provides a brief summary of the interviews and direct input that inform this document.

Green Schools Contact	Title	Contact Information	Notes
Janelle Frail	Executive Director (new in June, 2010), Nova Scotia Environmental Network (NSEN) SENSE is a working group of the NSEN	nsen@cen-rce.org www.nsen.ca	Janelle is apprised about the development of the Green Schools program, and as the lead organization for promoting Education for Sustainable Development in NS, her (the NSEN's) support of the program is important. She is a potential member of the recommended Green Schools Advisory Committee

Sam Juru	Education programs coordinator, NSEN	esd_novascotia@lsf-lst.ca	Sam is very knowledgeable about environmental education delivery programs and, as the outreach person at NSEN, he is a potential support and possible member of the advisory committee. I spoke with him about the prospect of a GS program in June, 2010.
Principal Mary Manning	Principal, Lockeport Regional High	902-875-4900 mmanning@tcrsb.ca	Principal Manning is already doing the kind of work in her school that a fully functioning Green Schools would want to achieve. She is an environmental leader and has spearheaded a wide range of student-action environmental and conservation projects in her school. She connects her school to the community through partnership projects and hands-on environmental action. She would be a fantastic advisor to the program.
Sue Boutlier	Collaborative Apprenticeship, NSCC Dartmouth Waterfront	902-491-6780	Sue is a regular member of the SENSE network (a sub-committee of the Nova Scotia Environmental Network), and is very interested in supporting the GS initiative. She has said she could help w/ possible internship opportunities through NSCC. She works on curriculum design and sustainability issues. I met with her in July and she is a committed contact with interest in supporting and promoting the program. There may also be potential to work with NSCC operations to do training for caretakers. She is interested in being part of the proposed advisory committee.
Rochelle Owen	Dalhousie University Sustainability Coordinator	rjowen@dal.ca 494-7448	I met with Rochelle in July, 2010. She shared a lot of ideas about sustainability initiatives at Dalhousie, and about involving students in sustainability. Projects and research. Rochelle fully supports a GSNS program and advised that energy savings could easily cover the cost of hiring a sustainability coordinator for the program at the provincial level, and one per district. She envisions GSNS doing similar work as they do at Sustainability Dalhousie. Their website is extensive, and will be useful to GSNS.
Debra Ross	Community Outreach Coordinator School of Sustainability, Dalhousie University	dross@dal.ca	The School of Sustainability has a mandate to do community outreach, connect researchers to community research opportunities, and related organizations and programs. She is an important contact, and follow up with her is recommended.

Gordon Harrison	Director, GreenLearning Canada The Pembina Institute www.greenlearning.ca	613-256-1487	I spoke with Gordon on the telephone on July 19th. Greenlearning.ca develops high quality, Canadian energy education resources with curriculum links in a number of provinces (so far). They work with the Learning for Sustainable Futures organization and the Pembina Institute, and <u>are interested in adapting their materials to meet NS curriculum</u>. He is preparing a proposed budget for adapting their activities as part of the Green Schools program development. For follow up.
Jessica Dawe	The Sierra Club She was the coordinator of the now-defunct <i>Eco-buddies</i> environmental mentoring program for junior high and high school students. Jessica no longer works for the program, and the program is no longer being offered. There is a new program through the Sierra Club called Wild Child, which is a direct experience in nature program for young children.	902-444-3113	Jessica ran the Ecobuddies mentoring program in the Halifax region, and she shared experiences and her perspective on delivering environmental education in Nova Scotia schools. She stressed that empowering youth is an essential factor. She gave expressed a need for increased learning opportunities in NS schools, and a need for more participatory involvement (i.e.: 'not just the keepers' in environmental groups). She referred me to Michael Cosgrove's SAVE class, and the Sierra club's Sustainable High Schools program. She also expressed a need for more collaboration and cooperation among environmental groups, the Department of Education, and teachers.
Paul Gregory	Federation of Canadian Municipalities Municipal Sustainability Grants (Paul used to be on the Board of the SEEDS Foundation – an environmental Program operating across the country.)	613-907-6291 pgregory@fcm.ca	Paul verified the value of SEEDS programming and curriculum, and the high quality of the people involved in developing materials, etc. He connected me to Diane Field (the new Exec. Director), and indicated that the organization is going through revitalization.
Jill Alcoe Holland	Teacher, New Ross Consolidated School	902-689-6100 nrcs@ssrsb.ca	A teacher at New Ross Consolidated, Jill has spearheaded a number of environmental projects and continues to be a 'champion' at her school. I contacted Jill for input and received a brief email response about the kinds of things they do and the

			importance of giving students opportunities for outdoor learning, but she didn't respond when I asked whether they might be interested in doing a Green Schools pilot, or get involved with a proposed GSNS. Recommendation: for future contact as the program extends regionally, perhaps, and for contact as an example of best practices.
David Lunn	SEEDS program development	dlunn@rife.com	He wrote that the SEEDS foundation will work in collaboration with other groups, and encouraged me to pursue building a connection. Further contact was with w/ Bill Batycky and Diane Field.
Catherine Mahler	Catherine used to be a Program Officer for Ontario Ecoschools She has a new position as the Environmental Education Coordinator with the Department of Education, Ontario, and has seen the shift from not being funded at all by the department, to full engagement.	catherine.mahler@ontario.ca 416-325-2523	I talked with Catherine for over an hour in July, 2010 about the early development of <u>Ontario Ecoschools</u>, and for her advice and perspective about starting a program in NS. The Ontario program began as a non-profit organization, grass-roots initiative with support from York University and the Federal Dept. of Environment. It has since garnered full support from Dept. of Education and the School Boards Association. She is a very helpful, knowledgeable, and supportive individual and may be contacted in the future for advice and perhaps to come and do training for the new GSNS staff. Much of their work involves teacher training, developing resources for the program, and delivering operations training workshops.
Virginia Olsen	Virginia works for the Nova Scotia Government, waste management. Virginia used to work for the Simcoe County District School Board and worked with the EcoSchools directly.	olsenvl@gov.ns.ca	I was referred to Virginia by Catherine Mahler of Ontario Ecoschools, and I spoke with her in late October, 2010. She has a lot of direct experience about the EcoSchools program, and had nothing but enthusiasm and encouragement about developing a similar program for Nova Scotia.

Diane Field	She is New Executive Director of the SEEDS Foundation (a national environmental education program that is well-established, and is active in Nova Scotia) dfield@seedsfoundation.ca	I spoke on the telephone to both she and Bill Batycky about the SEEDS foundation and possible options for collaborating on developing and delivering environmental education curriculum via a Green Schools program. They already have a lot of contacts and resources, and it is recommended that a direct relationship with them be developed and maintained. Their organization is in transition, and are very interested in the Green Schools Nova Scotia program development. <i>"We need a community of green schools ..."</i> SEEDS is a key organization for the program to promote and work with. For follow up.
Bill Batycky	Curriculum design, SEEDS bbatycky@shaw.ca He used to work for Calgary School Board He has worked with BC Green Schools	Bill is very interested in helping with GSNS, and has many connections across the country re: environmental sustainability education.
Ann Blackmore	Department of Education, director of English language programs BLACKWAA@gov.ns.ca	We met with her once in late June, at the first meeting with the Dept. of Education regarding the development of a Green Schools program, and how it can coordinate with their work on implementing Education for Sustainable Development. Further meetings were without her presence (but with Jennifer Burke and Marilyn Webster).
Jennifer Burke	Dept. Education, Social Studies curriculum Burkejel@gov.ns.ca	Jennifer is a progressive and energetic teacher and curriculum developer at the N.S. Department of Education. She is in charge of implementing ESD from the humanities perspective, esp. re: social studies and cultural issues. We met with her and Marilyn Webster regarding delivering programs in the schools system, and about the importance of quality control, relationship building, and cooperation of the environmental education community and the Department of Education.

Marilyn Webster	Dept. of Education, Science and ESD Lead	Mwebster@gov.ns.ca	Marilyn is basically the point person for the Nova Scotia Department of Education on implementing Education for Sustainable Development. She is on the national committee as representative for N.S. We have been in conversation with her regarding ESD implementation, the potential partnership of the department and a Green Schools program, and the necessity for curriculum links for programs and activities that GSNS delivers. Marilyn presented on ESD delivery at the 2010 ACASE conference at UPEI, and is in the process of developing an ESD working group in N.S. Marilyn has offered to give feedback into the GSNS research and proposed program, and a working relationship with her – and the department of Education - on the development of the program is important.
Lynda Rankin	NS Environment and Labour Procurement specialist	rankinx@gov.ns.ca	Lynda has a lot of materials and resources about sustainable procurement, and non-toxic cleaning products, etc. for use in schools (along with learning activities, etc.). She is keen to assist, if required, and it would be good to keep her 'in the loop' as the program is developed.
Krista Hilchey	Dept. of Environment NS, Water Division, Outreach and Education	hilchekg@gov.ns.ca	Krista is interested in an advisory role, if required. She will provide input into the development of water-related education activities and conservation measures.
Tamara Lorinz		tlorincz@dal.ca	Tamara is the Ex-Director of the Nova Scotia Environmental Network, and a practicing environmental lawyer. She has a child at school, and is interested in helping to deliver the program at his school. She is very interested in environmental learning, community and school greening, and is interested in an advisory role.
John Colton	Atlantic Canada Sustainability Institute	John.colton@acadia.ca	I spoke with John on the telephone in June. He is a professor at Acadia U and Director of the ACSI (though the organization is on hiatus, as per needing funding). He is willing to and interested in supporting the Green Schools program. The ACSI has done sustainability training for corporations and

			municipalities, and he may be a good contact for connecting volunteer experts to help with school 'greening' activities and projects.
Dayle Eshelby	Past Community Sustainability Coordinator, Lockeport, N.S.	Cell: 874-0568 Home: 656-2444 Dayle_eshelby@hotmail.com	Dayle is a mover and shaker in the Shelburne/Lockeport area, and she has worked with a number of schools on sustainability initiatives. She is a potential advisor if the program extends regionally, and is a definite support of program.
Ken Meech	N.S. School Board Association Executive Director, N.S. He is interested in Environmental initiatives	kmeech@nssba.ca	Mr. Meech was on vacation, and my email for request for input and discussion was forwarded to Sharon McPhee
Sharon McPhee	N.S. School Board Association direct contact	491-2856	I spoke with Sharon McPhee in September, 2010, and she is very keen about a Green Schools program, and would be interested to sit on an advisory committee. She is involved with the healthy schools program, and has a real interest in environmental issues. For follow up.
Michael Cosgrove	Philosophy teacher, Dartmouth High. mcosg@staff.ednet.ns.ca	464-2457 Extension 4001236	Mr. Cosgrove's grade 12 class developed an S.A.V.E. program (Students) about valued energy awareness. By request, they arranged with the school board to receive half of the savings garnered as a result of their energy awareness and reduction campaign in their school; a ground breaking and excellent initiative. I asked him if he would be willing to be interviewed and filmed re: sharing best practices of his students in action on the GSNS website. He is very open to this idea. For follow up w/ M. Cosgrove. He is a potential advisor.
Earl McMullen	Facilities manager, Halifax Regional School Board	emcmullin@hrsb.ns.ca 902-464-2000 ext 5116	It took a long time to arrange a meeting with Mr. McMullen (he is very busy!), but he is a huge source of information and a very important contact for this program. He knows as much as anyone in the area, I'd say, about the premise of Green Schools, energy efficiency in schools, the potential for the program, and how important behavior and learning is to support efficiency infrastructure changes.

			He could do a workshop to train caretakers and facility managers about his efforts and his ideas, and he is recommended highly as a person to maintain contact with and to work with. Mr. McMullen spearheaded the <i>Energy Matters</i> program, and he is a huge source of information, knowledge and experience. He accesses and manages all of the energy data from the schools in the district on software he himself uses, and he acknowledges that there is a huge need for schools to have direct access to this information. We discussed the Zerofootprint software and organization (he had been contacted by them directly), and he thinks their software may be useful here. However, as he is focused on accessing funding for infrastructure needs, he is not looking for this kind of diversion at the moment (but would in a year or so). If GSNS were to take on this aspect of energy management in schools, he would be willing to assist, but not to oversee the effort.
Jennifer McKeane	Outreach officer, NS Department of Environment	mckeanjw@gov.ns.ca	Jennifer is on the EECOM group and her role with the Department is a coordinating position and is an important contact. Met with her on Oct. 18, and she is interested in being an advisor to the program.
Ron Dembo	CEO, ZeroFootprint Canada	416-465-7557 ext 121 www.zerofootprint.net	I spoke directly with Ron Dembo about the possibilities of using the Zerofootprint software without entering the schools challenge. They are preparing a budget and options for doing a pilot for a limited amount of schools in HRM. I spoke to a number of professionals in the field about doing a challenge at the same time as launching a Green Schools program, and all agreed that it would be better to establish the Green Schools process first.

Richard Christie	Toronto District School Board EcoSchools (a separate org. from - but connected to - Ontario EcoSchools).	www.ecoschools.tdsb.ca 416-394-7495	Mr. Christie was contacted for information about the Toronto program as to why it is separate from the Ontario EcoSchools program, and their reasons for partnering with Zerofootprint, a program that enables schools to access energy information online (when set up for the program). I was also interested to understand the Toronto EcoSchools management structure, and their relationship with the department of education, etc. He is very knowledgeable about their program and others, and he advocates using their resources (w/ references clearly cited; as per Ontario EcoSchools as well) and he especially advocates using a certification process. He is an excellent contact, is very open and helpful, and it would be useful to stay in contact with him if GSNS is implemented.
Paul Lukaszek	Manager, B.C. Green Schools Program Dept. of Education	Paul.lukaszek@gov.bc.ca 250-387-6398	The Green Schools program in B.C. works as a coordinating body, and is linked directly to ESD curriculum maps. Paul Lukaszek advised that partnerships were important for delivering the program; especially corporate sponsorships and non-profit environmental organizations. He suggested that Nova Scotia would benefit greatly by working closely with the Department of Education, and not be afraid or hesitant to work with funders and resource developers. He also advised that it is important to have people delivering the Green Schools program who know the environmental community, and have experience dealing with people in operations and teaching.

¹ Halifax Regional School Board *Energy Matters Update*. September 2008. www.hrsb.ns.ca

Appendix B: Alignment with Nova Scotia Education and Environment Policy

Federal provincial, and NS School Board Environmental Education and Sustainability Policy	Green Schools Nova Scotia Support
Learn Canada 20/20 – Joint Declaration of Provincial and Territorial Ministers of Education (CMEC April 2008) ESD (Education for Sustainable Development) is one of <u>eight key activity areas</u> identified by the Council of Ministers of Education, Canada: <i>“Raise students awareness and encourage them to become actively involved in working for a sustainable society.”</i>	The program involves the students directly in stewardship activities and action-oriented environmental learning.
NS Department of Education Business Plan 2009-2010: Goal #2: <i>“<u>Sustainability is a focus of the department</u> ... The department will work with partners under the auspices of the Council of Minister of Education to develop an Education for Sustainable Development (ESD) Framework for collaboration and action.”</i> P22	The Green Schools Nova Scotia (GSNS) program is designed to support the delivery of ESD specifically. Activities that are developed for the program incorporate ESD elements (see “A framework for developing GSNS activities”). As the ESD framework for collaboration and action is developed, Green Schools will serve as <u>a delivery agent of some of the goals</u>. The program promotes student engagement, stewardship learning, and collaborative action. GSNS will also formalize a working relationship between the formal and non-formal environmental education sectors. In the interim (until there is a Nova Scotia Framework for ESD), the Green Schools program is informed by <i>Acting Today, Shaping Tomorrow</i>. A Policy Framework for Environmental Education In Ontario Schools, and the CMEC’s recent policy paper on delivering ESD in Canada.

The Environmental Goals and Sustainable Prosperity Act (EGSPA), 2007 The EGSPA commits the Nova Scotia government to 21 goals, including: <i>Developing and adopting a Sustainable Procurement Policy for NS;</i> <i>Reducing the amount of waste we sent to landfills;</i> <i>Decreasing greenhouse gas emissions to 10% below the 1990 levels.</i> The communication piece for The EGSPA , Vision 20/20, indicates “what you can do to help”: • <i>Consider aligning your organizations <u>procurement practices</u> with the Provincial Sustainable Procurement Policy.</i> • <i>Adopt <u>pollution prevention practices</u> in your organization to eliminate Toxic materials, reduce waste, and improve your water and energy efficiency</i> • <i>Examine each of your organizations’ activities from start to finish To <u>identify waste and look for opportunities to reduce or eliminate it.</u></i>	The Province’s <u>Sustainable procurement policy</u> will be promoted as part of GSNS delivery, and it will be adapted according to school needs. Assessing and improving on school practices and behaviours, pollution prevention, waste management, water use, and energy efficiency are key components of the Green Schools program. The program will help to implement the goals of EGSPA in the school setting, and will adapt NS guidelines for businesses to the school setting (e.g office greening and pollution prevention). One of the goals for improving environmental performance in Green Schools will be to track, measure, and reduce greenhouse gas emissions in schools in the short term, and over time.
Halifax Regional School Board Business Plan Goal #4: “Through a dynamic regional plan, ensure our facilities are sound, secure and healthy and support effective curriculum delivery”, specifically addressing priority #3, <u>Increasing Energy Efficiency.</u>” In 2005, HRSB embarked on a comprehensive energy program, <u>Energy Matters</u>, with a goal to substantially reduce the amount of money spent on energy, the amount of electricity, fuel and water used in our schools and the amount of greenhouse gas emissions that our schools generate into the atmosphere.	Green Schools Nova Scotia builds on Clean Nova Scotia’s <i>Towards a Brighter Future Program</i>, which is noted in Energy Matters as the community arm of implementing the HRSB program. <i>Towards a Brighter Future</i> delivered energy conservation awareness and action in schools, and helped to fulfill the goals of Energy Matters. GSNS incorporates the successes and fundamental approach of the <i>Towards a Brighter Future</i> program, though with an increased focus on stewardship learning, building capacity from within, and promoting student engagement.
Halifax Regional School Board Business Plan and Budget 2010-2011 <u>Priority #4</u> (update from above). “increasing in-house maintenance and operations’ support to schools” “continuing the energy efficiency retrofit program” Priorities for 2010-2011 1. <u>New Initiatives (d)</u>	<u>Priority #4:</u> As environmental practices and procedures are already in place in NS schools, the Green Schools program will help to assess for compliance, and offer advice and support where compliance and performance is lacking. Green Schools will also develop training and tools for operations and grounds managers, and help to implement standardized environmental practices across districts and the province <u>New Initiative 1(d):</u> The GSNS program will involve students, staff

Provide or enhance instructional programs about the environment “The Board is currently exploring an energy management project proposal with an external vendor. Part of that contract will be educational programs for students and staff on energy conservation and recycling.” P24 Summary: “... additional priorities that were dependent on sufficient funds to implement. While these issues are no less important, lack of funding prevents the Board from making any significant progress in these areas in 2010-2011. These additional priorities were; 7. “Providing additional resources to enhance strategies for increasing student engagement through discussions with teachers, school administrators, and parents.”	and the School Board in reducing energy use in participating schools. Heating and lighting are the main sources of Greenhouse Gas Emissions in Nova Scotia, and it is a priority of the NS government and this program to substantially reduce waste in schools by creating awareness of usage patterns, and guiding improvement. The Green Schools model has proven to deliver results in energy reduction, and GSNS intends to match or improve on estimated results. 7. Green Schools will carry out environmental audits with participation from the whole school community, creating an opportunity for student and staff engagement and learning.
Toward a Greener Future – Nova Scotia’s Climate Change Action Plan (2009) <i>Action 52: Incorporate climate change, sustainability and complex decision making into the school curriculum</i>	GSNS delivers curriculum-linked activities and teaching resources on the topics of climate change and environmental sustainability to participating schools. Most of these resources will be sourced and promoted, not specifically created for the program. GSNS will also deliver and/or organize professional development opportunities for teaching environmental sustainability.

APPENDIX C: BECOMING A GREEN SCHOOL - THE PROCESS*

1. Establish A Green Leadership Team

This team should include a combination of administration, staff, operations, teachers and students, and the principal (or vice principal) of the school is an essential participant. The make-up of the Green Leadership Team (GLT) will vary from school to school, but will usually include:

- the principal or vice principal of a school
- a representative from the facility operations team
- a groundskeeper
- at least two teachers
- a community member/parent
- students

2. Pledge a commitment to the goals of the Green Schools Nova Scotia

The Green Leadership Team signs a Green Schools Nova Scotia (GSNS) pledge that formalizes their commitment to facilitating the program in their school. The pledge will state the objective of incorporating green thinking and doing as a normal part of school operations, teaching and learning. It will be posted visibly in the school and promoted regularly via school and community communications.

3. Launch the Green Schools Program

Incentive is so important for motivating change, and one of the incentives that Green Schools applies is public recognition for involvement and achievement. The principal, ideally, will launch the program visibly to the whole school community, and the launch should be a fun and energizing event.

4. Conduct a Green School Environmental Audit

Tools will be provided by GSNS to assess the school's environmental practices or 'baseline'. Any of all of the following may be addressed: energy use, waste management, adherence to the 3 Rs, procurement, curriculum offerings, and transportation. The scope of the program can be overwhelming and it is suggested that schools start with a manageable part of the whole approach.

This whole-school exercise will be carried out as a teaching tool by involving students in the process. Different classes will carry out different aspects of the assessment, and then contribute their findings to the whole report.

GSNS staff will assist schools with carrying out the assessment process. Evaluation checklists and pre-designed activities that go with different environmental topics will be provided to teachers.

5. Create a School Environmental Improvement Plan

GSNS will provide a Green School Report Card to schools that complete their environmental audits. The report cards will identify areas that the school is doing well, and will identify areas that need improvement.

The Green Leadership Team will announce to the school community the results of their assessment and their report card 'marks'. From these results, the GLT will write an Environmental Improvement Plan (E.I.P.), and begin implementing the plan.

Each Green Schools plan will be specific to the needs and priorities of the school, and of the leadership teams' ability to carry out the projects and changes identified.

Green Schools Environmental Improvement Plans should identify short and long-term goals, and should extend over a period of at least two years. The E.I.P. needs to identify specific goals and objectives, and set measureable targets for improvement.

6. Monitor and Evaluate Progress

Green Schools are only 'green' if they are making positive change and working toward implementing their Environmental Improvement Plans.

Nova Scotia Green Schools staff will assist schools to set up evaluation and tracking procedures, and standardized tools will be provided to record data and track progress.

7. Celebrate Successes and Gain Recognition

Green Schools Nova Scotia will recognize and communicate best practices and notable school achievements based on criteria yet to be established.

Recognition will be shared in a public manner to encourage continued improvement, and so other schools will want to achieve similar milestones. The importance of recognizing and publicly acknowledging achievement cannot be overstated. It is one of the main drivers of the program.



*Primary source of adaptation: www.greenschools.net – 7 steps to becoming a green school

Appendix D: Branding the Program and Green Schools ‘Name’ Considerations

Green Schools programs across North America and Europe share common features but each is distinct according to place, structure, style, and goals of the participants and the overseeing organization. This is one of the main reasons to develop a program that is specifically designed for Nova Scotia instead of adopting an external model.

It is essential to give the program a unique look and feel that is responsive to place, as place-based education is promoted, and the image of the program will be prominent as the program develops. Basically, the image will need to be both a symbol of the program, and a signifier of achievement. The logo for the program will be featured on program materials, and will be visible on school plaques, awards and certificates. It needs to be a symbol that will evoke pride, and be instantly recognizable as a mark of participatory environmental achievement.

Some logos are more successful than others at communicating these things. It is advised that the logo be designed as part of the pilot program, so that direct feedback on the image can be obtained from participants. It might be useful to do a contest or to hold a vote to decide on a favourite choice from a number of different logo options, to ensure that the logo will garner the kind of positive response that it needs to.

As the program is intended to be a long-term and comprehensive initiative, the image for the program also needs to be something that will translate well over time. The brand for the program must also take into consideration that all program materials will be translated into French. Sometimes catch phrases and titles, and branding features can be distorted or lose effectiveness when translated into French. A number of Green Schools program logos are included, below.

A second issue that will require consideration is the actual name of the proposed program. While Green Schools Nova Scotia has been applied throughout the research, it is not necessarily the best choice for the program. There are a number of issues to consider:

- The SEEDS foundation uses the term Green Schools to identify schools that have completed an optimal number of environmental projects that meet the requirements of the program. SEEDS has been active for twenty years, and many schools that are environmentally aware and progressive in Nova Scotia are both aware of the program, and are likely familiar with this application of the term Green Schools. However, the use of the term Green Schools by SEEDS does not mean that Green Schools Nova Scotia cannot also be used, and it does not mean that they are mutually exclusive. Further, the SEEDS foundation is in transition as an organization, and they may be interested to work directly with the proposed new Green Schools program, and perhaps apply the name in a dual application manner. The new

Executive Director of SEEDS has voiced interest in working with a Green Schools program in N.S., and adapting their programming to match the goals and approach of GSNS.

- A second note on using the term Green Schools Nova Scotia or GSNS is this: it sounds good, and sounding good can actually matter a lot in terms of a program's success on the ground, especially in terms of whether the term has 'play' for students.
- When the term Green Schools is mentioned, some people respond negatively as the word 'green' is increasingly being tied to the term 'green washing'. It would do serious disservice to the concept of Green Schools NS if its legitimacy were questioned because the term 'green' is increasingly co-opted to mean a lot of things for sale that are not necessarily 'green', but apply the term 'green' because it sells.
- The term EcoSchools (or Eco-Schools) is the second most commonly-used title for Green Schools-type programs, and it has particular legitimacy as Eco-Schools International was the original program developed in collaboration with the United Nations for the purpose of integrating Sustainable Development into the school system. EcoSchools Toronto, and EcoSchools Ontario are the only two programs in Canada that apply the term, and as their programs are so well-established and reputable, it could either be wise to apply the same term in Nova Scotia, or unwise; depending on the point of view. From one perspective, EcoSchools Nova Scotia might be seen as an offshoot of the Ontario program. This may or may not be a bad thing, again, depending on one's perspective.
- The down-side of using the term EcoSchools - because it is only applied in Canada in Ontario - is that it might be seen to be an offshoot of the Ontario program to its detriment. The home-grown nature (and name) of a Green Schools program for Nova Scotia will likely matter. Fairly or not, there is resistance in smaller provinces, Nova Scotia included, to programs and ideas that are seen to be imported from Ontario. Also, while there are many useful resources that Green Schools Nova Scotia will likely adapt for application here, the program that is proposed for Nova Scotia is not an adaptation of their whole program or their program delivery method.
- A last note on the potential use of the term EcoSchools: because Eco-Schools International is so well-established, widely applied, and reputable, it might be an odd juxtaposition that the name is applied to the Nova Scotia program, but it is not their program that is applied. Regardless, these issues are provided here for consideration purposes, only, as some people I have talked to in the course of this research have been unsure about what the term means (and whether Green Schools NS refers to the SEEDS foundation connection), and others have questioned whether a different name should be used. The recommendation on this is simply to think carefully about what name to apply to the program, and know why it is being applied over other potential options.

Upper Canada College



Eco-Schools International logo
(behind girls on flag)

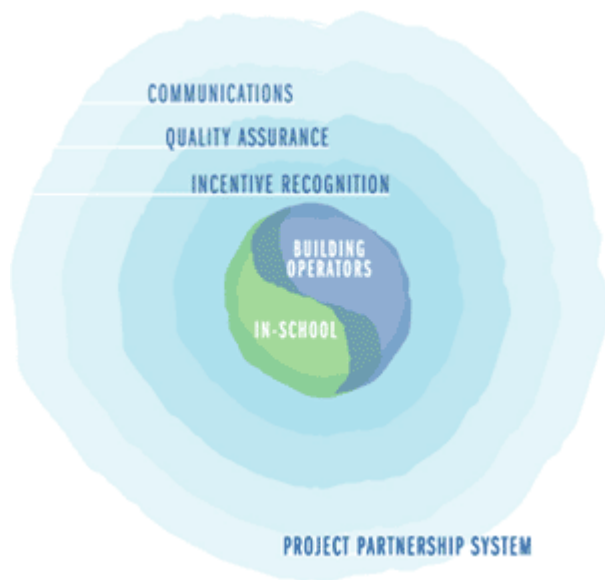




B.C. Green Schools



Montreal Brundtland Schools



Earthcare, Ontario (Green Schools modelled program)



Kansas Green Schools

Appendix E: Framework for Designing Green Schools Activities to support Education for Sustainable Development – Background

“Education for Sustainable Development (ESD) entails a reorienting of education to guide and motivate people to become responsible citizens of the planet. ... it moves students from learning about sustainable development to students experiencing how to live sustainably. It therefore encourages linking ideas to action.

... ESD is experiential, authentic, and action-oriented education, using real-world sources rather than relying exclusively on textbooks. ESD emphasizes information analysis, not just information transfer. ESD brings together elements from many curricular areas at the same time and integrates these through a sustainability lens, ensuring that students are able to address the key challenges we all face.”

Background – Developing a Pan-Canadian ESD Framework for Collaboration and Action, ESD Working Group (ESDWG), January, 2010

The Green Schools Nova Scotia program can enhance the parallel implementation of Education for Sustainable Development (ESD) in Nova Scotia. Following the lead of other provinces in Canada, Green Schools Nova Scotia can integrate ESD policy and objectives in program delivery, and provide action-oriented learning that is an important facet of sustainability education (and is difficult to provide strictly through traditional school functioning).

At this time in history, education is weighted with a new kind of import; students need to learn beyond content and understanding, they literally have to learn how to change their own behaviours, and the ways of the culture around them. The demands on schools to deliver education for environmental sustainability, then, are substantial. Teaching is already demanding and serious, but in the context of environmental and social crises, teaching takes on a heightened level of demand and seriousness. Now, teaching must be realigned and reconfigured. Teaching in the 21st century must be nothing less than transformative. If our schools, now, are not teaching how to live and think differently than we have in the past, then our youth will continue on the path we are already on, and it goes without saying that the path we are on appears to be going nowhere good.

Education for Sustainable Development is not an ivory tower idea, it is not an ideal vision handed down from the United Nations, it is not an academic exercise or inclusive theory. Education for Sustainable Development is an international movement that is on the cusp of being familiar to everyone in the field of teaching and learning.

“Even though the concept of ESD and its application have evolved over the past 17 years, many of the tenets set forth in Agenda 21 have proved seminal.” These key elements include:

- The definition of ESD as encompassing economic and social dimensions requires it to be broader than just environmental education;
- The insistence that ESD is education for (and not about) sustainable development;

- The notion of linking knowledge, values, perspectives, and skills/behaviour (the head, the heart, the hands);
- The recognition of the importance of Aboriginal and traditional knowledge

Activities designed for the new Green Schools Nova Scotia program can be designed to integrate ESD objectives, and give intentional and strategic support to the Department of Education and teachers as ESD is put into practice in this province. Education for Sustainable Development is all about reincorporating thinking and doing in our schools. The Green Schools NS program can deliver learning activities and teaching that will help teachers and students make the transition from ideas and knowledge acquisition to learning how to apply learning in real and meaningful ways – in their own lives, and schools, and community. The proposed framework for designing GSNS teaching activities to support ESD follows, as does an explanation of the proposed framework.

Name of Activity & Purpose of the Exercise (w/ curriculum link #s)	Role of Teacher or Leader	Role of Students	ESD knowledge or content: what key information is to be learned?	Place-based learning?	Action-oriented experiential element:	Is the activity multi-disciplinary? (what disciplines?)

Framework for Designing Activities for Green Schools program – Explanation of the Framework

1. Name of Activity & Purpose of the Exercise

It is essential to consider and state clear objectives to ensure that the purpose of the activity is actually met by doing the activity. When testing the effectiveness of an activity designed or promoted (i.e. developed by an external agency) for Green Schools NS, it is key to ask whether students and teachers have learned what the activity was designed to teach/impart.

The curriculum links that the activity fulfills will also be included here.

2. Role of the Teacher

It should be specified clearly what the teacher's role in carrying out the activity is. If their role is clearly outlined - and the purpose of doing the activity is clear and linked to curriculum outcomes - they are more likely to deliver the activity in their class without facilitation assistance. It is so important that the teacher is offered a clear and concise perception of what the activity is, how they will carry it out, and how it will benefit their students and enhance their teaching.

Resources for background reading and further information (if they want to prepare further for delivering the activity, or learn more about teaching for sustainable development) can also be provided in this section.

3. Role of the Student

What students will be doing during the activity needs to be clearly linked back to the purpose of the exercise (i.e. the learning outcomes), and their participation needs to make sense in terms of the purpose of doing the activity. What students will learn via doing the activity must determine what their role is, and what they are asked to *do*.

4. ESD knowledge or content: what key information is to be learned?

This section is for specifying the content and/or skill that the students (and teachers, perhaps) will learn by doing the activity. Because climate change and energy are the main focus in the first year of Green Schools Nova Scotia, the content will likely be limited to this theme of Education for Sustainable Development. However, aspects of teaching for sustainable development, such as linking local behaviours and resource use to global scenarios and long-term possibilities of continuing on as we are, can be addressed.

Also, knowledge acquisition in support of ESD should encourage critical thinking and problem-based analysis, and consider whatever content or issue that is considered to be considered from a number of perspectives (in other words: be multi-disciplinary, and attempt to address all three facets of sustainable development: the social, environmental, and economic aspects of any issue or topic).

5. Place-based learning?

“Even though a common reporting framework has been devised, it is recognized that ESD will take many forms around the world, because it must take into consideration the local, environmental, economic, and societal conditions.”

Learning about one’s own community is the first step in learning how and why to care about it. The Green Schools NS program is about developing a culture of sustainability in schools. It is about teaching and learning stewardship, which is contingent on: knowing and understanding the place you’re in, knowing what it needs, and learning how to care for it.

Learning to know about the place you’re in (about the parts of it, and how the parts work as a whole) engenders learning how to know places in general. Learning how to know and understand about the complexities, interconnections, and unique specifics of place; is where learning how to care about place (or environment) begins.

6. Action-oriented experiential element:

Education for Sustainable Development (aka: the new delivery method for environmental education) advocates linking ideas to action, and learning activities for Green Schools NS will focus on this aspect of ESD delivery specifically. The whole-school approach that the Green Schools program is built upon, which involves everyone in caring for their shared environment, is one of the main ways that students will be actively involved.

7. Multi-disciplinary?

Learning activities designed for the Green Schools program will promote lateral thinking – which is learning to think across disciplines, and link different ideas together. Environmental issues and problems are complex. Our environment and shared communities (whether a home, a school, community, landscape, watershed, what have you) are complicated interconnections of different inputs and behaviours, and processes. By learning to assess surroundings and buildings from multiple perspectives, we learn how to think about systems and how to analyze complexity. Activities and whole school participatory action that the Green Schools program designs and promotes will consider and incorporate different disciplines and perspectives. This section of the framework will be used to ensure that multiple disciplines have been incorporated, and will identify what disciplines are addressed.

Appendix F

Nova Scotia Home Builders Association Eco Home Pilot

Nova Scotia Eco Home Project

**Presentation prepared for the:
Program Development Working Group**

December 14, 2010



Eco Home Nova Scotia

To design and build a new home focused on advanced building techniques that promote energy efficiency, sustainability, recycling and adaptability.



ECOHOME

BUILD SMART • LIVE RIGHT

efficiency
NOVA SCOTIA CORPORATION

 **NOVA SCOTIA**
HOME BUILDERS' ASSOCIATION

Recap of the Nova Scotia Eco Home Pilot Project?

- A joint initiative between Nova Scotia Power Inc. & the Nova Scotia Home Builders' Association
- The goal is to educate the general public, residential construction industry, government and special interest groups on the importance of energy efficiency in new home construction
- To create awareness of new and innovative energy efficient design applications
- The Nova Scotia Eco Home Pilot Project will be a showcase of the work that has been done to make energy efficiency a priority for all Nova Scotians



Goal

To design and build a new home focused on advanced building techniques that promote energy efficiency, sustainability, recycling and adaptability.

Project

- The project includes two components – the design phase and the build phase
- Focus on innovativeness in design in terms of energy efficient components and the home's sustainability that are adaptable to today's trades and attempt to exceed current limits of performance
- Project to run from August 2010 – November 2011



Summary of Design Process

- A series of ads were included in the provincial section of The Chronicle Herald and The Metro
- Information was included on the NSHBA website with all the competition specifications, details and requirements
- Request for design proposals were extended to the:
 - Nova Scotia Home Builders' Association
 - Nova Scotia Home Designers Association
 - Nova Scotia Architects Association
 - General Public



The Judging Process

Judging criteria included a mix of the following:

Judging Criteria	Weight of Scores	Judges' Score
Innovativeness & affordability of energy efficiency components	20 pts	
Mechanical system design (space heating and domestic hot water)	20 pts	
Adaptability of design	10 pts	
Design of Building Envelope	15 pts	
Use of sustainable and/or local products	10 pts	
Cost analysis of energy efficient components	5 pts	
HOT 2000 results	10 pts	
Application Completeness	5 pts	
Judge's Discretion	5 pts	
	TOTAL SCORE	



Background on the Judges

Dr. Lstiburek received an undergraduate degree in Mechanical Engineering from the University of Toronto, a masters degree in Civil Engineering from the University of Toronto and a Doctorate in Building Science at the University of Toronto. Dr. Lstiburek has been a licensed Professional Engineer in the Province of Ontario since 1982. Dr. Lstiburek is a principal of Building Science Corporation and is a forensic engineer who investigates building failures. He is internationally recognized as an authority on moisture-related building problems and indoor air quality.

Betsy Pettit, FAIA, is the president of Building Science Corporation and is a registered architect with over 30 years of professional experience. She is the project manager for Building Science Corporation's Building America project that has provided whole system designs for over 3,000 high performance houses nationwide. Ms. Pettit was responsible for the design of numerous developments and houses that have set standards for resource efficient housing around the country. She is the former Director of Modernization and Redevelopment in the public housing division of Massachusetts' Executive Offices of Communities and Development. There she oversaw over \$120M of building improvements to the Commonwealth's 40,000 units of public housing.

Stephen Dupuis is President and Chief Executive Officer of the Building Industry & Land Development Association. Mr. Dupuis joined the Association in 1988 as Manager of Government Relations following stints with the Association of Municipalities of Ontario and the provincial Ministry of Municipal Affairs and Housing. Dupuis serves on the Government Relations Committee of the Canadian Society of Association Executives, the Schulich School of Business Real Property Advisory Committee and the Canadian Newspaper Advisory Board. He has served as a citizen appointee on the Town of Aurora Economic Development Advisory Committee.



The winning design

APPENDIX F



efficiency
NOVA SCOTIA CORPORATION

 **NOVA SCOTIA**
HOME BUILDERS' ASSOCIATION

Highlights of the chosen design

The judges were impressed with this home and its attention to **Energy Efficiency & Sustainability**.

When processed through the HOT 2000 program, the home will achieve an energy rating into the mid 90 range of the EnerGuide scale

Items to be included in this home will include:

- a master on/off switch for the building's non-essential appliances will be included
- a high efficiency Heat Recovery Ventilator (HRV)
- On demand hot water boiler in the kitchen
- Low flow fixtures and dual flush toilets to reduce water consumption
- construction details pertaining to the building envelope detail will be extensive to maximum insulation levels and the home's performance
- an energy management system will be included to help measure and monitor energy consumption and savings



The Next Steps:

The Build Phase – Incentives & Recognition

- With the slight modifications to the winning design, a request for bids will be sent out to builders.
- Monetary incentives will be offered to the builder to allow for the implementation of energy efficient building products and materials up to a value of \$100,000
- The Builder will receive an award at the NSHBA Peak Awards in 2011
- The project will be highlighted on the NSHBA website and included in the marketing campaign associated with the Nova Scotia Eco Home Pilot Project
- Complimentary one-year NSHBA membership will be awarded to the Builder



Sample of e-monitor tool

APPENDIX F



efficiency
NOVA SCOTIA CORPORATION

 **NOVA SCOTIA**
HOME BUILDERS' ASSOCIATION

Marketing & Promotions of Advanced Houses Pilot Project

The Build Phase Marketing Campaign will include (commencing January 2011):
A pre-advertising campaign will include the development of a website and blog, video to highlight the innovative techniques and products, further continuation to build the brand, promotions at events during the Spring season, radio and print advertisements, social media and an online ad-buy campaign

Beginning mid – August – close of the project: print advertisements, radio campaign, billboard and bus ads, social media, video production and development, on-line ad buy, pop-up displays, signage, print booklet (12-pages), promotional giveaways, bus tours / seminars, on-site posters and material, brochures, etc



Allocations of Funds to NSHBA

APPENDIX F

Allocation of Funds	January 1, 2011 – November 30, 2011 Amount
Phase III - Administration - Technical Assistance - Build Process (pre-advertising, education & training for target audiences)	\$15,000 \$20,000 \$60,000
Phase IV -Marketing, Advertising, Education and Training Budget will be based on direction set by committee. Ideally, the marketing budget should be three times the amount paid to the builder to maximize campaign, but the campaign can be adjusted to still meet the needs of the program based on the budget that is allocated.	To be determined

efficiency
NOVA SCOTIA CORPORATION

 **NOVA SCOTIA**
HOME BUILDERS' ASSOCIATION

Allocations of Funds to Home Designer / Builder APPENDIX F

Allocation of Funds	January 1, 2011 – Nov. 30, 2011	
	Billing Date	Amount
Incentive paid to Builder - 4 draws from commencement of build to final completion of 25% each. - Prior to the advancement of each draw, verification by Advance House Pilot Project team will do an inspection of the work to date to ensure energy efficiency targets are being met	4 draws – dates will vary	\$25,000 / draw (\$100,000 total)
Totals		\$100,000



Thank you.

Questions?

