

# NOVA SCOTIA CLIMATE ACTION PLAN AND ENERGY STRATEGY

*A Contract for a Low-Carbon Future in Nova Scotia*

*Submission of the Ecology Action Centre*



Submitted to the Nova Scotia Department of Energy

December 2007

# TABLE OF CONTENTS

<b>Opening Message.....</b>	<b>4</b>
<b>Executive Summary .....</b>	<b>5</b>
<b>Purpose &amp; Vision .....</b>	<b>11</b>
A Contract for a Low-Carbon Future in Nova Scotia .....	11
<b>Goals, Objectives &amp; Long-Term Planning .....</b>	<b>13</b>
<b>Greenhouse Gas Emission Regulations .....</b>	<b>16</b>
Regulatory Strategy .....	17
Regulatory Proposals .....	19
Immediate Regulations for Resource Acquisition and New Power Supply .....	19
Immediate GHG Regulations .....	21
Immediate Market-Based Regulations .....	22
Inter-Provincial or Federal Market-Based Regulations .....	24
<b>Transportation .....</b>	<b>26</b>
Overview .....	26
Investments in Sustainable Transportation Options .....	26
Home for Sustainable Transportation .....	26
Funding Targets .....	27
Modal Split Targets .....	28
Pay-as-You-Drive Insurance .....	30
Centralized Information .....	31
Carpool Matching .....	31
Incentives for Energy Efficient Land Use Planning .....	31
Municipal Planning Act .....	31
Tax Incentives .....	32
Requirements for Fuel Efficiency .....	33
California Vehicle Efficiency Standards .....	33
Biofuel .....	33
Speed Limits .....	33
Rail Freight .....	34
<b>Energy Efficiency .....</b>	<b>35</b>
Administration, Planning & Accountability .....	36
Formation of Collaborative .....	37
Accountability for Results .....	38
Electric Energy Efficiency .....	39
Multi-Fuel Energy Efficiency .....	41
Combined Heat and Power (Cogeneration) .....	41
On-Site Renewable Energy as an Efficiency Improvement .....	44

Fuel Switching, Fuel Choice .....	50
Infrastructure Development .....	50
Efficiency Standards.....	51
<b>Energy Poverty.....</b>	<b>53</b>
<b>Renewable Energy.....</b>	<b>54</b>
How do we meet the Renewable Electricity Generation Goal?.....	55
How Do We Increase Renewable Electricity Generation Even More in Nova Scotia? 56	
How Do We Integrate Renewable Energy Into A New Social Contract For A Low- Carbon Future?.....	60
Conclusion .....	61
<b>Sustainable Energy Innovation.....</b>	<b>63</b>
R&D and Deployment Funding .....	63
Energy Storage .....	64
Carbon Capture and Storage .....	64
Ocean Energy .....	65
Transitions in Existing Industries.....	65
<b>Planning For Change .....</b>	<b>67</b>
Climate Change Adaptation Strategies for Nova Scotia .....	69
<b>Forest Management &amp; Carbon Storage .....</b>	<b>73</b>
Impacts on biodiversity.....	73
Forest harvesting and carbon storage .....	73
Forest Harvesting for Biomass.....	74
<b>Governance.....</b>	<b>77</b>
<b>Conclusion: Towards Action.....</b>	<b>78</b>
<b>List of Recommendations.....</b>	<b>79</b>

## OPENING MESSAGE

The Ecology Action Centre (EAC) very much appreciates the opportunity to provide written submissions to Nova Scotia's Climate Action Plan and Energy Strategy.

In June 2007, the EAC released a document titled "Pathways to Sustainable Energy Prosperity in Nova Scotia" which identified key strategic priorities for meeting the province's environmental and economic goals.

Our submission to the Climate Action Plan and Energy Strategy process has allowed us to work diligently, with available resources, to provide more comprehensive suggestions for action. Various committees and staff members of the EAC have collaborated to provide an in-depth submission that presents specific options for immediate implementation as well as longer term and framework oriented policies and principles aimed at ensuring Nova Scotia achieves its environmental and economic goals.

We offer our suggestions and recommendations in a spirit of collaboration. Thus, we would be very pleased to engage with the Government of Nova Scotia and the citizens of Nova Scotia in ongoing discussions on specific policy implementation.

The energy, transportation, coastal, food action, and wilderness committees have all contributed to the production of this submission. We invite you to contact the various committees of the EAC to enter into future discussions on how we can move the province of Nova Scotia towards Sustainable Prosperity. We have attached the contact information of relevant staff members below.

The aggressive pursuit of GHG reductions through policy implementation must fit the aggressive environmental and economic goals Nova Scotia has established for itself. We urge that the development of a Climate Action Plan and New Energy Strategy be the first step towards the aggressive implementation of legislation, regulations and provincial investments and look forward to working with you in the future.

Yours Sincerely,

Brendan Haley

Stephanie Sodero

EAC Energy Coordinator

EAC Sustainable Transportation  
Coordinator

### Ecology Action Centre Contacts

<u>Committee</u>	<u>Name</u>	<u>Phone</u>	<u>E-mail</u>
<b>Energy</b>	Brendan Haley	902-442-0199	energy@ecologyaction.ca
<b>Transportation</b>	Stephanie Sodero	902-429-0924	trax@ecologyaction.ca
<b>Energy – Solar Gain</b>	Wayne Groszko	902-442-0300	solargain@ecologyaction.ca
<b>Coastal</b>	Jennifer Graham	902-442-5046	coastal@ecologyaction.ca
<b>Food Action</b>	Marla MacLeod	902-442-1077	foodaction@ecologyaction.ca
<b>Wilderness</b>	Minga O'Brien	902-429-1335	forests@ecologyaction.ca

## EXECUTIVE SUMMARY

The environment and climate change is now an overarching concern in Canada, and even more so in Atlantic Canada. This provides a strong mandate for aggressive action against climate change in the province of Nova Scotia.

To answer the question of whether the people of Nova Scotia will “accept higher energy prices” the EAC encourages the Climate Change Action Plan and Energy Strategy to help define a *Contract for a Low-Carbon Future* with the people of Nova Scotia. Such a contract must seek to provide opportunities for Nova Scotians to cut their bills through efficiency, to earn energy revenues for community revitalization, to receive basic energy services as a right, to have access to services and transportation, for the transition to greener industries to be a just one for workers, and for businesses to be competitive in sustainable production.

Defining this Contract for a Low-Carbon Future today will help provide the framework for the accelerated emission reductions that are mandated in the Environmental Goals and Sustainable Prosperity Act.

### *Goals, Objectives and Long-Term Planning*

The Environmental Goals and Sustainable Prosperity Act (EGSPA) mandates Nova Scotia to “demonstrate international leadership”. This requires Nova Scotia’s Climate Action Plan and Energy Strategy to recognize the need to keep global warming under 2 C from pre-industrial levels to avoid dangerous climate change and to recognize the United Nation Framework Convention on Climate Change’s (UNFCCC) principle of common, but differentiated responsibilities.

A long-term target of reducing greenhouse gas emissions (GHG) by 90% below 1990 levels by 2050 is consistent with the reductions necessary in Nova Scotia in order for the province to demonstrate international leadership by avoiding dangerous climate change.

The EAC suggests that the following short-term, medium-term and long-term targets be utilized in all government planning exercises:

- Reduce GHGs to 1990 levels by 2012
- Reduce GHGs, *at least*, 10% below 1990 levels by 2020
- Reduce GHGs 90% below 1990 levels by 2050

### *Greenhouse Gas Emission Regulations*

Regulations on Nova Scotia’s Large Final Emitters and economy-wide carbon pricing is essential for Nova Scotia to meet its legally-mandated 10% reduction target by 2020. Existing policies at both the federal and provincial levels will not only fail to reduce GHG emissions, but could also significantly increase GHG emissions before 2020 through the addition of fossil fuel generation that will be dirtier and more expensive than sustainable energy alternatives.

Well-designed, outcome-oriented, market-based regulations can move Nova Scotia towards the type of economy envisioned in the Environmental Goals and Sustainable Prosperity Act and Opportunities for Sustainable Prosperity by inducing companies to reduce wastes and costs, improve product quality and engage in product and process innovations.

In addition to economy-wide regulations, targeted government intervention in specific companies and sectors should accelerate, not impede, the transition towards a green energy future. We recommend the creation of an *Office of Sustainable Prosperity Strategy* to lead the transition both within and between sectors of the economy consistent with economy-wide carbon reduction policies.

The EAC recommends that the Climate Action Plan and Energy Strategy introduce immediate regulations for resource acquisition and new power supply, absolute GHG regulations on Nova Scotia Power Inc., and a carbon tax modelled after the tax that exists in Quebec, while aggressively negotiating inter-provincial GHG regulations.

Resource acquisition and new power supply regulations include a *loading order* to make cost-effective energy efficiency and renewable and distributed generation the resources of first choice. Regulations are also needed that prevent the building of new coal-fired power plants without the utilization of carbon capture and storage technologies and new biomass plants without sustainable harvesting practices.

To meet the interim 2012 and 2020 GHG reduction goals, the EAC recommends placing a cap on Nova Scotia Power's GHG emissions equal to their 1990 levels by 2012 and 10% below 1990 levels by 2020.

To provide an incentive for Nova Scotia companies to exceed their regulated caps and to provide economy-wide incentives a price must be placed on carbon through market-based regulations such as a carbon tax and/or cap and trade. As an initial "baby step" towards carbon pricing, the EAC recommends implementing a modest carbon tax of \$3/tonne of GHG emitted, modelled after the Quebec carbon tax. The revenue from the tax is best used to invest in all cost-effective non-electric energy efficiency and to bring Nova Scotia's sustainable transportation investment up to the Canadian average.

In addition to the modest carbon tax the government of Nova Scotia must urgently work with other provinces in Canada to implement a carbon price consistent with leading the energy sector towards low-GHG emissions, which the Intergovernmental Panel on Climate Change (IPCC) estimates to be \$20 to \$50 US per tonne of GHG.

### *Transportation*

Nova Scotia's transportation sector is the second largest source of GHG emissions in Nova Scotia. A comprehensive three-pillar approach is needed to reduce emissions in the transportation sector:

- Investments in sustainable transportation options;
- Incentives for energy efficient land use planning; and
- Requirements for fuel efficiency.

Given transportation's contribution to Nova Scotia's GHG emissions it is recommended that NS Energy take a leadership role in creating a home for sustainable transportation within the provincial government. Within this role, NS Energy would identify the modal split target and associated funding levels that will achieve Nova Scotia's greenhouse gas emissions reduction targets.

Nova Scotia's funding for sustainable transportation is significantly lower than other provinces. For example, in 2004 Nova Scotia funded urban transit to the tune of \$0.84/capita compared to the national average of \$21/capita.<sup>1</sup>

To provide the right incentives and opportunities for service delivery and mobility the EAC recommends pay-as-you-drive insurance and centralized transit information and carpool matching. The Climate Action Plan and Energy Strategy must incorporate energy efficient land use planning into the Municipal Planning Act, implement California vehicle emission standards, consider lowering speed limits and encourage rail freight transportation, which is not currently subsidized in the same manner as the trucking industry.

### *Energy Efficiency*

The Climate Change Action Plan and Energy Strategy must recognize energy efficiency as a cost-effective and abundant energy resource, and the first and lowest cost step to reducing emissions while also creating more jobs than any other form of energy development.

We encourage Nova Scotia to take a leading position in the development of multi-fuel energy efficiency strategies incorporating not only electricity, but other forms of fuel as well, including heating oil, wood, natural gas, combined heat and power, and on-site renewable energy generation, delivered through an independent Energy Efficiency Utility overseen by the NS Utility and Review Board and a public stakeholder collaborative. The efficiency utility must be made accountable for results through performance indicators and incentives/penalty provisions and funded through electric ratepayer investments and a small carbon tax.

A base assumption for electric energy efficiency is the levelling of load growth and load reduction of 1% a year starting in 2016. The Nova Scotia Utility and Review Board (UARB) must be ordered to prioritize investment in *all cost-effective* efficiency resources, with this level of savings as a base assumption to be tested against.

---

<sup>1</sup> Canadian Urban Transit Association. 2006. *Federal, Provincial and territorial Funding for Transit: A Compendium*.

As a component of a multi-fuel energy efficiency strategy we recommend the development of a combined heat and power (CHP) action plan that includes:

- The development of an encouraging standard interconnection policy for CHP and the implementation of an immediate and encouraging CHP feed-in tariff;
- An initial CHP study to estimate the potential savings and aid in long-term planning;
- Policies to ensure that CHP is deployed as a “bundled” service complementarily to natural gas deployment by mandating CHP and efficiency as components of natural gas distribution franchises;
- The full consideration of CHP as an eligible energy efficiency technology within energy efficiency portfolios such as those of the proposed Energy Efficiency Utility; and
- Demonstration and commercialization support for micro-scale CHP.

A comprehensive and integrated efficiency strategy should also consider on-site renewable energy as an efficiency improvement including: passive solar shelter design, solar water and air heating systems, solar electricity, biomass and biogas and on-site wind turbines.

In reference to solar hot water in particular the EAC is finding that information about renewable energy systems is necessary, but not sufficient to promote installation. We suggest consistent long-term incentives and new financing arrangements such as low-interest loans and municipal improvement charges to finance capital and/or the creation of a Solar Utility in Nova Scotia to sell thermal units so customers are not required to make capital investments.

While energy efficiency creates the most jobs per million dollar invested compared to other forms of energy, it also means that the largest challenge in quickly ramping up efficiency services will be finding and training qualified efficiency related service providers. The EAC strongly recommends the development and implementation of a comprehensive labour market strategy for energy efficiency.

Minimum efficiency standards must be immediately established and then reviewed over a 3-year period. The EAC recommends new standards for housing, buildings, appliances, equipments and lighting, point of sale standards, and energy and GHG labels.

### *Energy Poverty*

Eliminating energy poverty is a key component of a Contract for a Low-Carbon Future with Nova Scotians. The EAC supports policy that is aimed at alleviating unsustainable energy burdens in Nova Scotia through a combination of income increases, energy efficiency and targeted support.

We recommend introduction of a Universal Service Program for both electricity and home heating fuel to ensure against unsustainable energy burdens through fixed credits, emergency assistance and arrearage management and the establishment of a minimum

amount of funding in energy efficiency portfolios for programs that will be accessible to low-income Nova Scotians.

### *Renewable Energy*

While the natural potential for renewable energy is enormous, this natural abundance is hampered by prior support and subsidization of a fossil fuel based electricity system in Nova Scotia. Given that renewable energy is a resource for the future, we suggest that Nova Scotia's existing electricity system must operate and adapt to complement the development of renewable energy in Nova Scotia.

To achieve deep GHG reductions large scale hydro, carbon capture and storage and decentralized energy pathways are frequently considered. To promote local innovation, avoid risk and increase autonomy and security, the EAC recommends that Nova Scotia prioritize research, experimentation and development consistent with a decentralized energy (with energy storage) pathway, while also exploring Hydro Quebec imports and carbon capture and storage.

A decentralized energy pathways will require an independent system operator that will develop expertise in renewable energy balancing and energy storage solutions, a strategic and coordinated upgrading of transmission and distribution systems and community renewable energy resource centres.

Technology-specific feed-in tariffs that are also differentiated based on the potential for energy storage are considered to be necessary and proven to be very effective for achieving the legislated renewable energy goal, increasing the amount of renewable energy beyond that goal, and ensuring wide-scale community participation and rural economic revitalization through co-operative and local ownership.

### *Sustainable Energy Innovation*

Innovation and economic development is a major component of Sustainable Prosperity and a new Contract for a Low-Carbon Future. Innovation is imperative for Nova Scotia to follow a decentralized energy pathway.

R&D and deployment support investments in Nova Scotia should be consistent, or greater than, what is recommended in the *Stern Review on the Economics of Climate Change*. We estimate that low-carbon technology annual deployment support should be increased to \$24 million in 2015 and \$53 million 2025 and that annual R&D funding should be \$16.3 million.

Special consideration should be given to research and innovation projects to encourage energy storage, an appropriate carbon price and/or appropriate regulations can leverage R&D in carbon capture and storage and Nova Scotia's developing interest in ocean energy must maximizing experimentation with multiple technologies, in multiple locations, in cooperation with multiple research institutions.

We recommend the creation of a *Sustainable Prosperity Transitions and Training Division* within the Department of Labour to aid in labour market transitions and an *Office of Sustainable Prosperity Strategy* in the Department of Economic Development to develop sectoral strategies consistent with economy-wide carbon reduction policies.

### *Planning For Change*

Developing and implementing climate change adaptation strategies cannot be separated from prevention and mitigation strategies. The current and future risks facing Nova Scotia require that we start serious adaptation efforts immediately. Our adaptation strategy should be based on identifying risks, minimizing vulnerability and maximizing the resiliency and buffering capacity of our natural systems.

### *Governance*

Integration must be increased between government departments to implement carbon reduction policies effectively and in a way that establish a Contract for a Low-Carbon Future. This could occur through the establishment of *Sustainable Prosperity Officers* in each department.

We suggest that the Public Utilities Act be revised in light of the province's new economic and environmental goals and that an *Environmental Advocate* position be created to participate in Nova Scotia Utility and Review Board processes.

The action necessary to meet the province's environmental and economic goals will require a significant increase in resources for relevant government departments.

### *Forest Management & Carbon Storage*

Logging of intact forests is one of Canada's least recognized drivers of global warming, and can be a significant contributor of carbon dioxide. Pressures on Canada's forests for bioenergy are mounting, and can only be considered "green" if carbon sequestration, storage, and emissions are carefully balanced. The current use of clearcutting and the oversimplified methods proposed for the extraction of biomass fuels from forests threaten to negate any potential benefits bioenergy might have. If harvesting practices were more suited to the ecosystems of this region, harvesting biomass for fuel would be much more conceivable.

### *Conclusion*

We urge the Climate Action Plan and Energy Strategy to lay the framework for immediate policy implementation. One suggestion to move quickly towards action is to include draft regulatory and/or legislative language and budget recommendations.

***Please The Final Section for a List of Recommendations From Each Section.***

## PURPOSE & VISION

### A CONTRACT FOR A LOW-CARBON FUTURE IN NOVA SCOTIA

The sense of urgency has never been greater. Scientists and economists around the world are insisting that failure to achieve deep greenhouse gas reductions and failure to adapt to climate change impacts will have serious consequences for the economy, ecology and health of our society.

Canadians are now identifying the environment and climate change as their top concerns. In English Canada, Atlantic Canadians lead the pack in identifying environment as their top concern<sup>2</sup> and saying that all regions have equal responsibility to take strong action on climate change<sup>3</sup>.

This evidence suggests that the public is demanding leadership and action. In the public consultations on Nova Scotia's Climate Change Strategy the question of "if we would accept higher energy prices" was often asked. The answer to this question justifiably contains a level of nuance because environmental sustainability and the province's vision of Sustainable Prosperity recognize that the world is complex and governed by notions of fairness. Moving towards a low-carbon economy requires thinking of the entire social, economic and environmental system in Nova Scotia.

The EAC encourages the Climate Change Action Plan and Energy Strategy to make significant steps towards defining a *Contract For a Low-Carbon Future* with the people of Nova Scotia. Such a contract should recognize that energy prices might increase in a low-carbon economy, but that they must increase to avoid significant costs in the future and to create a new form of economic development that can bring benefits to our region in the 21<sup>st</sup> century.

A new contract needs to be established with the people of Nova Scotia that fully identifies how communities can participate. In addition to potentially higher energy prices, a contract with the people of Nova Scotia can implement the following principles:

- 1) Cut your Bills!  
*Provide opportunities for families and businesses to cut their bills through energy efficiency by making efficiency services as easy to access as energy supply is today*
- 2) Energy Revenues for Community Revitalization  
*Provide communities and companies operating in the province with opportunities for economic revitalization by becoming energy producers themselves through renewable and decentralized energy*
- 3) Energy as a Right  
*Ensure universal access to a reasonable amount of energy services by eradicating energy poverty in the province*

---

<sup>2</sup> Harris/decima National Poll conducted for ClimateforChange between August 15-21, 2007.

<sup>3</sup> Trudeau Foundation and Canada West Foundation Poll available at <http://www.trudeaufoundation.ca>

- 4) Full Accessibility to Services and Transport  
*Increase service accessibility through sustainable transportation and energy efficient land-use planning*
- 5) Just Transitions  
*Ensure a just, and accelerated, transition from old jobs to new for workers and their unions*
- 6) Sustainable Competitiveness  
*Create targeted sectoral strategies to make Nova Scotia's businesses the cleanest and most environmentally sustainable in the world*

These are just a few of the policies and practices that we believe are part of a *Contract for a Low-Carbon Future* in Nova Scotia. The EAC has been working with rural communities, low-income organizations, businesses and unions to help define this contract, but what is very much needed at this time is leadership from our government.

The creation of a climate change strategy for Nova Scotia that adopts the principles inherent in the *Environmental Goals and Sustainable Prosperity Act* (EGSPA) is an opportunity for the province to show leadership that will continuously accelerate Nova Scotia's transition towards a low-carbon economy.

## GOALS, OBJECTIVES & LONG-TERM PLANNING

The EAC supports the development of a Climate Change Action Plan and Energy Strategy that works towards meeting the long-term goal of the *Environmental Goals and Sustainable Prosperity Act* to “demonstrate international leadership by having one of the cleanest and most sustainable environments in the world by the year 2020.”

One aspect of “demonstrating international leadership” is the development of a plan that is consistent with the fundamental objective of the United Nations Framework Convention on Climate Change (UNFCCC), which is to avoid “dangerous” climate change. The UNFCCC also recognizes a principle of common but differentiated responsibilities. Industrialized regions have both an historic responsibility and a greater capacity to act compared to less developed nations.

The *Background Paper to Guide Nova Scotia’s Climate Change Action Plan* quotes the Intergovernmental Panel on Climate Change by stating that “scientists agree that if global temperatures increase more than 2 C it will mean the difference between being able to manage and adapt to climate change or being completely susceptible to the dangers of the weather events to come.”<sup>4</sup>

A recent briefing memo by the Canadian Department of Foreign Affairs and International Trade briefing highlighted the international recognition of 2 C as a critical threshold level of climate change.<sup>5</sup>

The *Environmental Goals and Sustainable Prosperity Act* (EGSPA) mandates the Government of Nova Scotia to demonstrate international leadership. The evidence clearly states that the Climate Change Action Plan and Energy Strategy must recognize the need to keep global warming under 2 C from pre-industrial levels in order to “demonstrate international leadership”.

The *Consultation Paper* provided discusses a target of reducing GHGs by 50% by 2050 from 1990 levels.<sup>6</sup> This target is the bare minimum of what is suggested to keep global warming below 2 C and it is a global target.

To “demonstrate international leadership” in its long-term planning, Nova Scotia, must explicitly recognize that the UNFCCC’s principle of common but differentiated responsibilities, which requires industrialized regions to make reduction targets commensurate with their historic responsibility and capacity to act. This means regions with higher per capita emissions; per capita wealth and share of historic responsibility for global warming will need to make deeper reductions than the global average.

---

<sup>4</sup> Climate Change in Nova Scotia: A Background Paper to Guide Nova Scotia’s *Climate Change Action Plan*, pg. 14.

<sup>5</sup> Dept. of Foreign Affairs and International Trade “Background – Limiting Global Climate Change to 2 C” May 1<sup>st</sup>, 2007, Document Released Under Access to Information Act.

<sup>6</sup> Consultation Paper: Nova Scotia’s Renewed Energy Strategy and Climate Change Action Plan, pg. 5

In a discussion of the global 50% reduction target by 2050, Sir Nicholas Stern suggests that industrialized nations must reduce further to follow basic principles of equity.<sup>7</sup>

Stern suggests that world average emissions must drop to two or three tonnes per person. The Nova Scotia background paper shows that the province's emissions are currently 24 tonnes per person, which is higher than the per capita average amongst industrialized regions. The equity principles of the UNFCCC and economic principles consistent with finding the lowest cost reductions in high per capita emitters, suggest that Nova Scotia should aim to reduce emissions to 2 tonnes per person. This is consistent with a 90% reduction below 1990 levels by the year 2050 for Nova Scotia.<sup>8</sup> This target is well within the range of 80-95% reductions below 1990 levels by 2050, which the IPCC suggests to stabilize GHG levels at 450 ppm CO<sub>2</sub>e.<sup>9</sup> A 90% reduction below 1990 levels by 2050 is consistent with Nova Scotia's higher per capita emissions and its legislative commitment to "demonstrate international leadership".

We would like to further note that the EGSPA 6(1) requires the Minister to conduct an annual review to the House of Assembly on the progress made towards achieving goals as well as "on the adequacy of the goals". We also emphasize the GHG reduction goal in clause 4(1) of the EGSPA is stated as a minimum, and is subject to change based on annual re-evaluations of the adequacy of the goals. This ability to change and adapt Nova Scotia's goals in order to demonstrate international leadership must be recognized in the long-term Climate Action Plan and Energy Strategy.

To meet the legislated goal to reduce GHGs by at least 10% below 1990 levels by 2020 we also recommend an interim target that will focus the attention of present-day policy makers and provide some assurance to the public that present-day political leaders are not making promises outside of their mandates.

Therefore, the EAC recommends that the Climate Action Plan also articulate a province-wide target to reduce GHGs to 1990 levels by the year 2012. This interim target is consistent with the New Brunswick Climate Change Action Plan, and can be made consistent with an appropriate emissions reduction pathway towards 90% reductions below 1990 levels by 2050.

---

<sup>7</sup> Sir Nicholas Stern "Bali – now the rich must pay: A fair and global effort to tackle climate change needs wealthy states to take the lead in CO<sub>2</sub> cuts", *The Guardian*, November 30<sup>th</sup>, 2007.

<sup>8</sup> Nova Scotia emitted 21 tonnes per person in 1990.

<sup>9</sup> The IPCC's analysis applied to stabilization of the atmospheric concentration of GHGs at 450 parts per million of carbon dioxide equivalent. This will be necessary to have a better than 50 percent chance of limiting average global warming to 2°C relative to the pre-industrial level. See Bill Hare and Malte Meinshausen, "How Much Warming are We Committed to and How Much can be Avoided?," *Climatic Change* 75, nos 1–2 (2006): 111.

In accordance with the preceding discussion, we suggest that the Nova Scotia *Climate Action Plan* articulate the following short-term and long-term province-wide, domestic GHG reduction goals:

- 1) Reduce GHGs to 1990 levels by 2012
- 2) Reduce GHGs, *at least*, 10% below 1990 levels by 2020
- 3) Reduce GHGs 90% below 1990 levels by 2050

We recommend these targets formally guide all future planning decisions in Nova Scotia. Through legislation and/or regulation the Climate Action Plan and Energy Strategy must require all long-term planning and scenario planning exercises within all government departments, government agencies and regulatory bodies such as the Nova Scotia Utility and Review Board to utilize these GHG reduction targets as their planning assumptions.

We further recommend that the Climate Action Plan and Energy Strategy outline specific sectoral targets and sectoral strategies for GHG reductions. We will outline some sector specific issues below.

## GREENHOUSE GAS EMISSION REGULATIONS

The EAC wishes to strongly communicate the need for the Nova Scotia government to introduce absolute, outcome-oriented regulations on GHG emissions from large industries. It is clear that the 10% reduction target, or more aggressive targets, cannot be met without the provincial government bringing forward regulations.

We support the development of regulations and sector-specific targets for all large final emitters in Nova Scotia, and carbon pricing for all sectors of the economy. For the purposes of this submission, we will concentrate much of our comments on the electricity sector due to its importance in reducing GHG emissions.

Nova Scotia Power's (NSPI) *Integrated Resource Plan* (IRP) has provided useful insights in the development of electric sector regulations and strategies. We wish to highlight four important points that stem from the EAC's analysis of Nova Scotia Power's IRP:

- 1) The IRP clearly showed that energy efficiency and renewable energy are extremely cost-effective options for Nova Scotia's electricity sector. The IRP recommended holding load growth flat through energy efficiency and doubling the existing mandatory renewable energy target. We note that the IRP did not adequately consider combined heat and power options, energy storage options, or the prospect for *reducing* load in the future through energy efficiency. We suspect that each of these options is likely very cost-effective in the context of the province's 10% reduction target.
- 2) The IRP also clearly demonstrated that GHG regulations commensurate with the province's GHG reduction target are necessary. The base assumption in the IRP, which attempted to track the current regulatory regime show NSPI's emissions remaining well above 1990 levels in the year 2020.
- 3) The IRP also conducted scenarios with 30% and 50% reductions below NSPI's 1990 levels by the year 2020. We note that the projected percentage rate increases in these more aggressive GHG reduction scenarios were close to the 28% increase in Nova Scotia's electricity rates that occurred between 2000 and 2006 alone, due to our dependence on global fossil fuel prices.
- 4) The IRP also stated that if plans for energy efficiency and renewable energy failed or were found to be "unachievable", the next most cost-effective generation addition would be to add **400 MW of coal-fired capacity** by 2016. We note that the base assumption required policies for both energy efficiency and renewable energy that are significantly more aggressive than the current policies of the government of Nova Scotia, and that deployment of aggressive energy efficiency is required in 2008 to remain consistent with the base plan.

The IRP thus points to both affordable solutions and the prospect for existing policies to not only fail to reduce GHG emissions, but to significantly increase GHG emission before 2020 through the addition of dirtier and more expensive fossil fuels.

We believe this situation calls for the introduction of both immediate emergency regulations and near-term economy-wide regulations. We would also note that

framework regulations as well as direct interventions in particular industries and sectors is warranted in Nova Scotia's context.

## **REGULATORY STRATEGY**

Implementing GHG regulations in Nova Scotia is critical to bringing the province into this century's economy. The Climate Change Action Plan should aim to create a regulatory regime that both improves environmental performance and induces new innovations to make Nova Scotia a leader in the "environmental economy".

Making Nova Scotia a leading jurisdiction in low-carbon innovations calls for stronger, not weaker, targets and regulations. Well-designed, outcome-oriented, market-based regulations induce companies to reduce wastes and costs, improve product quality and engage in product and process innovations according to Michael Porter, an internationally renowned expert in competition and corporate strategy from Harvard University.<sup>10</sup>

The EAC supports the development of regulations that will ensure we meet the minimum GHG reduction target through domestic action, while also providing market-based incentives for further GHG reductions.

Un-innovative business interests often attempt to frighten governments away from new regulations. However, history has shown that regulations have propelled innovations and increased profits in high value-added and innovative companies.

The EAC however acknowledges the potential for regulations to trigger transitions in the economy that can create macro and regional economic costs. The task for the Climate Action Plan and Energy Strategy and broader economic strategies in the province is to ensure that these transitions do not create disturbances that hinder long-term progress. Instead, the transition must become a tool for moving Nova Scotia towards the type of economy envisioned in the EGSPA and *Opportunities for Sustainable Prosperity*.

Regulations can be a tool to move Nova Scotia from older, inefficient and unproductive industries that will become liabilities in the long-term, towards the environmental economy industries emphasized in the government of Nova Scotia's economic strategy.

In the case that the implementation of regulations is expected to create significant difficulties for one industry or company, we emphasize that this does not provide a rationale for cancelling, delaying or weakening economy-wide regulations. If a company claims significant economic hardship due to regulations we recommend that the Climate Action Plan and Energy Strategy outline the following guidelines and principles to follow:

- 1) Regulations are an economic tool to reduce wastes and improve innovation and meet environmental goals.

---

<sup>10</sup> See Michael E. Porter & Claas Van Der Linde "Green and Competitive: Ending the Stalemate" in 1996 *On Competition* Boston: Harvard Business Review

- 2) Assessment of the significance of economic hardship to a company or industry that could have negative impacts on the Nova Scotian economy will be based in fact and evidence compiled by the government of Nova Scotia itself. The assessment of economic consequences of regulations on one company will come from information gathered by sectoral experts in the government of Nova Scotia.
- 3) Based on this information, the Government of Nova Scotia will work within existing sectoral strategies to reduce wastes and induce innovation to propel Nova Scotia towards a low-carbon economy.
- 4) The Government of Nova Scotia will consider beneficial and/or detrimental effects on the Nova Scotia economy based upon the strategies outlined in *Opportunities for Sustainable Prosperity*, *The Environmental Goals and Sustainable Prosperity Act*, and *Nova Scotia's Climate Change Action Plan* and the recommendations of the *Premiers Advisory Council on Innovation*.
- 5) The Government of Nova Scotia will promote beneficial labour market transitions and retraining of a company's existing workforce for re-employment in new sectors or companies
- 6) Nova Scotia employees will be provided with direct social supports, job transfer assistance, and skills upgrades in collaboration with labour unions in the event of plant or corporate closures that are deemed to occur as a result of greenhouse gas reduction and economic transition policies.

These guidelines are meant to ensure that Nova Scotia's economic and climate change policies include both framework-oriented policies, while maintaining adaptive capacity in the economy and targeted support where necessary to propel the province towards Sustainable Prosperity. We recommend that a new *Office of Sustainable Prosperity Strategy* be created within the Department of Economic Development to create ongoing sectoral strategies to accelerate, not impede, the transition towards a low-carbon future and implement targeted support for specific sectors and/or companies.

The Climate Change Action Plan and Energy Strategy must strongly reject the "intensity-based" regulatory approach of the federal government. These regulations will only reduce emissions if the intensity target is aggressive enough to outstrip increases in output. This approach creates significant uncertainty as to whether GHG reduction goals will be reached and could see the Nova Scotia government violating its own *legally mandated* absolute GHG reduction target. Nova Scotians clearly do not desire this regulatory approach as demonstrated in a Global National Poll reported on May 12<sup>th</sup>, 2007, which found that Atlantic Canadians were the least supportive of the federal Conservatives plan to tackle climate change.<sup>11</sup> Nova Scotia has a responsibility to oppose "intensity-based" regulatory measures because they could contribute to ever-increasing emissions in other jurisdictions and their GHG pollution effects Nova Scotia because it affects the global atmosphere.

"Intensity-based" standards or regulations that utilize life-cycle accounting mechanisms could require a complete revision of international GHG accounting. They would thus fail

---

<sup>11</sup> Only 30% of Atlantic Canadians approved of the Conservative Plan to Tackle Climate Change. The lowest region in the country. Reported May 12<sup>th</sup>, 2007.

to work within existing international conventions and the regulatory framework of other jurisdictions. “Intensity/performance” policies that affect the price at the point of consumption would place the entire responsibility for emissions reductions on consumers, which is likely to not lead to the forms of industrial innovation the Nova Scotia government is seeking to encourage because of market failures being more pronounced at the individual consumer level than at the level of production.

The government of Nova Scotia and the province’s Climate Action Plan and Energy Strategy should not take “intensity-based” regulatory proposals seriously and should instead join with other provinces and countries that are introducing absolute, market-based regulations to reduce emissions.

## **REGULATORY PROPOSALS**

Below EAC will outline proposals for both specific regulations and the creation of a longer-term regulatory framework to be developed in cooperation with other provincial governments.

### **Immediate Regulations for Resource Acquisition and New Power Supply**

Regulations on new power supply and resource acquisition are actions that Nova Scotia can implement immediately to diminish load growth and ensure new energy resources are procured in a responsible manner.

#### Loading Order

We recommend that the Climate Change Strategy legislate a “loading order” for energy resources that will guide decisions of government agencies and the Utility and Review Board, modelled after practices in the state of California.<sup>12</sup> The recommended loading order is aimed to ensure that all cost-effective, clean and reliable energy options are fully considered in Nova Scotia. The suggested loading order is:

- 1) First, optimize all strategies for increasing conservation and energy efficiency to minimize electric demand, and the demand for other regulated fuels (e.g. natural gas).
- 2) After cost-effective efficiency and demand reduction, meet needs through renewable energy resources and distributed generation, including combined heat and power applications.
- 3) To the extent that efficiency, demand reduction, renewable resources and distributed generation are unable to cost-effectively satisfy energy and capacity needs, support clean and efficient fossil fired generation.
- 4) Simultaneously improve electric transmission grid and distribution facility infrastructure to support growing demand centres and the interconnection of new renewable end distributed generation. This includes measures to support renewable energy load following and energy storage.

---

<sup>12</sup> 2003 California Energy Action Plan

We recommend that cost-effective resource allocation be determined through a 3-year *Integrated Resource Planning* process that will include the societal costs and benefits.

### Coal

We believe it is prudent for the Nova Scotia to develop permitting rules for possible new coal-fired power plants to prevent new plants burdening electricity customers with a legacy of financial liability for carbon costs. We propose that coal plant siting or emission rules incorporate the following restrictions prior to granting a permit or awarding a contract:

- A New Coal Unit – must have an equal or lower rate of GHG emissions than a natural gas combined cycle power plant from commencement, through its operational lifetime to its decommissioning.
- A Coal Unit Re-powered, Refurbished or Replacing an Existing Coal Unit – must demonstrate the legal, technical and economic likelihood that it will achieve, within 10 years of becoming operational, a GHG emission rate equivalent to the emissions profile of an Integrated Gasification Combined Cycle (IGCC) unit employing carbon dioxide capture and storage. Demonstration must be specific as to expected locations and economics of carbon dioxide transportation and storage. Replacement units must not commence operation until an equivalent or greater capacity of old unit(s) ceases operation.
- Existing and New Coal Units – should have permit requirement or fall under emissions control programs that severely limit emissions of sulphur dioxides, nitrogen oxides, and mercury and also require proper handling and disposal of solid and other facility waste.

We believe this regulation is necessary in the immediate future to prevent the scenario of 400 MW of new coal fired generation considered in Nova Scotia Power's Integrated Resource Plan. We believe this regulation will concentrate attention on creating an effective and aggressive energy efficiency program. It is also likely to induce private sector research and development of carbon dioxide capture, transportation and storage technologies.

### Nuclear Power

The building of a nuclear power plant remains illegal in Nova Scotia and we strongly support maintaining this standard. We further recommend that Nova Scotia advocate the suspension of new or refurbished nuclear power plants in the region until the problems of non-proliferation, protection from domestic attack, life-cycle GHG emissions, and permanent waste storage have been adequately addressed.

Therefore the government of Nova Scotia should refuse to support policies, practices, or indirect subsidies to support the development of nuclear power in neighbouring jurisdictions. We recommend that the Climate Action Plan and Energy Strategy for Nova Scotia recommend the phasing out of existing nuclear power plants within the region's energy system and support replacing their generating capacity with increased investments in energy efficiency, renewable energy and some new fossil fuel generation with carbon capture and sequestration.

## Biomass

To achieve carbon neutrality, all new biomass power plants must meet the following prerequisites:

- Disqualify unsustainably harvested biomass, as defined by broad stakeholder participation focused on achieving ecosystem health and resilience.
- Establishing sustainable land management and harvest requirements associated with natural resource and carbon preservation through Forest Stewardship Council certification or best management practices for agriculture.
- Removal of contaminated material from demolition and wood waste
- Setting best practice air emissions standards for biomass production and combustion
- Establishing waste disposal requirements

Please see the Forest Management and Carbon Storage section for further elaboration on the importance of sustainable forest practices for biomass generation, carbon storage, biodiversity and adaptation.

## **Immediate GHG Regulations**

The EAC recommends the establishment of immediate short-term GHG reduction targets that will lead to meaningful action for all sectors of the economy.

Nova Scotia Power Inc. (NSPI) is responsible for 42% of all GHG emissions in the province. Given the large emissions from NSPI the bulk of cost-effective GHG reductions to meet any target will come from Nova Scotia's electricity sector. In addition, a principle of fairness requires that the electricity sector contribute to a reduction equivalent to the overall GHG reduction target for Nova Scotia as a minimum.

In Nova Scotia's context mandating absolute, minimum GHG reductions from the electricity sector, in a similar fashion to existing air emission regulations, is warranted because they will mirror the reductions that would result from implementation of a larger market-based regulatory framework. Mandating absolute caps on the emissions from NSPI is necessary to ensure Nova Scotia complies with its legally mandated GHG reduction target.

Reductions from NSPI must be domestic to meet the GHG reduction goal in the EGSPA. We recommend against allowing NSPI to purchase offsets internationally, in Canada or within Nova Scotia to meet its regulated cap, but recommend that emissions reductions that result from the recycling of waste heat from thermal power plants (e.g. district heating systems) be counted as a compliance measure.

We therefore recommend that immediate GHG regulations be placed on NSPI that require:

- 1) NSPI's GHG emissions to be reduced to 1990 levels by 2012 (cap of 6.9 Mt)  
*This reduction target could see the bulk of the suggested 2012 province-wide reduction target being met through reductions in the electricity sector. We believe this reduction target is feasible given the massive drop towards 1990 levels that occurred in 2002 as a result of emissions decreases from the electricity sector. Mandating this target immediately will allow NSPI to find the most cost-effective options available – including energy efficiency, fuel switching, renewable energy and combined heat and power.*
  
- 2) NSPI's GHG emissions to be reduced 10% below 1990 levels by 2020 (cap of 6.2 Mt)  
*This sector specific target would likely require significant GHG reductions to also occur in other sectors. We emphasize this as a minimum target that would not preclude further reductions from NSPI that would occur as a result of market-based regulatory mechanism.*

For other Large Final Emitters, the EAC recommends that the Climate Action Plan and Energy Strategy establish a comprehensive geographic, sectoral, and facility-specific inventory for existing industrial sectors and their processes to implement specific regional and sectoral strategies for Sustainable Prosperity, including the establishment of short-term and long-term GHG reduction regulations for the remaining Large Final Emitters in Nova Scotia.

We recommend the establishment of “corporate account managers” and “sectoral specialists” that will work within an *Office of Sustainable Prosperity Strategy* who will have detailed knowledge and a working relationship with specific sectors, industries and facilities aimed at improving efficiencies, reducing wastes and experimenting with new low-carbon technologies to help define command and control regulations on other industries.

### **Immediate Market-Based Regulations**

The EAC believes the Nova Scotia government must move swiftly to introduce market-based GHG regulations that will provide an incentive for further GHG reductions in regulated sectors. Such regulations will ensure that Nova Scotia meets or exceeds its GHG reduction target in the most cost-effective manner possible by placing a price on carbon emissions.

As an initial “baby-step” towards carbon pricing, we recommend that the 2008 budget introduce an preliminary modest carbon tax of \$3/tonne of GHG emitted. The carbon tax price is modeled after the Quebec carbon tax rate.

We recommend a carbon tax because it is relatively easier to administer than cap and trade or offset systems and ease of administration is an important factor for a province

such as Nova Scotia. A preliminary carbon tax at such a modest rate will also have no significant effect on end-users of energy, because producers might not pass the costs onto consumers and reducing consumption can easily offset the added price.<sup>13</sup>

This suggested carbon price is unlikely to induce significant behaviour change or innovation in industrial sectors. It will however be an introductory step that could start inter-provincial negotiations for carbon pricing and be combined with the Federal Government's proposed regulatory framework or provincial equivalency regulations.

Indeed, the primary intent of the modest carbon tax suggested is to raise revenue for emission-reduction activities in Nova Scotia. We recommend that the carbon tax be utilized to fund long-term, cost-effective measures to reduce GHGs to prepare Nova Scotia for a low-carbon economy. High priority areas include non-electric energy efficiency and sustainable transportation (see efficiency and transportation strategies below for details).

We recommend that the annual carbon tax rate be set at whichever is higher of either \$3/tonne of GHG or the revenue required to invest in all cost-effective non-electric energy efficiency and to bring Nova Scotia's sustainable transportation investments up to the Canadian average. The amount of the carbon tax could then be gradually increased based on efficiency and transportation program administration ramp-up.

The funds collected from the carbon tax should be placed in a separate fund that is legislatively protected from becoming general funds of the province. Utilization of the funds should follow criteria related to achievement of cost-effective GHG reductions, long-term GHG benefits, and social benefits and be overseen by an environmental auditor and/or the environmental roundtable outlined in the EGSPA.

As mentioned, the modest carbon tax proposed for immediate implementation does not provide the carbon price signal necessary to induce the deployment of low-carbon technologies. For example, the government of Nova Scotia has expressed an interest in carbon capture and storage (CCS) technology as a means to control emissions. According to the IPCC's Special Report on Carbon Dioxide Capture and Storage (Summary for Policymakers, 2005) "CCS systems begin to deploy at a significant level when CO<sub>2</sub> prices begin to reach approximately 25-30 US\$/tonne of CO<sub>2</sub>". As a small province, it is therefore imperative that Nova Scotia takes a leadership position in the negotiation of higher carbon prices with other provinces and potentially the federal government.

The Climate Action Plan and Energy Strategy should express the Government of Nova Scotia's immediate intention to urgently work with other provinces in Canada to implement a carbon price consistent with leading the energy sector towards low-GHG emissions by implementing a real or implicit price of \$20 to \$50 US per tonne of GHG, sustained or increased over decades. These prices are consistent with the 2007 Mitigation

---

<sup>13</sup> We estimate that an average electricity customer can recoup the "cost" of a \$3/tonne carbon tax by replacing 2 incandescent light bulbs with compact fluorescents.

Report of the Intergovernmental Panel on Climate Change.<sup>14</sup> The recommended carbon-pricing schedule for Canada is \$30/tonne of GHG by 2009 and at least \$50/tonne of GHG by 2020.<sup>15</sup> If delays are experienced higher carbon prices might be required.

### **Inter-Provincial or Federal Market-Based Regulations**

Nova Scotia is a small province with environmental goals that are currently more ambitious than those of the federal government. This situation highlights the need for Nova Scotia to find allies in other jurisdictions that are also committed to reducing GHGs.

An opportunity exists for Nova Scotia to work with other provinces to introduce regulations on large final emitters because a number of provinces have committed to the same, or more aggressive, targets than Nova Scotia. Below is a table showing the commitments of other provinces in Canada.

**Table: Greenhouse Gas Reduction Targets in Various Canadian Provinces**

	<b>Reductions by 2012</b>	<b>Reductions by 2020</b>
<b>British Columbia</b>		10% below 1990 levels
<b>Manitoba</b>	6% below 1990 levels	
<b>Ontario</b>		15% below 1990 levels
<b>Quebec</b>	6% below 1990 levels	
<b>New Brunswick</b>	1990 levels	10% below 1990 levels
<b>New England Governors and Eastern Canadian Premiers</b>		10% below 1990 levels

Given this situation, the Climate Action Plan and Energy Strategy should actively support the negotiation of inter-provincial or federal GHG regulations. We recommend that provinces work towards the implementation of market-based regulations such as a carbon tax or cap and trade system.

Government staff resources need to be dedicated towards championing provincial negotiations through multi-lateral and bi-lateral discussions amongst Premiers and governments and the championing of inter-provincial regulations at forums such as the Council of the Federation and the Conference of the New England Governors and Eastern Canadian Premiers.

Inter-provincial, or federal, regulatory policies should introduce a carbon price of \$30 by 2009 and \$50 by 2020. These are currently the minimum carbon prices that are suggested to be necessary for Canada to make GHG cuts that are commensurate with avoiding 2 C of warming.

Nova Scotia’s negotiating position should be based on meeting the legislatively mandated GHG reduction goal and going farther to “*demonstrate international leadership by*

<sup>14</sup> Working Group III contribution to the Intergovernmental Panel on Climate Change Fourth Assessment Report *Climate Change 2007: Mitigation of Climate Change* Summary for Policymakers, pg. 29

<sup>15</sup> Big Steps Forward: Green Budget Coalition Recommendations for Budget 2008

having one of the cleanest and most sustainable environments in the world by the year 2020”<sup>16</sup>, and should emphasize the following:

- 1) Nova Scotia’s high per capita emissions mean that it also has some of the most cost-effective potential to reduce GHG emissions
- 2) Nova Scotia’s economic strategy is to encourage the development of environmental industries, instead of GHG-intensive industries
- 3) Nova Scotia will require financial resources to exceed its environmental goals.

This negotiating position is akin to presenting a business case to the rest of Canada because of our low-cost GHG reduction potential. In many cases, it will be less costly for other jurisdictions to fund GHG reductions in Nova Scotia than for them to search for high-cost GHG reductions in their own jurisdiction.

Thus, the EAC is suggesting the following priority areas for inter-provincial GHG regulations

- 1) In the event of a cap & trade regulatory system, strong criteria and oversight must exist to ensure all GHG reductions are additional (i.e. would not have occurred otherwise).  
*GHG reductions in Nova Scotia’s fossil fuel based electricity system are likely to be highly additional due to the low price of coal-fired electricity in the absence of internalization of environmental externalities. This position will ensure that Nova Scotia receives adequate credit for deeper GHG reductions.*
- 2) The citizens of Nova Scotia should receive benefit from valorized GHG reductions or GHG reduction rents.
  - a. In the event of a cap and trade system, the Nova Scotia government must auction all pollution permits
  - b. In the event of a nationwide carbon tax, Nova Scotia must receive all the carbon tax revenue collected in the province of Nova Scotia and potentially more, due to the added social, environmental and economic development benefits associated with “revenue recycling” towards areas that help meet important objectives related to regional equality, economic diversification, and exploitation of the most cost-effective GHG reduction opportunities.

To “demonstrate international leadership” Nova Scotia must indicate its intention to agree to more aggressive GHG goals to be consistent with avoiding two degrees Celsius of warming above pre-industrial levels. If the federal government refuses to implement regulations consistent with this benchmark, Nova Scotia’s EGSPA requires the government of Nova Scotia to “demonstrate international leadership” by championing the development of regulations with as many jurisdictions as possible that are consistent with avoiding the 2° C of warming threshold.

---

<sup>16</sup> Environmental Goals and Sustainable Prosperity Act

# TRANSPORTATION

## OVERVIEW

Nova Scotia's transportation sector is the second largest source of GHG emissions in Nova Scotia, however this sector receives little attention in the consultation paper. To meet Nova Scotia's goal of reducing emissions 10% below 1990 levels by 2020, and subsequent more stringent goals, substantial emissions reductions are needed in all sectors.

A comprehensive three pillar approach to transportation is needed including:

- Investments in sustainable transportation options;
- Incentives for energy efficient land use planning; and
- Requirements for fuel efficiency.

As the discussion paper stands, only fuel efficiency is addressed through reference to biofuel and vehicle efficiency. Sustainable transportation - transit, carpooling, carsharing, vanpooling, van shuttles, walking, cycling, intercity bus and rail - are more energy efficient than driving alone. However, no reference is made to these modes in the document.

This approach is inadequate because increases in travel distance will outstrip increases in fuel efficiency. Fuel efficiency needs to be aggressively complemented with initiatives to manage demand for fuel, vehicles and travel; this approach is called transportation demand management (TDM). Two key components of TDM are providing attractive sustainable transportation options that are competitive with driving alone and promoting energy efficient community design.

## INVESTMENTS IN SUSTAINABLE TRANSPORTATION OPTIONS

### Home for Sustainable Transportation

Recommendation 1: NS Energy take a leadership role in creating a home for sustainable transportation within the provincial government

Given transportation's contribution to Nova Scotia's GHG emissions it is recommended that NS Energy take a leadership role in creating a home for sustainable transportation within the provincial government. This would require substantially increased staff capacity in this area; particularly employees with strong land-use planning and transportation demand management skills.

Currently there is no home for sustainable transportation within the provincial government, although several departments have interest in various aspects of the topic. For example, Service Nova Scotia and Municipal Relations funds the Community Transportation Assistance Program (CTAP), Transportation and Infrastructure Renewal funds roads and Health Promotion funds trail development. Other relevant departments include Community Services, Education, Environment and Health.

There is a need for NS Energy to provide a coordinating role amongst all stakeholder departments. As well, there is a need for NS Energy to establish a Sustainable Transportation and Land-Use Advisory Committee made up of relevant non-governmental stakeholders, such as transit, van, cycling, rail, intercity bus service providers and users.

Most importantly, NS Energy must identify the modal split target and associated funding levels that will achieve Nova Scotia’s greenhouse gas emissions reduction targets (see Funding Targets and Modal Split Target sections below).

**Funding Targets**

Recommendation 2: Create an annual predictable source of sustainable transportation funding - including, transit, carpooling, carsharing, vanpooling, van shuttles, walking, cycling and intercity bus and rail - comparable to the national average (e.g. \$21/capita for transit)

Fuel prices are on the rise. As prices increase Nova Scotians’ will increasingly look for relief. Fuel price regulation and other proposals to decrease the cost of fuel, such as reducing the fuel tax, will provide at best temporary relief in the face of steadily increasing prices.

Investment in more sustainable modes has the dual benefit of reducing emissions and increasing accessibility. Seniors, youth, low-income earners, those with physical and mental challenges constitute about 30% of Nova Scotia’s population.<sup>17</sup> Their quality of life would be increased with greater access to employment, education, stores, health and social opportunities. For example, in the Strait Area, three of the top four barriers to employment are related to a lack of transportation.<sup>18</sup>

Nova Scotia’s funding for sustainable transportation is significantly lower than other provinces. For example, in 2004 Nova Scotia funded urban transit to the tune of \$0.84/capita compared to the national average of \$21/capita.<sup>19</sup> Therefore, it is recommend that the NS Energy create an annual predictable source of sustainable transportation funding - including, transit, carpooling, carsharing, vanpooling, van shuttles, walking, cycling and intercity bus and rail - comparable to the national average.

Such a schedule for public transit funding could be as follows:

<b>Year</b>	<b>Funding/Capita</b>	<b>Total Funding</b>
2009	\$10	\$9,260,000
2011	\$15	\$14,040,000
2013	\$20	\$18,720,000

<sup>17</sup> Transport 2000 Atlantic.

<sup>18</sup> Richmond County Literacy Network, 2004. *Barriers to Employment in Richmond County*. p. 27.

<sup>19</sup> Canadian Urban Transit Association. 2006. *Federal, Provincial and territorial Funding for Transit: A Compendium*.

Additional funding schedules for other sustainable modes need to be identified.

A carbon tax could be used to fund sustainable transportation initiatives. Quebec identified the amount of funding needed to meet its transportation goals - \$200 million - and adjusted the carbon tax to ensure this revenue would be raised. The EAC has recommended that a \$3/tonne carbon tax, modelled after Quebec, to fund sustainable transportation and non-electric energy efficiency.

In Halifax, the premium MetroLink service charges users a higher fare; monthly MetroLink passes cost \$75 versus \$60 for a regular pass. The experience of the MetroLink confirms that cost is not a major barrier to transit use for a portion of the population. Indeed, citizens are willing to pay more for a quality service that offer travel time and comfort comparable to driving alone.

British Columbia, Quebec and Alberta fund transit through gas tax revenue: \$0.12/L, \$0.015/L and \$0.05/L respectively. Victoria received provincial permission to collect \$0.025/L which raised 12% of their total transit costs in 2005/06. Similarly, Quebec allocates \$30 from each licensing fee in the Montréal Area to transit.<sup>20</sup>

It is important to consider the implementation timing of initiatives that could result in consumer price increases. Ideally substantial investment in sustainable transportation modes will be made prior to or at the same time as any potential increases in consumer costs. Similarly, initiatives that will result in fuel price increases need to be complemented by opportunities for consumers to save money. For example, the implementation of Pay-as-You-Drive insurance may be a strong complement to fuel price increases (See Pay-as-you-Drive Insurance section below).

### **Modal Split Targets**

Recommendation 3: Conduct an analysis of what modal split models achieve Nova Scotia's GHG emissions reduction target within the transportation sector.

A modal split is a breakdown of how a given population travels. Statistics Canada collects information on how citizens travel to work in the Census. Nova Scotia's modal split for commuting is skewed heavily in favour of driving alone. It is recommended that NS Energy conduct an analysis of the modal split model that will achieve Nova Scotia's GHG emissions reduction target. An example of potential modal split targets follows:<sup>21</sup>

---

<sup>20</sup> Canadian Urban Transit Association. 2006. *Federal, Provincial and Territorial Funding of Urban Transit in Canada: A Compendium*.

<sup>21</sup> Statistics Canada. 2001. *2001 Canadian Census*. Journey to Work Data.

Year	Drive Alone	Carpool	Transit	Walk	Cycle	Rail
2001	85%	n/a	5%	8%	1.0%	0%
2012	71.5%	10%	7%	10%	1.5%	0%
2018	63%	12%	9%	12%	2.0%	2%
2021	55%	12%	14%	13%	2.0%	4%

In this scenario the percentage of commuters driving alone decreases 30% by 2021. Nova Scotia’s actual targets will depend on the public’s interest in trying more sustainable modes and thus on the viability of various modes, projected changes in community form and projected improvements in fuel efficiency. Please note that these data only reflect journey to work data. Ideally, Nova Scotia could create modal split targets for all passenger trips.

Creating modal shifts towards more sustainable modes requires investment in high quality options. An excellent Canadian example of providing viable sustainable transportation options is found in the Halifax Regional Municipality (HRM). Metro Transit received funding from Transport Canada, HRM and the province to develop a bus rapid transit service. The MetroLink service provides a high quality service that is competitive with driving alone in terms of time, cost and comfort. Metro Transit surveys indicate that 30% of Link passengers formerly drove alone.

A modal shift in the order of 30% is dramatic and signals a tremendously successful project. These passengers could drive alone but choose not to because of the quality of the alternative. This is the level of service that the provincial government needs to provide and/or incent to create substantial emission reductions in the transportation sector.

The bus rapid transit model may provide a model for other communities in Nova Scotia. In *Heat*, George Monbiot describes his vision for an inter-community coach system in England that would use sections of dedicated lane and signal prioritization to create high speed travel between communities. As well, the buses would stop at stations located on the periphery of communities rather than in the centre to reduce travel distance.<sup>22</sup> If a coach, van and/or rail initiative, of the quality of the MetroLink were implemented throughout the province, Nova Scotia would be regarded internationally as an environmental leader.

<sup>22</sup> Monbiot, George. *Heat*. A New Transport System. p. 150

## Pay-as-You-Drive Insurance

Recommendation 4: Explore options to work with the insurance sector to offer Pay-as-you-Drive insurance to Nova Scotians.

The purchase of a car and insurance represent fixed costs. A typical motorist spends almost as much on insurance as on fuel. It is the largest vehicle cost for many lower-income motorists.<sup>23</sup>

Fixed costs are an incentive to drive more as each trip reduces the per kilometre fixed cost. PAYD gives consumers a way to save money by returning to individual motorists the insurance cost savings that result when they drive less. Motorists who continue their current mileage would be no worse off on average than they are now, while those who reduce their mileage save money. As a result, consumers benefit overall.<sup>24</sup>

British Columbia is exploring this concept. In 2005 the Vancouver City Council and the Greater Vancouver Regional District passed resolutions asking the Insurance Corporation of British Columbia, which provides basic liability coverage for all vehicles in the province, to offer PAYD pricing. In 2003 Oregon passed a bill that provides a \$100 per policy tax credit to insurers that offer PAYD pricing. In 2001, Texas gave insurers permission to offer cents-per-mile pricing for vehicle insurance.<sup>25</sup>

Several insurance agencies are piloting or testing PAYD pricing. For example, Norwich Union in the UK has run a PAYD pilot project.<sup>26</sup> Under this scheme, PAYD is sold as an inexpensive way to maintain a second or third vehicle. However, this 'loophole' could be addressed by allowing it to be applied only to a family's primary vehicle.

General Motors and On Star offer mileage based discounts in some states. The system automatically reports vehicle odometer reading at the beginning and end of the policy term to verify vehicle mileage. The following is the discount schedule:

<b>Miles</b>	<b>Discount</b>
1-2,500	40%
2,501-5,000	33%
5,001- 7,500	28%
7,501-10,000	20%
10,001-12,500	11%
12,501-15,000	5%
15,001-99,999	0%

<sup>23</sup> Victoria Transport Policy Institute. *Online TDM Encyclopedia*. September 4, 2007. <http://www.vtpi.org/tdm/tdm79.htm>

<sup>24</sup> Victoria Transport Policy Institute. *Online TDM Encyclopedia*. September 4, 2007. <http://www.vtpi.org/tdm/tdm79.htm>

<sup>25</sup> Victoria Transport Policy Institute. *Online TDM Encyclopedia*. September 4, 2007. <http://www.vtpi.org/tdm/tdm79.htm>

<sup>26</sup> Norwich Union. Retrieved December 13, 2007. <http://www.norwichunion.com/pay-as-you-drive/>

It is recommended that the NS Energy explore options to work with the insurance sector to offer PAYD insurance to Nova Scotians.

### **Centralized Information**

Recommendation 5: Create a central transportation website including schedules, rates and routes

An important aspect of promoting sustainable transportation is to facilitate intermodal connectivity - moving from one type of transportation to another. Intermodal connectivity has a variety of aspects including scheduling, physical location, and planning. It is recommended that the NS Energy create a centralized transportation website where schedules, rates and routes for transit, carpooling, rail, intercity coach, van shuttles and cycling can easily be navigated both by citizens and tourists.

### **Carpool Matching**

Recommendation 6: Fund and promote a province-wide carpool-matching site. HRM is currently in the process of launching such a site, creating potential partnership opportunities

Given the high rate of driving alone in Nova Scotia, it is logical than carpooling may be the easiest mode to transition to sustainable transportation. A key tool for creating matching is an online carpool matching website. The success of such a website is highly dependent on promotion and having a large pool of applicants. Currently, citizens try to find partners through informal methods such as notice boards or by using one of several generic carpool sites. It is recommended that the NS Energy fund and promote a province-wide carpool matching site. HRM is currently in the process of launching such a site, which creates an opportunity for partnership.

## **INCENTIVES FOR ENERGY EFFICIENT LAND USE PLANNING**

### **Municipal Planning Act**

Recommendation 7: Develop a provincial transportation statement of interest for inclusion in the Municipal Act that provides for the incorporation of transportation efficiency in land-use planning

Recommendation 8: Work with municipalities to coordinate provincial transportation infrastructure decisions with municipal plans

Sustainable transportation is integrally linked to and dependent on energy efficient land-use planning. Compact, mixed-use communities make sustainable modes of transportation such as transit, walking and cycling more feasible and attractive. However, Nova Scotia's urban density diminished by 36% between 1971 and 1996 – one of the sharpest declines in the country.<sup>27</sup> It is projected that increases in vehicle and fuel efficiency will be outweighed by increases in distances traveled as urban sprawl continues.

---

<sup>27</sup> GPI Atlantic. 2006. *The GPI Accounts: Sustainable Transportation in Nova Scotia*. p. 249.

Smart growth is an approach to community planning that developed in the 1990s in reaction to suburban sprawl. Density and mixed use are two important components of smart growth; other smart growth principles include:

- Directing development toward existing communities
- Mixing land uses
- Creating a range of housing opportunities and choices
- Taking advantage of compact building design
- Creating walkable neighbourhoods
- Providing a variety of transportation choices
- Preserving open space, farmland, natural beauty and critical environmental areas
- Making development decisions predictable, fair and cost effective
- Fostering distinctive, attractive communities with a strong sense of place
- Encouraging community and stakeholder collaboration.<sup>28</sup>

In combination, these approaches can result in communities that have a smaller environmental footprint, healthier citizens and a vibrant local economy.

It is recommended that NS Energy develop a provincial transportation statement of interest for inclusion in the Municipal Act that provides for the incorporation of transportation efficiency in land-use planning. As well, that NS Energy work with municipalities to coordinate provincial transportation infrastructure decisions with municipal plans. Both of these recommendations were included in the 2001 Energy Strategy.

### **Tax Incentives**

Recommendations 9: Explore options such as: introducing tax on greenfield development, providing tax incentives or rebate for vacant or underused buildings and implementing a vacant lands tax

It is recommended that NS Energy undertake a study to identify and prioritize a range of regulatory and policy changes that the provincial government can implement to facilitate smart growth planning at the municipal level. For example, it is recommended that NS Energy explore options such as: introducing a tax on greenfield development, providing tax incentives or rebate for vacant or underused buildings and implementing a vacant lands tax.<sup>29</sup> Such initiatives could reinforce efforts to promote smart growth at the municipal level, consequently making sustainable transportation more viable.

---

<sup>28</sup> Smart Growth Online. 2007. *About Smart Growth*. <http://www.smartgrowth.org/about/default.asp>

<sup>29</sup> National Roundtable on Environment and Economy. 2003. *Environmental Quality in Canadian Cities: The Federal Role*. P. 80-81

## **REQUIREMENTS FOR FUEL EFFICIENCY**

### **California Vehicle Efficiency Standards**

Recommendation 10: Support the implementation of California-like vehicle emission standards

Specific references to California-like vehicle emission standards, as stated in the recent *Nova Scotia Environmental Goals and Sustainable Prosperity Act*, are not included in the document. This strategy provides an excellent opportunity to reinforce Nova Scotia's vehicle efficiency commitment.

In addition to substantial GHG emission reductions, the David Suzuki Foundation calculated that the implementation of such standards would benefit consumers. While the upfront cost of a vehicle would increase \$400 to \$1,200, the savings in fuel costs over the life of a vehicle would be \$3,500 and \$5,000.<sup>30</sup>

### **Biofuel**

Recommendation 11: Promote the use of underused farmland to local food production, not biofuel crops.

It is stated that 40,000 hectares of farmland in Nova Scotia are underutilized and therefore may provide an opportunity for growing plant matter to be used for biofuel. However, as Nova Scotians' currently only get approximately 8% (down from 14% in 1991) of their food from local sources it is recommended that underused farmland is allocated to local food production.<sup>31</sup> This would have the added benefit of reducing the GHG emissions from importing food.

### **Speed Limits**

Recommendation 12: Assess the feasibility of lowering speed limits in partnership with NS Department of Transportation and Infrastructure Renewal

Driving at higher speeds consumes more fuel and results in greater emissions which contribute to climate change. The speed limit on twinned highways (110 km/h) is higher than on other highways (90km/h). The numbers are surprising: driving at a 110km/h consumes 15% more fuel than driving at 90km/h. The Energy and Materials Research Group at Simon Fraser University identified reducing speed limits as the single most important action that provinces in the Atlantic region could take to reduce emissions in the transportation sector.<sup>32</sup> Quebec has established a maximum speed for trucks of 105km/h. It is recommended that NS Energy in partnership with NS Department of Transportation and Infrastructure Renewal assess the feasibility of lowering speed limits.

---

<sup>30</sup> David Suzuki Foundation. 2006. *California vehicle emission standard a perfect fit for Canada*

<sup>31</sup> Ecology Action Centre. 2007. Food Miles Project.

<sup>32</sup> Marc Jaccard et al 2003 *The Cost of Climate Policy* UBC Press, pg. 172.

## **Rail Freight**

Recommendation 13: Increase truck licensing fees to reflect costs of damage to road infrastructure

Recommendation 14: Provide assistance for the development of an Inland Terminal in Halifax Regional Municipality

Recommendation 15: Provide grants to shippers for rail spurs, sidings, loading docks and freight cars

Recommendation 16: Buy rail lines, when they come up for abandonment, at scrap value and lease the tracks back to interested operators on favourable terms

The document does not address the significant source of GHG emissions from trucking, which are likely to grow steeply under the Atlantic Gateway initiative. Rail emits only 3% of transportation greenhouse-gas emissions, despite accounting for 64% of total tonne/kilometres hauled (workload) in the surface freight sector. Trucks account for 22% of greenhouse gases against a 36% total activity share.<sup>33</sup> A comprehensive assessment of the role rail will play in a low-carbon economy is needed.

Current policies favour trucking. A significant incentive is the fact that the construction, maintenance, snow removal, policing and insurance of roads are public sector responsibilities. In contrast, the construction and maintenance of rail is a private sector responsibility. Therefore, trucking companies are receiving a subsidy when rail is not. In the last 40 years a large part of the rail network in the Maritimes has been abandoned as subsidized road networks have distorted the economics of freight transportation. There is little consideration of the external cost of highways, in the unusual cases where modes are actually chosen through public policy based on costs or economics.

---

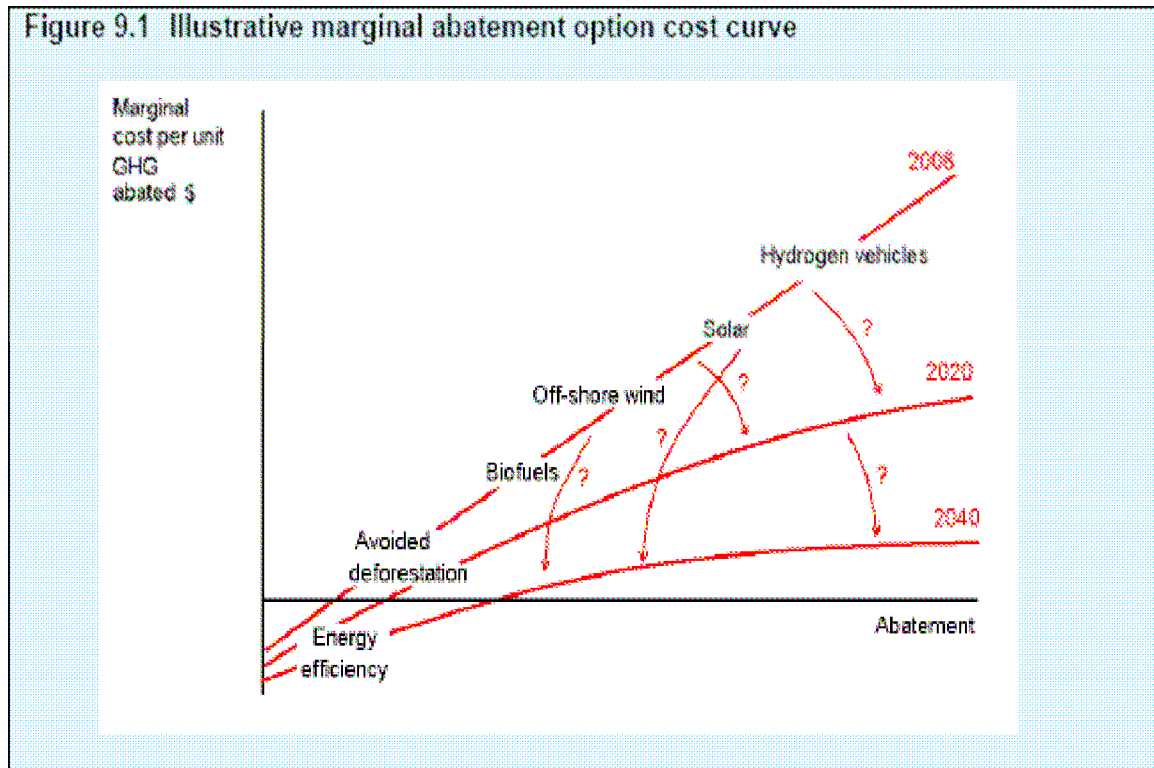
<sup>33</sup> Railway Association of Canada. 2005.

## ENERGY EFFICIENCY

We recommend that the *Climate Change Strategy* prioritize energy efficiency as a fundamental policy for achieving both environmental and economic objectives.

Energy efficiency is widely recognized as the most abundantly available and most cost-effective solution to climate change.

We note that in the IPCC's review of mitigation options for climate change, the building sector's economic mitigation potential was estimated to be by far the largest compared to other sectors through a review of bottom-up studies.<sup>34</sup>



The graph above is taken from the Stern Review on the Economics of Climate Change and shows the importance of energy efficiency in any GHG reduction strategy. The horizontal axis shows the level of GHG reductions, while the vertical axis shows the cost per unit of GHG reduced. Energy efficiency is conspicuously below the abatement line, indicating that implementation of these options produces net benefits (i.e. negative costs) even without the internalization of externalities. This indicates that any climate change strategy must improve energy efficiency as aggressively as possible because it is the first and lowest-cost step.

Efficiency is also important to provide economic development benefits. A report prepared for Environment Canada estimated that energy efficiency created 37 full time

<sup>34</sup> Summary for Policymakers of the Synthesis Report of the IPCC Fourth Assessment Report, pg. 16.

equivalent jobs for every \$1 million invested. That is more than any other form of energy production and 5 times more than conventional energy production.<sup>35</sup>

An aggressive and effective energy efficiency strategy is especially important in the Nova Scotia context for a variety of reasons:

- 1) Nova Scotia must develop job creation and economic development strategies that include rural communities. Energy efficiency strategies are implemented across all regions (urban and rural), thus contributing to distributed job creation and revitalization of rural communities
- 2) The *Discussion Document* went to great lengths to describe some of the challenges associated with integrating renewable energy into Nova Scotia's current electricity system. Energy efficiency is a near zero-carbon energy resource that does not face these same challenges.
- 3) Nova Scotia imports the vast majority of its energy resources for electricity, home heating and transport. Energy efficiency is a domestic resource.
- 4) Nova Scotia has one of the higher rates of energy poverty in Canada. Efficiency can cut low-income energy costs by 40%<sup>36</sup>.
- 5) Energy efficiency is cheaper than coal.

While many recognize that energy efficiency is a good idea, many jurisdictions are only now starting to consider energy efficiency as an energy resource that must be developed to its full potential. We encourage the Climate Action Plan and Energy Strategy to recognize energy efficiency as an energy resource that is superior to supply side resources.

The vision for energy efficiency should be one where accessing energy efficiency services is as easy as accessing energy supply options. This will require developing an infrastructure for energy efficiency that is as well developed as energy supply infrastructure is today. Effective efficiency resource acquisition requires a great deal of ongoing planning and sophistication. The Climate Action Plan and Energy Strategy must recognize this to ensure efficiency strategies are effective and accountable.

## **ADMINISTRATION, PLANNING & ACCOUNTABILITY**

The EAC encourages the Climate Action Plan and Energy Strategy to take a multi-fuel approach to energy efficiency. Energy efficiency has been deployed in various places in the electricity and natural gas sectors, with some jurisdictions only now starting to consider heating fuel efficiency strategies.

We encourage Nova Scotia to take a leading position in the development of multi-fuel energy efficiency strategies incorporating not only electricity, but other forms of fuel as well, including heating oil, wood, natural gas, combined heat and power, and on-site renewable energy generation.

---

<sup>35</sup> Campbell et al. 1997 "Comparative Analysis of Employment From Air Emission Reduction Measures" Report by *The Pembina Institute* for Environment Canada – Global Air Issues Branch.

<sup>36</sup> Evaluation of EnerGuide for Low-Income Households by Green Communities Canada

Any administrator(s) of energy efficiency must be held accountable to meeting clear energy efficiency objectives. Nova Scotia Power's *Draft Demand Side Management Plan*, submitted to stakeholders on December 11<sup>th</sup>, 2007 fails to make the utility accountable for achieving results. The plan proposed by the existing generation utility at this time does not appear to provide the accountability necessary to alleviate any conflict of interest problems associated with the generation utilities generation business.

The choice of administrator should also consider how to fully integrate efficiency strategies for multiple fuels. Having multiple administrators for different fuel types can result in customer dissatisfaction, extra administrative costs and undesirable strategies being following in particular businesses and homes.

To ensure administrative simplicity and accountability for results for a multi-fuel efficiency program, we recommend the creation of an *Energy Efficiency Utility* that is mandated with providing efficiency services for all fuels and overseen by the Nova Scotia Utility and Review Board (hereafter referred to as the Board).

It is critical that strong public accountability mechanisms exist to ensure performance from the Energy Efficiency Utility and that the right labour market infrastructure is created to staff the new utility.

We recommend that a franchise be awarded to an entity through a request for proposals process, overseen by a collaborative (see below). In the event of non-performance the Board should invite a recommendation from the collaborative to revoke and re-award the franchise. The formation of a long-term franchise vs. a contract that is frequently re-issued can work to ensure the right incentives for securing the long-term benefits of energy efficiency and building long-term relationships.

The EAC does not support seeing *Conserve Nova Scotia*, in its present form, as a delivery agent for energy efficiency programs. The agency's current structure makes it difficult, if not impossible to implement many of the accountability mechanisms mentioned above. We suggest that *Conserve Nova Scotia* might be able to play a valuable role as the entity dedicated to creating and updating energy efficiency standards and conducting independent evaluation and review of energy efficiency program performance and perhaps initiating the sustainable transportation recommendations contained in the previous chapter.

### **Formation of Collaborative**

To develop a long-term framework for energy efficiency accountability in Nova Scotia, we suggest that Nova Scotia develop a Collaborative, with broad public stakeholder representation, including energy supply and efficiency utilities, to work together to develop the demand side resource plan. We suggest that any formal decisions of this Collaborative should be required to pass a supermajority vote. The plans developed by the Collaborative would then be submitted to the Board for revision and/or approval.

We would propose that the Collaborative be comprised of a representative from each of the following:

- a) A manufacturing association (*e.g. Canadian Manufacturers and Exporters*)
- b) A small business association (*e.g. Can Federation of Independent Business*)
- c) A consumer advocate
- d) A low-income advocate (*e.g. Affordable Energy Coalition*)
- e) An environmental organization knowledgeable in energy efficiency programs (*Nominated by the NS Environmental Network*)
- f) A municipal government association (*e.g. Union of NS Municipalities*)
- g) Municipal Electric Utilities Co-operative of NS
- h) Nova Scotia Power Inc.
- i) The Nova Scotia Department of Energy
- j) The Nova Scotia Department of Environment

The Collaborative can be tasked with working closely with Board staff and the Program Administrator to develop a 3-year demand side resource plan for both short-term (3-year) and long-term (20-year) time frames and to review status and performance related to the plan's implementation.

### **Accountability for Results**

The energy efficiency utility must be made accountable for results for all energy efficiency objectives. Ensuring accountability for results, instead of micro-managing or prescribing programs will ensure performance as well as create opportunities for innovation in program design strategies and approaches.

We therefore recommend that the collaborative above work to define a series of performance indicators for the energy efficiency utility related to short-term as well as long-term energy savings, market transformations and equity criteria. An example of performance indicators can be found in the EAC's November 15<sup>th</sup> submission to the Demand Side Management (DSM) process currently moving forward in Nova Scotia.

In addition we recommend that the collaborative create incentives and disincentives tied to meeting the objectives specified in the performance indicators (see EAC DSM submission for examples). For an energy efficiency utility the receipt of no award in the event of non-performance would provide a powerful incentive to reach goals, given that efficiency will be their sole area of business. If NSPI were to be the program administrator (something we do not recommend at this point in time) the financial penalties for non-performance are appropriate given that NSPI currently earns returns from energy supply services in a way that constitutes a potential conflict of interest with the procurement of energy efficiency resources.

Finally, ensuring accountability also requires a legislative ruling that ensures funds invested for energy efficiency for all fuels will not be utilized for other purposes or as general revenue for the province. Budget "raids" by government, utilities, and private

companies can have a long-term detrimental impact on energy efficiency procurement efforts.

## **ELECTRIC ENERGY EFFICIENCY**

There has been considerably more experience with electric energy efficiency resources than with other forms of energy efficiency. We emphasize that the procurement of the energy efficiency resource is an iterative, ongoing and continuous process. Frequent re-evaluations and ramping up and down of specific programs is necessary.

Electric ratepayer dollars should fund electric energy efficiency, for the simple reason that efficiency is a resource similar to wind turbines and coal fired power plants. If efficiency is the least-cost resource it is in the interest of all ratepayers to fund it. Electric ratepayer funding can help ensure political independence and accountability, while also providing a dedicated revenue stream that will not compete with other priorities.

Therefore the role of government is to help establish a new framework for electric ratepayer funded energy efficiency under the purview of the Nova Scotia Utility and Review Board.

Many jurisdictions created dedicated funding for electric energy efficiency programs through *System Benefit Charges*. This dedicated funding provided some extremely valuable early experience with energy efficiency programs, but it also had the effect of creating artificial budget caps that prevented energy efficiency from reaching its full economic potential.

Learning from this experience the EAC recommends the establishment of minimum savings targets, a flexible resource planning process aimed at securing *all cost-effective* electric efficiency resources and a long-term base planning assumption for energy efficiency resources to ensure evaluation of best practice savings levels. The objective is to maintain the capacity necessary for long-term energy efficiency resource acquisition is developed and maintained while ensuring flexibility and accountability to maximize the potential for cost-effective energy efficiency savings.

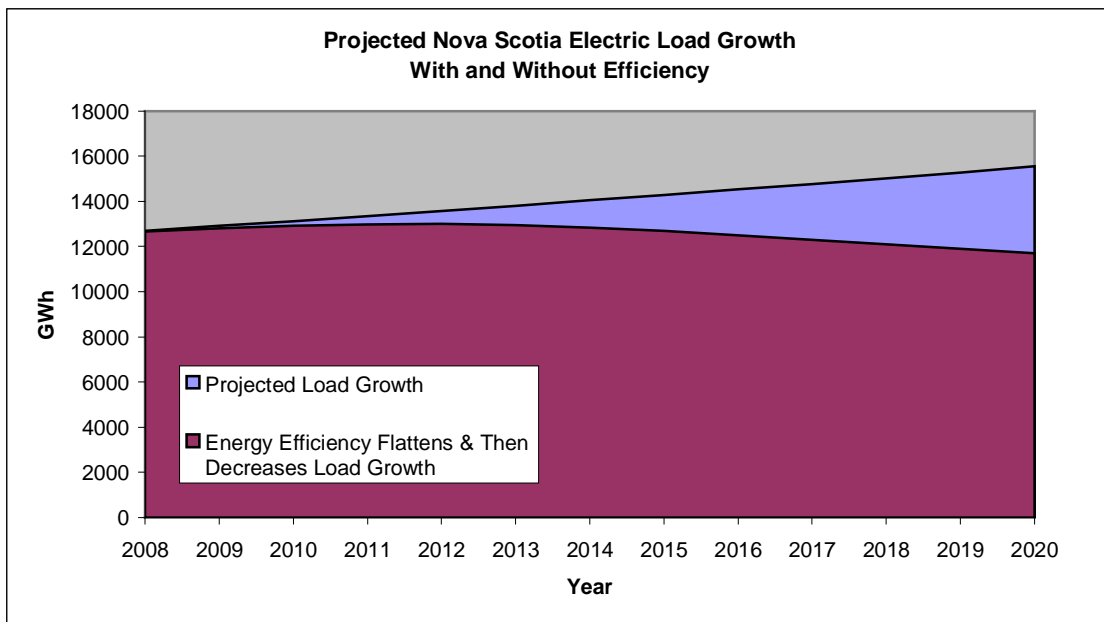
First, we recommend establishing minimum annual energy efficiency spending and savings levels. The major rationale for establishing minimum levels of savings is to ensure that capacity is not lost in the energy efficiency industry that will be very costly to rebuild. We note that Nova Scotia would currently have more capacity to secure the benefits of energy efficiency if NSPI had not terminated previous efficiency initiatives. Minimum spending levels could also be required, but we recommend policy focus on the objective of energy savings. We suggest establishing minimum annual incremental savings levels of 1% in 2011 and onwards. This would be akin to defining a resource standard, but we anticipate that many cost-effective opportunities exist beyond this level.

Next, in congruence with the *Loading Order* suggested in the GHG regulations section, we recommend legislating that the Utility and Review Board must secure all energy

efficiency resources that are cost-effective in electricity planning. In keeping with the spirit of the EGSPA we recommend that cost-effectiveness be defined through the societal cost test that roughly accounts for environmental and social externalities.

Finally, we feel that is appropriate for the Climate Action Plan and Energy Strategy to define a base planning assumption for energy savings levels in the future. This base planning assumption should be tested through a regular 3-year Integrated Resource Planning process to see if cost-effective, achievable potential is above or below the given targets.

The base planning assumption should be consistent with efficiency contributing 1.2% of annual electric load in 2011, 2% of annual electric load in 2013 and 3% of annual electric load in 2016. In Nova Scotia, these savings levels are estimated to be consistent with roughly holding electric load growth flat and then reducing it by 1% a year or more, starting after 2016.<sup>37</sup> This is illustrated in the descriptive graph below showing the levelling of load growth in the near-term and then reducing electric load from today’s levels before 2020.



Regardless of whether an independent energy efficiency utility, or another entity, is chosen to administer electric energy efficiency programs, generation utility incentives should be aligned with the interests of all ratepayers and with the goals in the EGSPA. We therefore recommend that the Climate Action Plan and Energy Strategy require that NSPI decouple its profits from sales in the near future. We suggest that a study should be

<sup>37</sup> Blair Hamilton, Policy Director for the Vermont Energy Investment Corporation presented these numbers as a “laggard” electric energy efficiency scenario at the *Power of Green* Conference sponsored by the Government of Nova Scotia.

commissioned on decoupling that will be completed no later than 2010 and that the government order a hearing to design a decoupling mechanism shortly afterwards.

## **MULTI-FUEL ENERGY EFFICIENCY**

In addition to electric energy efficiency, we encourage Nova Scotia to take a leading role in the development of multi-fuel energy efficiency strategies and programs that include:

- Home heating oil
- Natural Gas
- Wood & Biomass
- Combined Heat and Power - at industrial, commercial and residential levels
- Renewable energy - including solar thermal energy, building-integrated photovoltaics and other forms of on-site renewable energy generation.
- Fuel Switching

While the electric energy efficiency can be funded through electric ratepayer investments, we suggest supporting efficiency programs for other fuels through dedicated revenue from a carbon tax.

We recommend that revenue collected from a Nova Scotia carbon tax be placed into a *Climate Action Fund* and that these funds be secured by a legislative mandate to ensure that they cannot become general funds of the province. Further, it should be legislated that the Climate Change Action Fund will first fund all cost-effective and achievable non-electric energy efficiency. This is to guarantee that the fund is utilized to reduce GHGs in the most cost-effective manner.

The funds for non-electric energy efficiency will be transferred from the *Climate Change Action Fund* towards an independent Energy Efficiency Utility. Therefore a one-stop-shop for energy efficiency can be created, that receives guaranteed, dedicated and secure funding from differing sources such as electric ratepayer investments and a carbon tax.

Performance indicators, incentives, and collaborative oversight will occur for the non-electric efficiency programs in the same as is described above.

### **Combined Heat and Power (Cogeneration)**

The EAC wishes to make specific mention of combined heat and power, also known as cogeneration, due to its importance and timeliness, considering its potential interactions with Nova Scotia's growing natural gas distribution industry.

Combined heat and power (CHP) is the generation of electricity with the simultaneous capture of thermal energy from the generator for a useful purpose such as space heating. CHP units can operate on a variety of fuels, and are particularly well developed to use natural gas. They can be installed in industrial, commercial, institutional and residential buildings that have an electric grid connection, a source of fuel, and a heating load such as space heating, water heating or industrial processes. A few examples of ideal medium-

to-large scale sites include manufacturing facilities, hospitals, universities, breweries, schools and apartment buildings. Micro-CHP systems are now also being developed that can provide both heat and electricity at the scale of individual residential homes.<sup>38</sup>

By efficiently generating electricity and heat together, CHP or cogeneration displaces fuel that would otherwise have been used to supply either the heat or the electric energy services, and can be considered both a form of energy efficiency, fuel switching and a form of decentralized energy generation. Whichever way you name it, it is a potentially large and cost-effective solution to reducing greenhouse gas emissions, with many advantages that must not be overlooked. In Ralph Torrie and Richard Parfett's review of New Brunswick, Quebec and Ontario in "*Phasing out Nuclear Power in Canada: Towards Sustainable Energy Futures*" they state:

"A review of the international literature on low emission futures reveals cogeneration to be second only to improved efficiency in the size of the contribution it can make...in the short to medium term it is the potential for increased industrial cogeneration that looms largest."<sup>39</sup>

In Torrie and Parfett's scenario, distributed energy systems such as micro-CHP are estimated to provide 20% of space heating, water heating and electrical needs in houses and 35% of space heating, water heating and electrical needs in apartments by 2020.<sup>40</sup>

The potential for both large scale industrial and micro or residential scale CHP systems needs to be fully explored in Nova Scotia, and quickly. This is urgent because the natural gas distribution network is expanding in Nova Scotia right now. Nova Scotia has currently extended a natural gas franchise to Heritage Gas, has approved natural gas production through Deep Panuke, and has supported the development of a natural gas distribution network on the peninsula of Halifax through direct government funding. One stated objective of fuel switching towards natural gas is decreased GHG emissions. Fuel switching towards natural gas can reduce GHG emissions, but it can reduce them even more with the right strategies for deployment. We strongly recommend that the Climate Action Plan and Energy Strategy develop a strategic approach towards the distribution of natural gas in Nova Scotia that considers energy security, innovation and pathways towards a low-carbon future. This would ensure we utilize the gas we have more efficiently while simultaneously developing an energy infrastructure for the future that can then be transitioned towards other fuels such as hydrogen or biogas.

Potential industrial, commercial, institutional and residential clients are signing on to switch to natural gas as it becomes available, which involves capital investment in new equipment to burn natural gas. The time is ripe to put in place policies, incentives, directives and regulations that make it easy for these new clients to install cogeneration or combined heat and power units, to make the most efficient use of the natural gas they will

---

<sup>38</sup> Carbon Trust "Micro-CHP Accelerator" Interim Report, November 2007.

<sup>39</sup> Torrie & Parfett, *Phasing Out Nuclear Power in Canada: Towards Sustainable Electricity Futures*, Pg. 14, & 15

<sup>40</sup> Torrie & Parfett, *Phasing Out Nuclear Power in Canada: Towards Sustainable Electricity Futures*, pg. 20

buy, now and over the lifetime of our non-renewable natural gas resources. The timeliness of this particular suggestion cannot be overstated. After the switch to new gas-burning equipment has been made, if it is not a CHP system now, it may become too late to feasibly invest in CHP systems until the next round of capital investments.

Deployment of CHP in conjunction with the expansion of the natural gas distribution network should be quite cost-effective. Investments in new infrastructure and equipment are being made anyway. The key is to do what is necessary in the most cost-effective possible manner to ensure that those decisions on new equipment are weighted towards the highest-efficiency use of natural gas, which in many cases will be a CHP system.

We suggest that the deployment of CHP (including micro-CHP), as well as other end-use energy efficiency measures, be fully integrated into the conditions of the natural gas distribution franchise. We can capitalize on significant opportunities if Nova Scotia fully and rapidly develops CHP (including micro-CHP) to the extent that it is cost-effective from a societal and climate policy perspective, in conjunction with the development of natural gas distribution systems.

The widespread and rapid deployment of cogeneration or combined heat and power in conjunction with the expansion of natural gas infrastructure requires certain conditions in order to be successful, including access to technical expertise to choose, install and operate the appropriate type and size of equipment, and recognition of the value and safety of the equipment by regulators, inspectors, natural gas marketers, engineering and installation contractors. All these issues can be resolved, as they are in any technical field, by seeking the best practices from all jurisdictions and standards organizations, and by developing our own where necessary.

Of course, using the opportunity of new natural gas infrastructure to promote CHP is only one component of a comprehensive and integrated multi-fuel energy efficiency strategy. The deployment of CHP has interactive effects with other energy efficiency measures. It should therefore be evaluated as one measure in the context of the larger strategy. Given CHP's interactions with multiple fuel types, one benefit of the creation of a multi-fuel energy efficiency utility is the ability to incorporate CHP into both electric and non-electric efficiency strategies.

Nova Scotia's manufacturing sector is currently struggling with high energy costs and the pressure of a higher dollar. This situation is unlikely to subside, which calls for tackling the issue of energy costs at its source as a key component of a new industrial policy and a new Contract for a Low-Carbon Future. In addition to efficiency measures, providing strategies to have industrial operations become electricity producers themselves through CHP deployment can be part of an integrated energy efficiency and economic development strategy.

At the scale of individual residential buildings, micro-CHP technology shows promise and Nova Scotia should promote demonstration and commercialization. The benefits for Nova Scotia include options to improve efficiencies in our older housing stock,

innovation and technological development, and complementarities with natural gas penetration.

Most importantly, to deploy CHP the potential generating facility must have simple, standardized access to interconnect to the electricity grid and sell any surplus power generated by the CHP unit at rates that encourage deployment. For this reason, the EAC recommends that transparent, simple and encouraging interconnection standards and procedures for CHP units be adopted immediately based on existing best practices, and that a feed-in tariff be legislated to set a fixed and encouraging price that electricity utilities must pay for electricity provided by CHP operations. (See renewable energy for further discussion of feed-in tariffs).

The EAC recommend that the energy strategy create a Combined Heat and Power Action Plan that includes:

- 1) The development of an encouraging standard interconnection policy for CHP and the implementation of an immediate and encouraging CHP feed-in tariff;
- 2) An initial CHP study to estimate the potential savings and aid in long-term planning;
- 3) Policies to ensure that CHP is deployed as a “bundled” service complementarily to natural gas deployment by mandating CHP and efficiency as component of natural gas distribution franchises;
- 4) The full consideration of CHP as an eligible energy efficiency technology within energy efficiency portfolios such as those of the proposed Energy Efficiency Utility; and
- 5) Demonstration and commercialization support for micro-scale CHP.

### **On-Site Renewable Energy as an Efficiency Improvement**

We recommend that a multi-fuel energy efficiency strategy should also include the deployment of on-site, distributed renewable energy generation as an energy efficiency improvement. For example, a holistic approach to increasing energy efficiency at an institutional building could include more common efficiency measures such as switching to high-efficiency boilers for water heating, and also include installing solar water heaters to make more efficient use of the solar energy falling on the site to pre-heat the water before it goes into those efficient boilers. This is just one example of how on-site renewable energy generation can work together with other efficiency improvements. We think it is important that on-site renewable generation be considered and promoted as an efficiency measure in an integrated package with other efficiency measures, to come up with the most effective solutions.

To give another example, the Equilibrium Housing project, now being supported by the Canadian Mortgage and Housing Corporation, is demonstrating in real tests that a single-unit residential home can have a net-zero energy footprint, meaning that the building generates as much renewable energy on-site as the total energy used there. This is being accomplished through an integrated combination of energy-efficient design, passive solar

design, and on-site renewable energy generation systems such as solar water heaters and/or solar electric (photovoltaic) generators.

The on-site renewable energy generation technologies that we consider worthwhile for consideration as energy efficiency measures in the built environment in Nova Scotia at this time include:

- Passive solar shelter design;
- Solar water heating systems to heat buildings or to heat service hot water;
- Solar air heating systems;
- Solar electricity (photovoltaic) systems;
- Biomass systems to generate heat and/or electricity from waste biomass;
- Biogas digesters to produce methane gas from organic wastes, including food scraps, sewage and animal manure; and
- On-site wind turbines to generate electricity.

EAC recommends that, as part of the Climate Action Plan and Energy Strategy, the Department of Energy and/or the proposed Energy Efficiency Utility should develop the expertise, guidelines, standards, incentives, policies and regulations necessary to encourage market development and deployment of each of the technologies listed above, and any other similarly feasible on-site renewable energy technologies as appropriate. In many cases, the required information on these technologies and the best practices to promote them are available in Nova Scotia or in other jurisdictions. In at least one technology (passive solar shelter design), Nova Scotia is a national leader. The information resources on these technologies largely exist. The suggestion is to bring the information and incentive resources together into an easily accessible one-stop-shop and promote these technologies alongside other more common energy efficiency technologies in an integrated package.

Information alone has proven to be necessary but not sufficient to cause the widespread adoption of renewable energy technologies. Jurisdictions with high installation rates of on-site renewable energy generation, including Austria, Germany, Israel and California, have legislation and programs in place to facilitate uptake. Everything from price incentives to utility interconnection regulations to local municipal bylaws can positively or negatively affect the deployment of on-site renewable energy technologies.

### Solar Hot Water

To explain this recommendation in greater detail, we will focus here on one of the technologies listed above, namely solar water heating systems (referred to here as “solar hot water”), because we have direct experience with promoting this technology. The EAC is currently operating the *Solar Gain Project* ([www.solargain.ca](http://www.solargain.ca)) to encourage solar hot water installations at commercial, institutional, industrial and large-scale residential buildings. The Solar Gain Project is supported with funding from Environment Canada, Conserve Nova Scotia, and the Henry P. Kendall Foundation, was launched to the public in the spring of 2007, and is currently scheduled to continue until October of 2008. The goal of the project is to promote the installation of a total of 500 solar hot water collector panels (where a typical commercial installation could have 10 to 100 panels, depending

on the amount of hot water used in the building). Our first year of experience on this project has given us valuable knowledge on the barriers to solar hot water deployment.

In our experience, we have found that interest in solar energy technologies is very high among members of the general public. We receive numerous spontaneous enquiries from people, most of whom want to know how they can install a solar energy system at their home and how much it would cost. We focus our directed outreach on the owners and managers of larger buildings, and we find that in the majority of cases people are interested to learn more about solar technologies. We provide general information, followed by a detailed system size estimate, cost-benefit analysis and report for larger buildings, along with suggestions of possible suppliers and installers. We are able to provide this service free of charge due to the project funding we have received.

One year into the project, our experience can be summarized as follows:

- 1) Interest in solar energy technology is very high.
- 2) Detailed understanding of solar energy technology is generally fairly low.
- 3) So far, uptake of solar hot water among our clients has been lower than we would have hoped.

We are currently analysing how we can improve our strategy to achieve higher uptake and reach the objectives of the Solar Gain Project. We hope that this experience will be useful in your deliberations on how to promote renewable energy as a means to meet the goals of the Climate Action Plan and Energy Strategy. We completed a detailed report entitled “Solar Hot Water Promotion in Nova Scotia”, commissioned by Conserve Nova Scotia. Because Conserve Nova Scotia is currently using that report as advice in making an operational decision, the outcome of which may affect the solar industry, as of this writing we are not sure whether we can consider that report a public document. Some non-confidential parts of it are used here to explain our recommendations.

Financial incentives are already being offered for the installation of solar hot water in Nova Scotia. These consist of the 10% Nova Scotia Solar Hot Water Rebate, and for commercial, institutional and large-scale residential users there is the federal 25% ecoEnergy for Renewable Heat rebate. These can be combined, with the result that a client installing a large-scale commercial or institutional solar water heating system can receive a 35% rebate (off the total installed cost but before sales taxes). This represents a substantial rebate, although not as high as the 50% rebates offered in some jurisdictions, which recently include Ontario and Saskatchewan. Single-unit residential homeowners are not eligible for the 25% rebate, but in addition to the 10% rebate, there is a \$500 rebate on solar hot water from the federal government, through the ecoEnergy Home Retrofit (EnerGuide for Houses) program.

There is little doubt that the existence of such incentives has increased the rate of installation of solar water heaters. Conserve Nova Scotia has recorded an increase in payouts to successful applicants to their solar hot water rebate program over the period from 2005 to 2007. Similarly, the federal government has seen increases over time in the number of successful applications to their rebate program. However, the absolute number

of installations in Nova Scotia in 2007 is still quite small, much smaller than in jurisdictions such as Austria, which has a similar climate but overwhelmingly greater amounts of installed collectors per capita. The rate of installation of solar water heaters in Nova Scotia needs to increase dramatically to make significant use of this abundant and relatively cost-effective renewable resource to reduce greenhouse gas and air pollutant emissions.

Simply putting in place higher financial incentives may or may not be the most effective way to increase uptake. Experience and research suggest that the following are all important:

- Increased awareness and public education;
- Establishment of a norm;
- Capacity and confidence in the industry;
- Financing options;
- Sharing of costs and benefits over time;
- Consistent, long-term incentives; and
- Supportive policies and regulations

The Nova Scotia government can play a role in every one of the above factors to create an environment in which solar energy (or any of the feasible renewable energy technologies) will be more rapidly adopted. To consider these factors one by one:

#### *Increased awareness and public education*

Consistent, truthful information and knowledge about a renewable energy system is necessary, but not sufficient, to promote its installation. The government can take an active role in disseminating information through government, non-profit and community channels, as well as through media and advertising, and is already doing some of this through its support of the Ecology Action Centre Solar Gain Project.

#### *Establishment of a norm*

According to one of the principles of social marketing, to achieve a large rate of uptake it must eventually be considered both normal and desirable to use a solar water heater. Since the number of installed systems in Nova Scotia is relatively small now, one cannot just point to the number of systems in place to show that the technology is normal. In the short term it is necessary to find creative solutions to normalize the technology. One way is to use prominent leaders, well-known buildings, or commonly frequented places to showcase the technology, so that it takes on the appearance of being more normal than it yet is. As an example, if every Tim Horton's restaurant in Nova Scotia had a solar water heater, you can bet a lot more Nova Scotians would see solar energy as having reached a state of normalcy. The government can help grease the wheels for projects that normalize the technology.

#### *Capacity and confidence in the industry*

Products, manufacturers, installers and maintainers need to be qualified, reliable, and perceived as such. Unfortunately, we are working against negative perceptions from the past. We repeatedly hear vague stories about past solar installations that failed, and these

stories are used as reasons to avoid solar technology in the present. This can be countered with real success stories, of which there are enough in Nova Scotia and Canada to make the case. However, the industry will benefit from certification of products and installers to increase confidence. The Canadian Standards Association has developed standards for solar water heaters, and there are various agencies worldwide and in Canada that test solar water heaters to ensure that they meet standards. Also, the Canadian Solar Industries Association had developed a course and certification program for installers. Because these standards and certifications are in place nationally and internationally, the Nova Scotia government does not need to develop its own standards for solar hot water. However, it would help if, over time, the government would gradually begin to require that any systems installed in the province with government incentives should meet the relevant product standards and be installed by certified installers.

### *Financing options*

We have worked with several large commercial clients for whom a solar water heating system would be ideal, and who are interested in installing a system, but who cannot pay the initial up-front capital cost. Various financing options need to be available, such as loans or leasing arrangements. Some solar companies are already offering financing terms. These terms may or may not be conducive to greater uptake.

Loans: Government support in the form of zero-interest or reduced-interest loans or loan guarantees could help improve the terms and the rate of uptake. This approach has been used in Prince Edward Island, where the government offers a low-interest loan for energy efficiency upgrades, including solar water heaters.

Solar Utility Model: Another creative financing option is the “solar utility”, which is a utility that provides solar energy to the end-user. In this model, the user does not own the collection system, but the solar utility does. The solar utility pays the capital cost of purchasing and installing the system and takes care of all maintenance and repair. In return, the end-user of the solar energy pays the solar utility a fixed rate per unit of solar energy delivered, as if it were another fuel like oil or gas, typically with a ten-year energy purchase agreement. The end-user will never own the system, but they also don’t have to finance or maintain it and they have an operating cost for energy instead of a large capital cost. Typically, the solar energy price is set equal to or slightly less than the cost of the (usually fossil) fuel that it is displacing, so that the end user experiences no net increase in costs. Solar utility companies are now operating in Ontario and Quebec, and we have interviewed these companies to understand how they operate. The City of Toronto recently issued a call for proposals, seeking a solar utility company that will install, own and operate solar water heating systems at 20 municipal buildings, selling the solar energy to the City. The Province of Nova Scotia, being on a similar population scale as the City of Toronto, could set up a solar utility here, or grant a franchise to a company or organization to operate a solar utility. There is no legal barrier that we know of that would prevent one or more private solar utility companies from operating in Nova Scotia, so this may be a service that the market may eventually provide. However, to speed up the process and promote the local economic benefits of such an enterprise, it would help

if the Nova Scotia government would act to catalyze the formation of our first solar utility.

#### *Sharing of costs and benefits over time*

Solar energy equipment is a long-term investment, and people are often reluctant to make a long-term investment if they don't know how long they will own the building where it is installed. This is particularly true for single-family homes, which are now typically owned for five years, and for condominium units in large buildings, which in our experience are managed for the short term. One way to circumvent this problem, which has been done in some places, is to use municipal local improvement charges as a mechanism for financing solar hot water systems. It works like this: residents of a municipality are invited to have solar water heaters installed on their homes, financed through the municipality, and those who choose to receive a system make payments for it on their property tax bills. If they sell the house, the responsibility to continue the payments transfers to the new owner, along with the benefits of having a solar water heater. This spreads the cost among the present and future owners of the building, and avoids the deterrent of the present owner having to pay the whole upfront cost. The government of Nova Scotia, in cooperation with the Union of Nova Scotia Municipalities, could help set up such a system.

#### *Consistent long-term incentives*

Financial incentives must be reliable, available for long and well-defined periods of time, and large enough to make a difference. Sudden or unplanned changes in incentives have been shown to disrupt the growth of the solar industry. When the federal incentive for solar was suspended in late 2006, commercial solar installations came to a standstill because everyone was waiting to see if the incentive would come back. In the case of the Nova Scotia Solar Hot Water Rebate, we are recommending that the rebate be available for periods of at least three years between re-assessments, at a level that at least offsets all sales taxes (currently 14%). The reason for this percentage is the marketing appeal. People understand and identify with the idea of something being promoted by effectively not taxing it. It is also relatively simple and consistent to expand this concept to other renewable energy technologies, to say, "No sales tax on windmills, solar panels, biomass boilers,..."

#### *Supportive policies and regulations*

To encourage a technology to be widely deployed, it helps to provide a regulatory environment that facilitates and encourages its use. In the case of solar water heaters, supportive policies include:

- Solar access laws (these specify the rules for maintaining access to solar radiation for existing and new buildings so they can collect solar energy, or specify the process by which conflicts over access to solar radiation are to be resolved)
- Solar-ready mandates (these require all new buildings to be designed and built to easily accept solar collectors, whether the collectors are installed immediately or later)
- Solar obligations (these require all new buildings to use at least a specified minimum percentage of solar energy to supply their energy consumption)

A comprehensive report entitled “Solar Thermal Action Plan for Europe” was published in 2007 by the European Solar Thermal Industry Federation, and is available for download at (<http://www.estif.org/281.0.html>). This document provides the best information we know of on how to promote solar thermal energy.

These detailed suggestions for how to promote solar water heating systems are just as applicable to the six other on-site renewable energy technologies listed above. There will be technology-specific differences in the guidelines, regulations, target markets and incentive levels, but the basic framework can be the same for each technology. EAC recommends that a promotional system be developed for all seven of them, and that these promotional efforts should be integrated into the proposed energy efficiency utility or any other model of efficiency procurement the province chooses to adopt. When used on-site to supply energy to the built environment, we see these renewable energy technologies as tools to make more efficient use of the available resources, and as such should be considered part of Nova Scotia’s push for greater energy efficiency.

### **Fuel Switching, Fuel Choice**

The EAC also fully supports considering fuel switching and fuel choice within an integrated, multi-fuel energy efficiency strategy. Fuel switching and fuel choice should be evaluated in terms of societal costs and benefits.

Programs should fully consider, based on circumstances and costs and benefits, options to choose among or switch to fuels such as natural gas, propane, wood chips, other biomass, solar, CHP and other options instead of electricity, especially for heating loads. New construction is a high priority area for discouraging, and preferably banning through legislation, the utilization of electric resistance heat.

Fuel switching should be evaluated based on its ability to adapt, with emphasis on making heating systems “renewable ready”. For example, installation of hydronic heating systems can be transferred towards various forms of energy in the future.

### **INFRASTRUCTURE DEVELOPMENT**

As already mentioned, energy efficiency is the most powerful job creator compared to any other form of energy. This is an important benefit for Nova Scotia, but also a challenge.

We suspect that the largest challenge to quickly ramping up energy efficiency in Nova Scotia will be finding and training qualified efficiency related service providers.

We therefore recommend the immediate development of a comprehensive labour market strategy for all forms of energy efficiency. The strategy should include the training, retention and attraction of full time energy efficiency staff as well as training at all levels including vocational programs, unions, community colleges and universities.

## **EFFICIENCY STANDARDS**

Creating clear and aggressive standards for energy efficiency is an extremely urgent and important policy to avoid lost opportunities. Most of our current energy efficiency standards are non-existent or out of date. Energy efficiency improvements will continue to continuously occur, which is why we would also like to first suggest a process for ongoing standard setting.

We suggest that all energy efficiency standards be re-evaluated over a 3-year period to be upgraded to be the best in North America. Standard setting should be considered as part of a broader energy efficiency strategy targeted towards avoiding lost opportunities and achieving energy savings and market transformations in the most cost-effective manner. Therefore, mandatory standards should replace incentives wherever possible and as quickly as possible.

### *Housing Standards*

The EGSPA currently commits Nova Scotia to a minimum housing efficiency of EnerGuide 80 by 2011 and complementary labelling policies. We would encourage a regular 3-year review of this standard and the regulation of achieving an EnerGuide 90 rating by the year 2020. We also recommend standards to ensure that all new houses are oriented and designed to use passive solar energy to the maximum extent possible, and are “solar-ready” in the sense that they have all the features and infrastructure needed to easily install solar collectors for water heating, space heating, and electricity generation.

We also strongly recommend banning the utilization of electric resistance heat in all new housing. This form of heating is inefficient from a societal perspective and contributes disproportionate amounts of GHG emissions from the electricity sector. The inordinate amount of electric resistance heating being installed in new houses in Nova Scotia goes a long way to explaining why electric load has continued to grow despite steady population growth.

We would also encourage a comprehensive and integrated energy efficiency strategy to encourage the development of net-zero energy, equilibrium housing. Demonstration projects are currently operating through the Canadian Mortgage and Housing Corporation. We suggest establishing a market transformation performance indicator for the energy efficiency utility for at least 50% of all new buildings and homes to be net zero energy by the year 2015.

### *Buildings*

We recommend that all new buildings be constructed to achieve a 30% improvement in building efficiency above standard building code and to meet Leadership in Energy and Environmental Design (LEED) Silver standards by 2012. We suggest that future standard upgrade evaluations concentrate on achieving a 50% improvement in efficiency as aggressively as possible.

*Appliances, Equipment and Lighting*

We recommend that the operating and standby efficiency of all major energy using products be regulated by 2011. Further, that all in-efficient lighting be phased out by 2013 utilizing an energy per lumen, technology non-specific measure.

*Energy and GHG Labels*

By 2012, mandate the energy consumption labelling of all products, houses, buildings and vehicles with special recognition of best practice and best-in-class (e.g. Energy Star)

*Point of Sale Standards*

By 2015, or earlier if program ramp-up will allow for it, introduce mandatory upgrading of energy efficiency at the time of sale or re-commissioning of all houses and buildings.

*(Please see Transportation section for transport and land-use related standards)*

## ENERGY POVERTY

The EAC was very pleased to see reference to the important issue of Energy Poverty in Nova Scotia within the discussion document.

The EAC strongly supports a “burden based” measure of energy poverty. If someone is spending over 6% of their income on energy, they are considered to have an unsustainable energy burden and thus be energy poor.<sup>41</sup> The burden-based measure provides the right flexibility and incentives for both policy makers and individuals to reduce energy poverty in the most effective way possible, while also ensuring universal access to a reasonable amount of energy, which is integral to establishing a Contract for a Low-Carbon Future in Nova Scotia. There are three ways to reduce energy burden:

- 1) Increase income through policies such as job creation, social assistance support and minimum wage legislation
- 2) Decrease energy use through energy efficiency programs that are accessible to low-income Nova Scotians
- 3) Fixed credits or targeted support aimed at alleviating unsustainable energy burden

The Universal Service Program<sup>42</sup> that has been suggested before the NS Utility and Review Board provides a combination of energy efficiency, fixed credits, crisis intervention and arrearage management. By providing a fixed credit linked to the previous year’s savings, the program provides a strong conservation incentive for low-income Nova Scotians, while ensuring against energy poverty.

The EAC fully supports implementation of a Universal Service Program for both electricity and heating fuels in Nova Scotia. This program will result in cost savings for Nova Scotia Power Inc. and the Department of Community Services by alleviating the administrative costs associated with credit and collections and enforcement.

The EAC wishes to highlight low-income energy efficiency as a long-term solution to the issue of energy poverty. We suggest that a comprehensive low-income energy efficiency program be provided for all fuels types in Nova Scotia and funded through the dedicated revenue mechanisms suggested (electricity rates and carbon tax). To guarantee that energy efficiency programs will serve low-income Nova Scotians, we recommend establishing a minimum funding amount for low-income energy efficiency that is tied to Nova Scotia’s rate of household poverty and low-income program costs.

All efficiency programs targeted to those at or below the Low-Income Cut Off must be no cost to participants to ensure accessibility.

---

<sup>41</sup> See Direct Testimony and Exhibits of Roger D. Colton before the NS UARB in the matter of: An Application by Nova Scotia Power Inc., for Approval of Certain Revisions to its Rates, Charges and Regulations, April 23<sup>rd</sup>, 2007.

<sup>42</sup> See Direct Testimony and Exhibits of Roger D. Colton before the NS UARB in the matter of: An Application by Nova Scotia Power Inc., for Approval of Certain Revisions to its Rates, Charges and Regulations, October 22<sup>nd</sup>, 2007.

## RENEWABLE ENERGY

The Climate Action Plan and Energy Strategy should recognize renewable energy as the preferred and dominant option for electricity generation. While energy efficiency will be able to level and then reduce electricity demand by 2020, renewable energy will be needed to make reductions in emissions that are consistent with the province's environmental goals.

The energy strategy should recognize how renewable energy interacts with existing electricity infrastructure and consider the barriers to the increased use of renewable energy. A dramatic increase in the proportion of renewable energy used in Nova Scotia may require a higher level of ingenuity and investment compared to some other jurisdictions.

The natural potential for renewable energy is enormous. Globally, direct solar radiation at the Earth's surface equals 6,000 times the amount of energy that the world demands, and the energy in wind alone equals 24 times the total energy consumption of current human civilization. This natural abundance of energy, however, is presently hampered by prior support and subsidization of a fossil fuel based electricity system in Nova Scotia. It is now broadly recognized in our province that renewable energy is the energy source of the future. We therefore suggest that the Climate Action Plan and Energy Strategy outline the following principle with regards to renewable energy policy:

*Nova Scotia's existing electricity system will operate and adapt to complement the development of renewable energy in Nova Scotia in order to aggressively reduce greenhouse gas emissions and encourage economic development, within reasonable social cost ranges.*

Nova Scotia Power's Integrated Resource Plan, which included an assumed base case with GHG reduction targets much less aggressive than the EGSPA, showed that doubling the current renewable energy target by 2030 would be cost-effective. Given that the province has more aggressive GHG reduction goals than those considered in the Integrated Resource Plan, maximizing the amount of renewable energy on the system is clearly part of a long-term least-cost energy plan. Developing renewable electricity generation as aggressively as possible will result in lower long-term energy costs than the fossil-fuel alternatives. Given that \$30 to \$50 a tonne, or greater, carbon prices are associated with moving towards a low-carbon future, it is prudent to do everything possible to increase the amount of renewable energy through multiple avenues, including options that might add incremental costs to the existing system.

This backdrop develops three questions for renewable energy that the Climate Action Plan and Energy Strategy must answer:

- 1) How do we meet the renewable electricity generation goal?
- 2) How do we increase renewable electricity generation even more in Nova Scotia?
- 3) How do we integrate renewable energy into a new social contract for a low-carbon future?

## HOW DO WE MEET THE RENEWABLE ELECTRICITY GENERATION GOAL?

The EGSPA legally commits the government of Nova Scotia to achieve a goal of having 18.5% of the total electricity needs of the province obtained from renewable energy sources by 2013. In addition, Nova Scotia Power's Integrated Resource Plan has shown that it is very economic to double this goal between now and 2029. Thus, we wish to discuss both the legally mandated goal, as well as further renewable energy penetration as part of a least-cost electricity resource plan.

The existence of a specific, legislated renewable energy goal and a long-term environmental and economic objective to “demonstrate international leadership” in the EGSPA means policy makers have a legal duty to actively consider policy best practices in renewable energy and to guard against any practice that could lead towards non-delivery of the goal.

In this respect, the EAC wishes to raise concerns with regards to the current request for proposals system to contract renewable energy. Continued utilization of this system to procure renewable energy should be re-evaluated given that the history in North America is that 50% of contracted projects are not built.<sup>43</sup>

Other jurisdictions with similar goals to Nova Scotia are now re-evaluating their renewable energy procurement policies (e.g. Ontario, British Columbia, Michigan). The California Energy Commission's 2007 Integrated Energy Policy Report stated that the state is not on track towards meeting a goal of 20% of generation from renewables by 2010. The Commission stated that “the trend in failure and delay of IOU RPS (*Renewable Portfolio Standard*) contracts is not encouraging”<sup>44</sup> and that “the potential for contract failure and delay, discussed below, indicates that if current trends continue, the 20 percent target will be met after 2010.”<sup>45</sup>

California has now established a target for 33% of electricity generation from renewable energy by 2020, and the Commission is responding to the government's targets by suggesting what must be done to meet these goals. In addition to better planning and permitting along with transmission and distribution system expansion and upgrades, the Commission states “California must move to a new system, such as the expanded use of feed-in tariffs”.<sup>46</sup> Feed-in tariffs are legislated, fixed prices for renewable energy supply.

---

<sup>43</sup> Building a “Margin of Safety” into Renewable Energy Procurements: A Review of Experience with Contract Failure. Consultant Report prepared by KEMA Inc. for California Energy Commission, January 2006.

<sup>44</sup> California Energy Commission, 2007 Integrated Energy Policy Report, November 2007, pg. 163

<sup>45</sup> *ibid*, pg. 162

<sup>46</sup> *ibid*, pg. 184 & further, pg. 190 states “Although the Committee would like to see all the signed contracts for renewable energy come to fruition, the historical record to date indicates this unlikely to be the case. An expanded use of feed-in tariffs can stimulate the robust pace of renewable energy developed needed to achieve 33 percent renewables by 2020.”

The feed-in tariff is viewed not only as a mechanism to ensure California reaches its goals, it is also seen as a mechanism to increase transparency, reduce complexity, encourage non-wind renewable energy and to protect consumers. The commission raises the potential for renewable energy generator collusion to bid up the price in areas where new infrastructure investments are undertaken to procure renewable energy.<sup>47</sup> Given that construction of new transmission infrastructure in wind-rich areas is likely needed in Nova Scotia, this could also be a concern.

The California Commission has recommended the immediate implementation of a feed-in tariff for renewable generation projects up to 20 MW in size and the launching of a white paper to evaluate feed-in tariffs for larger projects to “accelerate renewable development in the next decade”.<sup>48</sup>

The EAC emphasizes that policy makers in Nova Scotia have a duty to consider lessons such as those in California. We recommend consideration of a Nova Scotia specific feed-in tariff policy to ensure the province’s legislatively mandated goal is achieved.

In addition, the EAC recognizes that transmission and distribution upgrades may be needed to reach the interim 2013 target. We call upon the costs of these upgrades to be spread across the entire rate base so these upgrades are undertaken in a planned fashion that seeks to marry renewable energy resources with new transmission infrastructure and that works towards the building of a grid for a decentralized energy future.

## **HOW DO WE INCREASE RENEWABLE ELECTRICITY GENERATION EVEN MORE IN NOVA SCOTIA?**

In order to meet more aggressive GHG reduction goals, Nova Scotia will very likely need to increase the utilization of renewable energy resources beyond what is currently considered to be the technical capacity of the existing grid infrastructure to accept renewable resources, considering that many renewable resources are intermittent, variable on fairly short time scales, and non-dispatchable.

To undertake these “deeper” GHG reductions in the electricity system a variety of options are generally put forward, not all of which involve high proportions of renewable or green energy. Some of these options could be described as pathways, four of which are the nuclear pathway, large-scale hydro pathway, carbon capture and storage pathway, and the decentralized energy pathway (with electricity storage). These pathways are not mutually exclusive. The EAC recognizes that all forms of energy have an environmental impact, but emphasizes a decentralized renewable energy system as a form of energy

---

<sup>47</sup> *ibid*, pg. 189-190 states “A competitive RFO does not protect the ratepayers against the risk of collusion by energy generators to ratchet up the price bid for RPS contracts in renewable resource zones with new infrastructure investments. Nor does it provide a transparent process for developers to easily know and anticipate what price they will receive their energy. A technology-specific feed-in tariff can accomplish both of these goals and pay a price that reflects the value of the energy product provided by the renewable energy generator.”

<sup>48</sup> *ibid*, pg. 192.

generation that has the least environmental impact and that is most conducive to the establishment of a new contract for a low-carbon future in Nova Scotia.

Below is a graph considering the costs and benefits of each pathway mentioned above:

**Table: Deep GHG Reduction Pathways**

<b>Pathway</b>	<b>Description</b>	<b>Environment</b>	<b>Economics/ Security/ Autonomy</b>	<b>Complements Renewables</b>	<b>Social – Part of Low- Carbon Contract?</b>	<b>Policy Conclusion</b>
<b>Nuclear</b>	Nuclear Generation Within Atlantic Region	GHG released during life-cycle operation & significant environmental problems with radioactive pollution	Expensive, Uncertain, Dangerous, Slow to Build  Requires large scale back-up in event of shut-down	No.  Hinders renewables  Centralizes grid, Slow dispatch,  Requires significant financial resources that competes with renewables	No.  Associated with large rate increases and debt levels with few opportunities for community based development	Illegal in Nova Scotia  Creates Significant Environmental Problems  Oppose development within regional context
<b>Large Scale Hydro</b>	Connection to Large Hydro Within Eastern Canadian Region	GHG emissions and environmental costs of new dams (Lower Churchill)  Quebec has existing hydro capacity that can be made available	NS does not have significant control over hydro resources/import availability or price	Yes	Maybe.  Policies would need to be established to allow community participation	Connection to Hydro Quebec worth ongoing consideration, but contingency plans must also be made
<b>Carbon Capture and Storage</b>	CCS Plant(s) in Nova Scotia	Viability and impacts of carbon storage still unknown	Unsure  CCS projects have recently been cancelled due to costs	No	No  Rate increases going to large centralized generation, not communities	Worth experimentation as contingency plan
<b>Decentralized Energy</b>	Diversified solar, wind, tidal, waste heat recycling, biogas etc. with energy storage	Little environmental impact	Provides energy autonomy & security  Extra costs associated with energy backup and/or storage	Yes	Yes  Opportunities for all to participate  Large potential for innovation	Best Choice  Most Worthwhile Policy Focus for NS

As can be seen from the table above, the EAC sees nuclear energy within the Maritime or Atlantic region as an option that will work against Sustainable Prosperity by creating significant economic and environmental costs, while providing no value-added in terms of renewable energy complementarily.

In contrast, connection to large-scale hydro from Labrador or Quebec is a potentially attractive option because the extra energy storage or backup capacity this would provide to Nova Scotia could allow the province to unleash our massive technical potential for renewable energy generation from intermittent sources such as wind. The availability of backup power from New Brunswick is the key reason why Prince Edward Island is on track to achieve very high proportions of wind power generation. Nova Scotia could do the same with a source of back-up hydro power. The largest potential source of this backup hydro power is the proposed Lower Churchill Falls hydroelectric project. However, this project will create GHG emissions and significantly alter ecosystems in Labrador. Instead of Nova Scotia being a participant in new ecological destruction in the Atlantic region, an ecosystem perspective would call upon Nova Scotia to utilize the existing hydro resources in Quebec. While the EAC would encourage Nova Scotia to explore this potential with the province of Quebec, we recognize that connection to hydro resources requires a large investment to upgrade transmission infrastructure, and that the price of hydro power from Quebec might need to reflect the higher prices in New England, where Hydro Quebec now sells electricity. Nova Scotia might have to achieve deeper GHG reductions through other strategies.

One such strategy is to utilize carbon capture and storage (CCS) technology. At the present time, this technology is very uncertain and cannot be relied upon to provide the solution for Nova Scotia to meet its environmental goals. It is however an area worthy of ongoing experimentation (see innovation section below for further discussion). One potential drawback to CCS, and potentially large-scale hydro imports, is that the centralized nature of these generation technologies would mean that extra costs would be born by the citizens of Nova Scotia without the commensurate opportunity for Nova Scotians to become renewable energy producers themselves, which we identify below is a significant component of a contract for a low-carbon future.

The policy option that appears most promising to focus on is for Nova Scotia to develop policies and practices to move us toward a decentralized energy pathway. This pathway can be followed in conjunction with experimentation and exploration of large-hydro and CCS options, but is preferred due its low environmental impacts, improved energy security and autonomy and complementarily with the vision for a low-carbon future emphasized in this document. In contrast to the large-scale hydro and CCS pathways, progress towards a decentralized energy future could not be hampered by other jurisdictions. The province of Nova Scotia can make progress towards this pathway by utilizing its own resources and skills.

We recommend that Nova Scotia explore a variety of options related to hydro imports, CCS, and decentralized energy while not putting all of our “eggs in one basket”. We

suggest that the bulk of government support should encourage the development of the decentralized energy pathway. Hence, options must be explored today that will allow Nova Scotia to eventually see 100% of the province's generation to come from renewable energy.

In order to move towards a decentralized energy future, Nova Scotia needs to begin deployment and experimentation with non-wind renewable energy resources. Other renewable or green energy sources include solar, tidal, wave, biomass, biogas, waste heat and geothermal. Some of these energy sources are not procured in the current renewable portfolio standard system because their marginal costs are currently higher than wind. Others such as biogas are smaller scale and more decentralized and thus do not participate in complicated bidding processes. Both emerging and smaller-scale decentralized forms of renewable energy can be developed in Nova Scotia by creating technology-specific feed-in tariff rates. Providing feed-in tariff rates for all forms of renewable energy will let Nova Scotia gain valuable experience with multiple forms of renewable energy and diversify our energy resources, which can put us on the pathways towards a decentralized energy future.

In addition to technology specific feed-in tariffs we recommend that a planned upgrade of Nova Scotia's transmission and distribution system be undertaken in order to complement the deployment of geographically diversified renewable energy sources.

A decentralized energy future will require the System Operator to play a major role to ensure reliability from a variety of diversified energy sources, requiring the System Operator to gain expertise in renewable energy balancing and storage. We also emphasize that these energy sources should be owned by a diverse range of Nova Scotians. In this future, we do not feel that it is appropriate for Nova Scotia Power Inc. to remain the System Operator.

We recommend that an Independent System Operator (ISO) be created within Nova Scotia, or potentially within the Maritime Provinces. The ISO should work to develop expertise in renewable energy balancing as well as energy storage solutions. Grid management in a decentralized energy future should seek to provide the most cost-effective, workable and reliable options for maintaining a continuous supply of electricity from a distributed set of generators.

We recommend that the ISO develop a wing that will work closely with Nova Scotia's universities and communities to experiment with energy storage and grid management solutions. We also recommend that the grid manager work with the provincial government and its committees to create rules and incentives for renewable energy producers that contribute to the efficient functioning of the electricity system.

An immediate project we suggest is the commissioning of a study to identify potential areas for pumped hydro renewable energy storage (e.g. hydro-wind systems), compressed-air storage and other energy storage options. We then suggest that feed-in tariffs be established that are differentiated based on the potential for energy storage to

mandate and/or encourage renewable energy producers to develop projects that will be amenable to energy storage solutions.

The EAC recognizes that a greater amount of ingenuity might be required to dramatically increase the amount of renewable energy generation in Nova Scotia. We believe this is an opportunity and not a “barrier” in the context of the EGSPA, which also includes a focus on economic development and innovation. If we begin to experiment today with a variety of different renewable energy sources and solutions for grid management in collaboration with our universities and communities, Nova Scotia can become a leader in the development of decentralized renewable energy systems.

### **HOW DO WE INTEGRATE RENEWABLE ENERGY INTO A NEW SOCIAL CONTRACT FOR A LOW-CARBON FUTURE?**

An important component of a new Contract for a Low-Carbon Future is to provide the opportunity for individuals, communities and businesses to become energy producers themselves. In *Opportunity Awaits*, Nova Scotia’s Co-operative Council has stated that “the development of renewable energy represents a great opportunity for Nova Scotia; an opportunity that can bring significant benefits to a broad spectrum of Nova Scotian communities and citizens with minimal consequences.”<sup>49</sup> The Co-operative Council views renewable energy as an important tool for the economic revitalization of rural communities. This type of thinking shows us the path to a low-carbon future where energy prices might increase, but communities and businesses are provided with opportunities to benefit as a result of that increase.

Nova Scotia has also recently experienced some local community opposition to wind power proposals. The EAC does not wish to discount the concern of these communities and supports the establishment of standard siting rules, policies and planning guidelines. We also suggest that renewable energy should not be held to a higher standard than fossil fuel generation. So, if we are going to consider compensation or support for communities affected by renewable energy generation, we should do the same thing for fossil fuel generation.

In addition, however, we note that “Not in My Back Yard” attitudes have been reduced in jurisdictions that have actively promoted policies to ensure local economic development benefits for communities through local and cooperative ownership and/or direct resource revenues flowing to neighbours and communities. One example is Prince Edward Island’s distribution of resource revenues towards neighbours of renewable energy installations. The EAC wishes to encourage the development of co-operatively and locally owned renewable energy as a fundamental component of a Contract for a Low-Carbon Future. We believe ensuring renewable energy installations are supported, as a benefit, not opposed as a curse, is integral to the widespread adoption of renewable energy.

---

<sup>49</sup> NS Co-op Council, *Opportunity Awaits*, pg. 1

Feed-in tariffs are one policy that provides increased transparency, reduced complexity and lowers the cost of financing, which can help community-based renewable energy projects participate in the market. In addition to feed-in tariffs to promote community-scale development, we would also encourage the development of Renewable Energy Resource Centres in both rural and urban communities to provide support with technical, financial, resource, interconnection and site and permit issues.

## CONCLUSION

The EAC supports a comprehensive, flexible and adaptive renewable energy policy that aims to increase the amount of renewable energy in Nova Scotia as aggressively as possible in order to stabilize energy costs.

All three questions that we identified with regards to renewable energy policy involved the adoption of a feed-in tariff as a component. We would therefore recommend that a public committee be established to determine feed-in tariffs under the following objectives and guidelines:

- 1) Feed-in tariff rates are based on the cost of generation, plus a reasonable profit.
- 2) Feed-in tariff rates are differentiated by renewable energy technology, including solar, biogas, tidal and combined heat and power.
- 3) Feed-in tariff rates are differentiated by energy resource
- 4) Feed-in tariffs rates may be differentiated to encourage energy storage and improve grid management

We suggest that the public committee for the purpose consist of representatives from:

- 1) The Nova Scotia Department of Energy
- 2) The Nova Scotia Department of Environment
- 3) The Nova Scotia Utility and Review Board
- 4) A representative of the NS Environmental Network knowledgeable in renewable energy issues
- 5) Representatives from each affected renewable energy industry
- 6) The Nova Scotia Co-operative Council
- 7) The Union of NS Municipalities
- 8) The Nova Scotia Federation of Agriculture
- 9) The Independent System Operator
- 10) The Consumer Advocate

The EAC recognizes that innovative technologies, most likely utilizing a form of energy storage, will be required for Nova Scotia to move towards a decentralized energy system. We therefore recommend that the Nova Scotia government continue to provide funding and incentives for research and commercialization, with specific emphasis in the area of energy storage. A strategy that links Nova Scotia's university sector, local communities and an Independent System Operator can be drawn upon to create a new system of innovation for decentralized energy in Nova Scotia, and the Maritime region.

We also recognize the need for upgrades to our existing grid. We recommend that the costs of grid upgrades be spread across the entire rate base and that grid upgrades be undertaken in a planned and coordinated fashion.

In addition to moving forward with experimentation and research to lead Nova Scotia towards a decentralized energy future, we are also supportive of Nova Scotia actively exploring opportunities to connect to hydro capacity that exists in other jurisdictions. We also support research into carbon capture and storage, which will be elaborated upon in our discussion of innovation policy.

## SUSTAINABLE ENERGY INNOVATION

Nova Scotia is well positioned to innovate in the sustainable energy field, given its smaller scale, its resources and the nature of its university sector.

Traditionally, the small size of Nova Scotia's population and institutions has been a disadvantage. It has been difficult for universities and companies to attract large amounts of research funding.<sup>50</sup>

However, Nova Scotia's geographically distributed university sector can complement the geography associated with sustainable energy development. Linking our universities with local communities to experiment and develop knowledge about sustainable energy systems is an opportunity too promising to miss out on.

The EAC supports an aggressive research and innovation strategy for Nova Scotia. Such a strategy must encourage experimentation and be flexible and adaptive to consider possible sustainable energy futures.

### R&D AND DEPLOYMENT FUNDING

Nova Scotia has recently announced \$9.5 million dollars from the present time until 2010 to encourage the commercialization of low-carbon technologies. We encourage an approach that allows researchers and communities to develop their own research and commercialization proposals to tap into existing innovative capacity and leverage funding opportunities. However, we believe there is also a role for government to encourage research and experimentation in areas of strategic importance for the province, such as energy storage, and to work towards developing capacity in these areas.

The *Stern Review on the Economics of Climate Change* estimates the existing deployment support for renewables, biofuels and nuclear energy to be \$33 billion each year. To achieve a 550 ppm CO<sub>2</sub>e stabilization level<sup>51</sup>, the Stern Review recommends that deployment support increase by 176% in 2015 and 393% in 2025<sup>52</sup>. If Nova Scotia is to make an equivalent per capita investment in deployment and then increase this investment in accordance with this schedule we estimate an investment in deployment support from Nova Scotia of \$24 million is required by 2015, ramping up to an investment of \$53 million by 2025.

The Stern Review also recommends immediately increasing global R&D levels for low-carbon technologies to \$20 billion each year. Based on the global investments suggested

---

<sup>50</sup> Rick Conroad "Private sector lagging in R&D" *Halifax Herald*, Nov 30<sup>th</sup>, 2005.

<sup>51</sup> Note that this is not the 450 ppm CO<sub>2</sub>e stabilization level consistent with avoiding 2 C of warming. Thus these suggestions should be taken as minimums. Both because they are less than adequate to avoid dangerous climate change and because Nova Scotia might wish to place particular emphasis on R&D and innovation consistent with the *Premiers Advisory Council on Innovation* recommendation.

<sup>52</sup> Nicholas Stern 2007 "The Economics of Climate Change" Cambridge University Press, pg. 422. This also assumes a carbon price of \$25 per tonne.

by the Stern Review we estimate that an appropriate annual R&D contribution in Nova Scotia would be \$16.3 M a year.<sup>53</sup>

We encourage R&D and deployment support to be spread over a wide variety of technologies, but key areas of interest for Nova Scotia include energy storage and emerging technologies, tidal power, and carbon capture and storage.

## **ENERGY STORAGE**

Energy storage is worthy of particular attention because of the relevance of intermittency constraints in Nova Scotia's electricity system, probability of success, the potential for short lead-times and global rewards associated with success and rewards associated with other areas such as transportation. If energy storage technology can be developed in Nova Scotia, that region can increase self-sufficiency and autonomy while providing economic development benefits to the entire province through distributed energy generation.

Energy storage research should be coupled with a variety of decentralized energy technologies such as wind, solar, and combined heat and power.

We also recommend that research and innovation projects to encourage energy storage be given special consideration for government support.

## **CARBON CAPTURE AND STORAGE**

The EAC recognizes carbon capture and storage (CCS) as a technology that will be most attractive to traditional utility and power sector interests because it allows for maintenance of central operation and control and maintenance of technologies and fuel types in which companies like Nova Scotia Power have investments and expertise.

Thus one of the best ways to leverage R&D and innovation in CCS and coal gasification technologies is to create an appropriate price for carbon and/or institute appropriate regulations. We expect that implementation of the new coal fired power plant standard suggested as well as the market-based regulations will induce significant private sector research into CCS technologies.

Some taxpayer investments in CCS R&D can be warranted, as long as taxpayers are assured a reasonable financial return on their investment by the government retaining equity in CCS infrastructure.

It is crucially important that Nova Scotia not allow the development of carbon capture and storage to hinder the development of more radical technologies such as wind, solar, and tidal power. Creating niche-markets and innovation strategies to allow these

---

<sup>53</sup> The Nova Scotia estimates for R&D and deployment are derived from distributing the suggested budgets over the OECD population.

technologies to develop to their full potential is extremely important for Nova Scotia's innovation policy and for the establishment of a Contract for a Low-Carbon Future.

## **OCEAN ENERGY**

A research and development (R&D) and innovation strategy for ocean energy must first and foremost focus on the full pursuit of knowledge. It must allow us to fully evaluate multiple technologies for their social, environmental and economic merits and it must be open to the numerous potential knowledge spin-offs that can occur in a variety of areas.

Nova Scotia must recognize that much is still not understood on a number of issues: the nature of the Bay of Fundy ecosystem; the full environmental effects of ocean energy; the social and institutional implications of these new technologies; and which ocean technology is most effective. These questions pose difficulties, but they also pose opportunities for Nova Scotia to explore a variety of exciting and unpredictable areas of knowledge.

Given this situation we encourage Nova Scotia's R&D strategy for tidal energy to work towards the maximization of experimentation with multiple technologies, in multiple locations, in cooperation with multiple research institutions. We encourage us to incorporate considerations of the entire Bay of Fundy ecosystem in our analysis and to encourage sharing of information and knowledge.

Ocean energy must also become part of a Contract for a Low-Carbon Future. Given some of the NIMBY attitudes associated with some wind developments in Nova Scotia, we believe it is important for Nova Scotia to develop an ocean energy economic development policy that is inclusive. We fully support revenues from ocean energy production flowing back into coastal communities. This will need to be done at a municipal county or community scale, with revenues perhaps going towards supporting visible social projects such as sustainable energy initiatives in local community centres, libraries and transportation options.

## **TRANSITIONS IN EXISTING INDUSTRIES**

Innovation is about transformation and transition. It is about shifting production from old products and processes to new ones. The pathway to sustainable prosperity through innovation moves us towards a more community-focused, less wasteful, higher value-added, democratic and socially responsible economy.

As already mentioned, some existing industries can feel threatened by newer, greener technologies. But, continuing the subsidization of pollution or offering short-term subsidies and pay-offs to existing industries that feel threatened by Sustainable Prosperity works to the detriment of Nova Scotia's long-term economic development and the development of existing industries themselves. Michael Porter, an internationally renowned expert on competition and corporate strategy from Harvard University explains that, "policies that convey static, short-term cost advantages but that unconsciously

undermine innovation and dynamism represent the most common and profound error in government industrial policy.”<sup>54</sup>

In our discussion on regulations, we discussed the need for economy wide regulations to spur new innovations and help propel useful transitions. As spelled out in some detail, this should not preclude targeted government intervention in specific companies or industries to accelerate, not impede, the transition towards a low-carbon economy.

Equally important is ensuring a smooth and productive transition for Nova Scotian workers. In many cases workers and their unions can be integral to transitioning existing industries towards low-carbon production because of their knowledge of production processes. In cases where transitions within and between sectors are warranted, a Contract for a Low-Carbon Future must be developed with workers and their unions to ensure they benefit by securing jobs in low-carbon industries that are socially responsible, competitive, value-added and safe.

Active labour market policies are required to transition from these old jobs to new, by providing direct social support, job transfer assistance and skills upgrades in collaboration with workers and their unions.

We suggest that the newly formed Department of Labour create a *Sustainable Prosperity Transitions and Training Division* that will be mandated with ensuring a fair and just transition towards a low-carbon economy.

We also recommend that an *Office of Sustainable Prosperity Strategy* within the Department of Economic Development develop a group of experts in green technologies and processes within specific sectors relevant to the Nova Scotian economy. This group will be tasked with leading the transition both within and between sectors of the economy consistent with economy-wide carbon reduction policies.

---

<sup>54</sup> Michael E. Porter “The Competitive Advantage of Nations” in 1996 *On Competition* Boston: Harvard Business Review, pg. 186.

## PLANNING FOR CHANGE

The Ecology Action Centre recognizes that “planning for the changes to our natural world is a broader and more complex discussion, involving areas as diverse as farming, coastal habitat, forestry, and real estate”<sup>55</sup>

The Climate Change Strategy proposes, “planning for change:” as the next order of business. The Ecology Action Centre suggests that planning for change by developing and implementing climate change adaptation strategies cannot be isolated from prevention and mitigation strategies. The current and future risks facing Nova Scotia to require that we start serious adaptation efforts immediately.

Adaptation planning will be complex; a process will have to be developed for the many government departments and levels of government to coordinate efforts and initiate discussion with academics, scientists, planners and the public about the key elements of a climate change adaptation strategy. Getting the right people at the table will take time. However, planning for change should not be separated from strategies to mitigate the current climate crisis by reducing green house gas emissions.

The literature on climate change adaptation<sup>56</sup> stresses that climate change adaptation must include the elements of preventing impacts through aggressive efforts to reduce greenhouse gas emissions; minimizing vulnerability by preventing risky activities such as new developments on floodplains, and strategic investments to protect existing infrastructure. The growing body of work on climate change adaptation<sup>57</sup> also reinforces the idea that at some point public policy decisions must be made about the cost effectiveness of different approaches. For example, is it a wiser investment to protect existing infrastructure by making dykes taller to accommodate rising sea levels or to let these areas be reclaimed by the sea?

Climate change adaptation is not just about reacting to changes – it requires proactive action to anticipate and minimize impacts; take advantage of emerging opportunities; and find ways to create environmental and economic benefits from climate change adaptation measures. .

More specifically, the EAC wants to incorporate climate change adaptation directly into the Climate Action Plan and Energy Strategy for the following strategic reasons:

1. *Linking greenhouse gas reduction with adaptation.* The elements of a climate change strategy should serve the dual purpose of helping reduce green house gas emissions and also help us prepare for change. For example, currently there is intensive pressure for new residential development in coastal areas. These properties and supporting public infrastructure such as roads are vulnerable to

---

<sup>55</sup> Climate Change in Nova Scotia: A Background Paper to Guide Nova Scotia’s Climate Change Action Plan, October 2007, pg. 2.

<sup>56</sup> CCIARNS 2006, Mount Allison 2007

<sup>57</sup> Environment Canada 2006

climate change impact such as sea level rise and storm surges. Sustainable transportation and planning strategies that encourage higher density commercial and residential hubs served by public transit and bike paths encourages sustainable and active transportation, while at the same time reducing the need for new roads in areas that will be vulnerable to sea level rise and storm surge damage. These strategies can reduce greenhouse gas emissions associated with transportation while also reducing public and private vulnerability to climate change impacts.

2. *Urgent need to start adaptation.* Climate change is not something that will happen in the future- it is already happening. We have to start dealing with the changes, not just plan for them. Certain areas of our province, especially floodplains and low-lying coastal areas are not suitable for certain activities such as new residential or commercial developments. Development in coastal areas damages these ecologically sensitive areas and is hazardous to the property owner and the public. The risk is recognized, yet no level of government has acted decisively to change patterns of land use development along the coast. We continue to allow new developments in coastal areas that increase private and public risk and vulnerability to climate change. There is an urgent need to start applying our existing knowledge by acting to avoid increasing our risks and vulnerabilities, while simultaneously filling in information gaps through research, mapping, modelling and risk assessment exercises.
3. *More cost effective adaptation by minimizing vulnerability and maximizing resiliency* Trying to separate climate change prevention from climate change adaptation will increase our vulnerability and miss potential opportunities to maximize the resiliency and adaptive capacity of natural systems. For example, coastal features such as wetlands are natural sponges soaking up water and slowly releasing it into the surrounding area. Many types of wetlands are very efficient at storing carbon. Altering, infilling and otherwise damaging wetland systems leads to a loss of very productive wetland habitat and the ecological services they provide. It also increases private and public risk and property damage since lands that are already natural sponges are going to face increasing flood risk. At the same time, wetlands and other coastal ecosystems are dynamic systems that are constantly evolving. Given room to move, wetlands move inland, increasing natural shoreline flood protection. Implementing strict wetland protection policies prevents development in flood prone areas and is also a good investment in maximizing the resiliency of coastal ecosystems. It is also far cheaper to protect the natural adaptive capacities and functions of coastal areas when while they are still intact than to rebuild or restore them after they have been lost to unwise coastal development.
4. *Getting Accurate Information* Nova Scotia shares many of the same climate change risks as neighbouring provinces that are also largely coastal and heavily dependent on natural resource based industries like fishing, forestry and marine

transportation. Our general risks and vulnerability are well understood.<sup>58</sup> In coastal areas, these include: increased tidal and freshwater flooding, changes in draining patterns, accelerated erosion and sedimentation, more frequent and intense weather events, storm surges and sea level rise. There are also concerns about how higher temperatures, changes in precipitation and drainage, will affect forestry, agriculture, and fisheries.

We still need more accurate information about the resources and vulnerabilities in different parts of the province and for different sectors. Identifying vulnerable and sensitive areas and predicting change at a more local level is important for climate change adaptation and the basis for starting a planning process. The Climate Action Plan and Energy Strategy needs to prioritize generating locally relevant information about climate change impacts so that municipal governments, community groups and affected sectors can participate in the planning and adaptation that is urgently needed.

## **CLIMATE CHANGE ADAPTATION STRATEGIES FOR NOVA SCOTIA**

The province of Nova Scotia should commit to developing a systematic approach to identifying risks and vulnerabilities around the province and by sector. They will need to offer resources and technical resources to municipalities and sectors (fisheries, agriculture) struggling to figure out what to expect and how to prepare. Risks by type, location, severity and likelihood and make this information widely available to the public and local governments.

Mapping climate change impacts and modelling different risk scenarios is crucial for preventing unwise land use decisions as well as for planning. A full coastal LIDAR mapping exercise may be prohibitive for the province, however criteria to evaluating the cost benefit of LIDAR assisted modelling should be developed to identify priority areas for LIDAR mapping. Making LIDAR the gold standard for risk assessment puts an unfair burden on municipalities in determining whether or not certain areas should be zoned as hazardous lands. The province should provide guidance and criteria for lower cost mapping, risk assessment and modelling techniques for municipalities.

There are many levels of government who have a role to play in climate change adaptation. A clear provincial leadership role is needed to coordinate effort and clarify responsibilities between the federal, provincial and municipal governments. The province must assume leadership in adaptation by developing and implementing a provincial coastal management strategy that addressed land use in coastal areas of the province and addresses climate change impacts.

Planners will play a key role in developing adaptation strategies that reduce vulnerability through land use planning. Planners based in academic institutions or larger municipalities have the information and support to develop adaptation tools to be used by planners or municipal councils around Nova Scotia. The province should actively seek

---

<sup>58</sup> NRCAN, 2004, NSDOE 2005

out and support the development of planning based adaptation approaches by partnering with the Canadian Institute of Planners, Dalhousie University School of planners, and the Union of Nova Scotia Municipalities.

The province will also play a crucial role in translating model adaptation tools into application at the municipal level. They can play a leadership role in establishing a *Statement of Provincial Interest* in support of climate change adaptation planning and developing the necessary policies and guidelines to support effective planning for change.

#### Natural shorelines

Vast areas of Nova Scotia's coastlines remain undeveloped. This creates an opportunity to develop land use strategies and adaptation planning before too much development occurs. Nova Scotia's coastlines include a diversity of ecosystems. All play a role in reducing our vulnerability to climate change. They are the interface between the land and they have evolved to cope with land and oceanic forces (wind, tides, storms, and run off) Coastal systems are naturally dynamic. They migrate and adapt to changes such as sea level rise. The current and future rate of change, however, will put a stress on these systems since natural processes like erosion and storm surges will be accelerated and intensified.

At the same time, the intensifying pressure of coastal development is putting a squeeze on coastal systems. They no longer have time or space to adapt and consequently, we are going to be losing beaches and other coastal features at an alarming rate. We will also be losing a natural, buffer between inland areas and the sea, increasing the vulnerability of coastal properties to storm damage and erosion. There is a tendency to protect coastal infrastructure by constructing breakwaters, rock walls and other shoreline "protection structures". This is expensive and counterproductive and leads to erosion problems elsewhere on the coast.

Preserving natural shorelines is a better investment than building rock walls. A climate change adaptation strategy should encourage preservation and protection of natural shorelines through aggressive and systematic acquisition of coastal lands and discouraging public or private investment in shoreline hardening.

#### Protecting Coastal and Inland Wetlands

Wetlands require special attention within a climate change strategy. Wetlands are productive habitat providing essential ecological services far exceeding their actual area. Wetlands are crucial for climate change adaptation: they offer protection against floods, sedimentation and coastal erosion; wetlands improve water quality and are often areas of groundwater recharge, making them an even more important asset in mitigated anticipate changes in precipitation and drainage patterns. Research shows that wetlands are effective carbon sinks and could play a role in carbon sequestration at a local level. While wetlands are an asset reducing change risks, wetland destruction and construction of homes and infrastructure on wetlands can increase our vulnerability as these areas are at risk of flooding.

A climate change strategy must prioritize preventing loss of wetlands, avoiding any further loss of salt marshes and other vulnerable coastal wetlands, and prioritizing restoration of damaged wetland systems. This strategy would be consistent with the British approach, which emphasizes restoring large areas of dykelands as natural shoreline protection for inland areas.

#### Beach Protection

Beach systems are natural buffers against wave energy and storm surges. They slow down the power of the water before it hits shoreline infrastructure. Protecting beaches and dune systems is another key element of climate change adaptation. Preventing development on and adjacent to beach systems will maximize their resiliency and give them room to move backwards and migrate inwards as they naturally do.

Existing rules around gravel extraction, and motorized vehicles on beaches as well as other activities, which weaken beach systems need to be strengthened and enforced. Beaches will protect us if we protect their natural functions.

#### Land Use Planning – Setbacks and Zoning

Land use planning is an effective strategy to reduce vulnerability to climate change impacts. We need to identify hazardous areas and zone them as such to prevent development on floodplains, and low-lying coastal areas. The best tool is setbacks from water bodies including wetlands, ponds and watercourses. Existing Statements of Provincial Interest need to be strengthened to address climate change adaptation. Currently, municipal planning and zoning is at the discretion of the municipality. This may not be adequate to minimize risks and protect the buffering capacities of coastal areas and watercourses. Provincial guidance is required within the context of planning for change and climate change adaptation. The province should work with the Union of Nova Scotia Municipalities to make changes to the Municipal Government Act to facilitate planning for climate change adaptation.

#### Watershed stewardship and Management

Water resources will be increasingly stressed as a result of climate change. The possible changes range from contamination of existing supplies, changes in precipitation and drainage and salt water intrusion into wells. Climate change adaptation requires managing water quality and quantity. This will require a good inventory of water resources and condition. Local planning is important for protecting and managing water resources, especially since so much is dependent on sound land use planning to protect water bodies, floodplains, and water recharge areas. Water planning should be done at the watershed level by management bodies that include local stakeholders, municipal government, scientists and provincial officials.

#### Protecting existing infrastructure

Climate change adaptation requires different strategies. There are many risks that can be minimized by planning and prevention. Nonetheless, Nova Scotia will still be faced with an increasing number of structures and infrastructure and rising protection and maintenance costs. Some of these increasingly vulnerable roads and structure are

essential to existing economic activities – wharves, highways, and bridges. Others may provide mostly benefit to private or commercial interests. Municipalities, landowners and the province will face increasing questions about the costs and benefits of maintaining and protecting certain types of vulnerable infrastructure. Should maintaining access to popular beaches and recreational trails have a higher priority than fixing washed out driveways or golf courses? Should rock walls be allowed to protect fish processing plants but not seasonal cottages? Should the province pay the costs of flooded basements or is this a private cost?

These will be difficult public policy questions with public, private safety and economic implications. Many jurisdictions are finding that the insurance industry is forcing state involvement in these discussions. The province should anticipate these challenging questions by fully identifying vulnerabilities and risks and starting to define priorities for protection. Other jurisdictions use public cost accounting criteria to decide what to protect for how long or gradually take over ownership of particular vulnerable properties and infrastructure. The province should engage insurance industry, property developers and other stakeholders in the development of policies and criteria for assessing what types of vulnerable infrastructure is a priority for protection and maintenance. .

#### Reinforce other provincial initiatives

Climate change adaptation should be integrated into existing public policy initiatives such as the Water Strategy, Coastal Framework, and Natural Resources Management Strategy. They could be better integrated if some clear goals for climate change adaptation are developed that can be presented discussed and adopted within each of the ongoing processes. In this way, all these policy setting processes will finish with a common and overarching of priorities and goals for climate change adaptation within which unique sector specific adaptation strategies can be developed and implemented.

#### Coastal Monitoring

Coastal monitoring can help address coastal erosion, infrastructure protection, and problems associated with sea level rise and coastal flooding as climate change impacts. Monitoring can be effective for addressing coastal erosion while predictive modeling and other tools may be more appropriate in dealing with sea level rise and coastal flooding. Baseline data collection is a key component of the monitoring process. Presently, there are very limited federal and provincial efforts to collect baseline data about coastal areas. We need information about erosion rates in different parts of the province to establish appropriate setbacks and land use guidelines. The provincial government should seek funding to create a provincial coastal monitoring program.

## FOREST MANAGEMENT & CARBON STORAGE

As noted in the discussion documents prepared by the Department of Energy for this strategy, forests absorb greenhouse gases. It is also noted that biomass fuels are “considered carbon neutral because as forests regenerate they use CO<sub>2</sub>”, and that the government is including biomass as a renewable energy source.

These ought to have been qualified statements, placed in the context of the overall impacts of climate change on forests, as well as the consequences of forest harvesting on forest carbon storage.

### Impacts on biodiversity

As noted by scientists around the world, climate change will have very significant impacts on biodiversity. For the forests of this region, the rate of change for the next 100 years is predicted to be about the same as the changes that have taken place over the last 10,000 years. Consequently, there is major concern about the ability of tree and other species to adapt to new conditions and/or shift their ranges. Depending on species responses to climate warming, especially their ability to migrate to new sites, habitat change in many ecoregions has the potential to result in catastrophic species loss.

In terms of impacts on the primarily softwood-driven forestry sector, modeling recently completed by UNB’s Faculty of Forestry suggests that only small temperature increases are going to reduce the amount of suitable habitat for spruce and fir in the province, and increase that for tolerant hardwoods. This would suggest that decades of government policy to encourage the planting and growing of softwood species for the forestry sector needs to be revisited and modified to adapt to changing conditions.

### Forest harvesting and carbon storage

In addition to the changes that global warming will create, the current state and condition of our forests, and the way they are being managed, has a very significant influence on forest carbon storage. Research from around the world indicates that the replacement of older, natural forests by younger ones will result in a net release of carbon to the atmosphere<sup>59</sup>. When clearcut, large amounts of stored carbon are lost from forests by volatilization as well as by the removal of merchantable biomass.

A 1998 New Brunswick study concluded that a landscape managed as a shifting mosaic of plantations on a 60-year rotation would store only 22% as much aboveground carbon (i.e. in live trees, standing dead trees, fallen trees and branches, and forest floor) as a landscape covered in older-growth natural forest<sup>60</sup>. Recent research from Nova Scotia modeling carbon storage under 2 management regimes – one protection, the other clearcut - resulted in much lower carbon stocks under the harvest scenario (ranging from

---

<sup>59</sup> Harmon, M. 2001. Carbon sequestration in forests: addressing the scale issue. *Journal of Forestry*. April, 2001

<sup>60</sup> Fleming, T. and Freedman, B. 1998. Conversion of natural, mixed-species forests to conifer plantations: implications for dead organic matter and carbon Storage. *Ecoscience* 5(2): 213-221

1-103 t C/ha)<sup>61</sup>. This was due to the greater disturbance frequency in the harvest scenario, increased volumes of decomposing biomass carbon, and the removal of carbon in forest products.

It can take many years for carbon stores to recover to pre-harvest levels. Modeling by Aber *et al.*<sup>62</sup> predicted that in the Acadian Forest soil organic matter decreases for 15 to 30 years after clearcutting and takes 60 to 80 years to recover to pre-harvest levels. As noted in Morton's research, these estimates will vary considerably with site class and forest age when clearcut.

Furthermore, the method of harvest has a strong influence on carbon fluxes. Recent Spanish research suggests that reducing thinning intensity and extending rotation length will increase carbon sequestration rates<sup>63</sup>. Research from Alaska indicates that cessation of harvesting is the best way to maximize carbon sequestration, and that 200-year rotation lengths are far more effective in minimizing carbon fluxes than 100-year rotation lengths<sup>64</sup>.

In sum, conservation science suggests that our best defense against climate change is large protected areas, intact old growth forests, and ecosystem-based forest management. Uneven-aged management, involving only small openings in the forest canopy, results in less heating of the forest floor, and thus lower rates of decomposition and losses of organic matter.

### **Forest Harvesting for Biomass**

Harvesting forest biomass for energy generation has to be considered within the context of harvesting rates for all forest products. Between 1995-2005, an average of 55,000 ha were harvested each year in Nova Scotia, 96% by clearcutting. Ecological science suggests that current rates of clearcutting within the Acadian forest region are already well above sustainable harvest levels.

Now, with interest in forest biomass peaking, previously-unmerchantable forest biomass is being considered for bioenergy development, including slash left on site after round wood processing, naturally occurring fallen dead trees and branches ('downed woody debris'), standing dead trees ('snags'), and the large volumes of low-value hardwoods in

---

<sup>61</sup> Morton, C. 2007. Estimating Current and Future Carbon Budgets in the Cloud Lake, Eigg Mountain-James River, Gully Lake, and Middle River-Framboise Wilderness Areas of Nova Scotia. MREM report. Dalhousie University.

<sup>62</sup> Aber, J.D., D.B. Botkin, and J.M. Melillo. 1978. Predicting the effects of different harvesting regimes on forest floor dynamics in northern hardwoods. *Can. J. For. Res.* 8:306-315.

<sup>63</sup> Balboa-Murias, M., Rodriguez-Soalleiro, R., Merino, A., and Alvarez-Gonzalez, J. 2006. Temporal variations and distribution of carbon stocks in aboveground biomass of radiata pine and maritime pine pure stands under different silvicultural alternatives. *Forest Ecology and Management*. 237:29-38

<sup>64</sup> Leighty, W., Hamburg, S., and Caouette, J. 2006. Effects of Management on Carbon Sequestration in Forest Biomass in Southeast Alaska. *Ecosystems* 9: 1051-1065

the region. Harvesting of these additional materials has ramifications for ecosystem health, nutrient capital, and, as noted above, carbon cycling.

In this region forest dependent species also rely heavily on the habitat features of snags and downed woody debris<sup>65</sup>. A study in the American Sierra Nevada showed that simply removing the standing snags in a forest caused a loss of 77% of cavity nesting birds<sup>66</sup>. In the Northeastern United States, 28 birds, 18 mammals, and 23 reptiles and amphibians are directly dependent on woody debris for their survival<sup>67</sup>. Though woody debris is essential for biodiversity, many still regard this material as waste in the forest. Consequently many of the discussions on collecting forest biomass often suggest making use of this “worthless material”.

As an example of forestry impacts where biomass for energy harvests have been included in conventional forestry practices, one can look at the biodiversity conditions in Sweden. In 1890, distribution of woody debris in central Sweden was approximately 13m<sup>3</sup>/ha<sup>68</sup>. After a period of intensified logging and the development of bioenergy systems this level was reduced to almost zero. By 1966 the distribution of woody debris was only 0.1m<sup>3</sup>/ha. The dramatic reduction in woody debris has been directly correlated to a rapid decline in biodiversity: over 7% of all their native species are listed as endangered or threatened and 258 species have been extirpated from the Swedish landscape<sup>69</sup>.

Downed woody debris is not only essential to wildlife habitat; the soil organic matter it creates is an essential feature in ecosystem services. On average, soil organic matter contains approximately twice as much carbon as the atmosphere and holds 2/3 of all terrestrial stores of carbon in soils, deadwood, and living biomass<sup>70</sup>.

There is also strong concern that biomass harvesting for energy would affect site fertility<sup>71</sup>. In trees the majority of nutrients are stored in the bark, small branches, and leaves. These are most often left on site following conventional harvests. Some have suggested that these biomass sources could be the dominant supply for bioenergy. However, in Nova Scotia the soils are generally young and have small nutrient reserves<sup>72</sup>.

---

<sup>65</sup> Freedman, B., S. Woodley and J.A. Loo. 1994. Forestry practices and biodiversity with particular reference to the Maritime provinces. *Environmental Reviews* 2:33–77.

<sup>66</sup> Raphael, M.G. and White, M. 1984. Use of snags by cavity-nesting birds in the Sierra Nevada. *Wildlife Monographs* 86:1-66.

<sup>67</sup> Keddy, P.A., and Drummond, C.G. 1996. Ecological properties for the evaluation, management, and restoration of temperate deciduous forest ecosystems. *Ecological Applications* 6(3):748-62.

<sup>68</sup> Berg, A. 1994. Threatened plant, animal, and fungus species in Swedish forests: distribution and habitat associations. *Conservation Biology*. 8(3): 718-731.

<sup>69</sup> Ostlund, L. 1998. Landscape change and biodiversity crisis: A forest history of Boreal Sweden. Pg. 60-71 in Sandburg and Sorlin (eds.). *Sustainability and Challenge: People, Power, and the Environment*. Black Rose Books. London.

<sup>70</sup> Post, W.M., Peng, T.H. Peng, W.R. Emmanuel. A.W. King, V.H. Dale, and D.L. DeAngelis. 1990. The global carbon cycle. *Am. Sci.* 78:310-326.

<sup>71</sup> Freedman B. 1981. *Intensive Forest Harvest: A review of Nutrient Budget Considerations*. Fredericton, New Brunswick: Maritime Forest Research Centre, Canadian Forest Service.

<sup>72</sup> Mahendrapa, T. 2005. “Biomass for bioenergy: The dangers of whole-tree harvesting”. *Atlantic Forestry Review*.

On shallow and nutrient-poor soils it has been found that the removal of branch and leaf material, even in small amounts, may after several rotations, seriously affect nutrient availability for future growth<sup>73</sup>. It has also been well established that large-scale disturbances causing the removal of forest biomass can lead to accelerated losses of nutrients from their watersheds.

In summary, bioenergy is only “green” if carbon sequestration, storage, and emissions are carefully balanced. The current use of clearcutting and the oversimplified methods proposed for the extraction of biomass fuel from the forest threaten to negate any potential benefits bioenergy might have. If harvesting practices were more suited to the ecosystems of this region, harvesting biomass for fuel would be much more conceivable.

---

<sup>73</sup> Boyle, J. and Ek, A. 1972. An Evaluation of Bole and Branch Pulpwood Harvesting on Site Macronutrients. *Canadian Journal of Forest Research*. 2: 407

## GOVERNANCE

Implementation of a climate change strategy that will achieve the province's environmental goals, while also establishing a new Contract for a Low-Carbon Future with the citizens of Nova Scotia will require cooperation amongst multiple departments. The deputy minister's forum is currently an example of inter-departmental collaboration for sustainable prosperity.

To move towards aggressive, fair and comprehensive implementation we suggest that the Sustainable Prosperity agenda be fully integrated into all government departments through the establishment of *Sustainable Prosperity Officers* in each department that will be tasked with implementing the goals outlined in the Environmental Goals and Sustainable Prosperity Act.

A number of issues extremely relevant to environment and climate change and currently decided by the Utility and Review Board. The Public Utilities Act was written almost a century ago and the UARB is currently left with little direction or mandate on social, environmental and economic issues related to climate change and sustainable prosperity. We recommend that the Public Utilities Act be revisited to include relevant revisions and amendments for a low-carbon economy.

In addition, there exist gross power asymmetries associated with the current decision-making process before the UARB. In particular, it is very difficult for environmental interests to participate in the same degree as other interests that regularly appear before the Board.

A position of the Consumer Advocate was created to ensure full participation by a relevant interest that was unable to fully participate in the process. The EAC recommends that a position of the *Environmental Advocate* be created before the UARB in the province of Nova Scotia. We believe the creation of this position would ensure that environmental interests are fully represented and that environment positions are based on realistic evidence and expertise. We suggest that the Nova Scotia Environmental Network should be the principle client of the *Environmental Advocate*.

We note that taking the action necessary to meet the province's environmental goals will require a significant increase in resources within the government departments implementing climate change, and complementary policies.

## CONCLUSION: TOWARDS ACTION

For the province of Nova Scotia to meet its environmental goals it must pursue these goals aggressively. The momentous task of preventing dangerous climate change must start today given that transitions take time. The sooner policies can be implemented, the sooner we will avoid lost opportunities, lower long-term costs, increase innovation, and provide greater certainty to economic actors.

The EAC is fully supportive of the goals outlined in the *Environmental Goals and Sustainable Prosperity Act*.<sup>74</sup> We have published “Pathways to Sustainable Energy Prosperity in Nova Scotia” and have worked on providing as comprehensive a submission as possible within the timeframe available to the Climate Action Plan and Energy Strategy to help the province meet its environmental and economic goals.

We are also supportive of the province of Nova Scotia engaging in an ongoing process of strategic planning for a low-carbon future. The next step is action through provincial budget allocations, legislation and regulation. We would like to suggest that strategic planning is best undertaken when conducted in parallel with policy implementation, now and in the future.

The task the Climate Action Plan and Energy Strategy will be to move towards action and policy implementation as soon as possible. The public is currently cynical of “government plans” that have been produced over the last two decades, but have not resulted in GHG reductions.

Nova Scotia’s plan can establish trust within the public by outlining, from the outset, a clear agenda for implementation. We suggest therefore that the Climate Action Plan and Energy Strategy attach, perhaps as an appendix, an initial set of legislative and/or regulatory language and initial budget recommendations for immediate implementation. This will provide a concrete signal to all Nova Scotians that we are moving forward.

The Ecology Action Centre is excited to work with all Nova Scotians to aggressively reduce greenhouse gas emissions and to establish a new Contract for a Low-Carbon Future in our province.

---

<sup>74</sup> We also fully support the process to review these goals on an annual basis

# LIST OF RECOMMENDATIONS

## VISION

- 1) Define a Contract for a Low-Carbon Future in Nova Scotia that incorporates the following principles:
  - a. Cut your Bills!  
*Provide opportunities for families and businesses to cut their bills through energy efficiency by making efficiency services as easy to access as energy supply is today*
  - b. Energy Revenues for Community Revitalization  
*Provide communities and companies operating in the province with opportunities for economic revitalization by becoming energy producers themselves through renewable and decentralized energy*
  - c. Energy as a Right  
*Ensure universal access to a reasonable amount of energy services by eradicating energy poverty in the province*
  - d. Full Accessibility to Services and Transport  
*Increase service accessibility through sustainable transportation and energy efficient land-use planning*
  - e. Just Transitions  
*Ensure a just, and accelerated, transition from old jobs to new for workers and their unions*
  - f. Sustainable Competitiveness  
*Create targeted sectoral strategies to make Nova Scotia's businesses the cleanest and most environmentally sustainable in the world*

## GOALS, OBJECTIVES AND LONG-TERM PLANNING

- 1) Recognize the need to keep global warming under 2 C of warming from pre-industrial levels to avoid dangerous climate change.
- 2) Establish the following GHG reduction goals
  - Short-term:* Reduce GHGs to 1990 levels by 2012
  - Medium-term:* Reduce GHGs, at least, 10% below 1990 levels by 2020
  - Long-term:* Reduce GHGs 90% below 1990 levels by 2050
- 3) Utilize GHG reduction targets in all government planning assumptions
- 4) Outline specific sectoral targets and strategies for GHG reductions

## GREENHOUSE GAS EMISSION REGULATIONS

- 1) Create an *Office of Sustainable Prosperity Strategy* within the Department of Economic Development to lead the transition both within and between sectors of the economy consistent with economy-wide carbon reduction policies.

- a. Implement strong economy-wide regulations, while establishing guidelines, action plans, and sector specific resources to ensure adaptive capacity in the economy and targeted support where necessary to propel the province towards sustainable prosperity.

### **Immediate Regulations for Resource Acquisition and New Power Supply**

- 2) Loading Order
  - a. First, procure all cost-effective energy efficiency
  - b. Second, procure all cost-effective renewable energy resources and distributed generation
  - c. Then, support clean and efficient fossil fuel generation
  - d. Improve electric transmission and distribution grid to support renewable energy.
- 3) Mandate a 3-year *Integrated Resource Planning* process that will include societal costs and benefits for the electricity sector
- 4) Establish a new coal fired power plant standard that effectively places a moratorium on new plants without coal gasification and carbon capture and storage technology
- 5) Refuse to support policies, practices, or indirect subsidies that support the development of nuclear power in neighbouring jurisdictions
- 6) Ensure sustainable harvesting practices for new biomass plants to ensure carbon neutrality

### **Immediate GHG Regulations**

- 7) Require NSPI to reduce emissions to 1990 levels by 2012 (cap of 6.9 Mt)
- 8) Require NSPI to reduce their GHG emissions 10% below 1990 levels by 2020 (cap of 6.2 Mt)
- 9) Introduce a modest carbon tax of \$3/tonne of GHG emitted in the 2008 budget, modeled after the Quebec carbon tax, to fund all cost-effective non-electric energy efficiency and to bring sustainable transportation investment up to the Canadian average.
- 10) Signal the Government of Nova Scotia's immediate intention to negotiate a carbon price of at least \$30/tonne of GHG by 2009 and \$50/tonne of GHG by 2020 with other Canadian provinces.

- 11) Establish a provincial carbon pricing negotiating position to ensure Nova Scotia receives adequate credit for GHG reduction in its electricity sector and adequate revenues from carbon pricing initiatives.

## **TRANSPORTATION**

- 1) Take a leadership role in creating a home for sustainable transportation within the provincial government
- 2) Create an annual predictable source of sustainable transportation funding - including, transit, carpooling, carsharing, vanpooling, van shuttles, walking, cycling and intercity bus and rail - comparable to the national average (e.g. \$21/capita for transit)
- 3) Conduct an analysis of what modal split model will achieve Nova Scotia's GHG emissions reduction target
- 4) Explore options to work with the insurance sector to offer Pay-as-you-Drive insurance to Nova Scotians
- 5) Create a central transportation website including schedules, rates and routes
- 6) Fund and promote a province-wide carpool matching site. HRM is currently in the process of launching such a site, therefore there may be partnership opportunities.
- 7) Develop a provincial transportation Statement of Interest for inclusion in the Municipal Act that provides for the incorporation of transportation efficiency in land-use planning
- 8) Work with municipalities to coordinate provincial transportation infrastructure decisions with municipal plans
- 9) Explore options such as: introducing tax on greenfield development, providing tax incentives or rebate for vacant or underused buildings and implementing a vacant lands tax
- 10) Support the implementation of references to California-like vehicle emission standards
- 11) Promote the use of underused farmland to local food production, not biofuel crops
- 12) Assess the feasibility of lowering speed limits in partnership with NS Department of Transportation and Infrastructure Renewal
- 13) Increase truck licensing fees to reflect costs of damage to road infrastructure.

- 14) Provide assistance for the development of an Inland Terminal in Halifax Regional Municipality
- 15) Provide grants to shippers for rail spurs, sidings, loading docks and freight cars
- 16) Buy rail lines, when they come up for abandonment, at scrap value and leasing the tracks back to interested operators on favourable terms

## **ENERGY EFFICIENCY**

- 1) Develop a comprehensive and integrated energy efficiency strategy for all fuels including electric, home heating fuel, wood, combined heat and power and on-site renewable energy.
- 2) Create an independent energy efficiency utility by awarding a long-term franchise to provide efficiency services for all fuels that will be overseen by the Nova Scotia Utility and Review Board
- 3) Develop a public stakeholder collaborative to help develop 3-year demand side resource plans
- 4) Develop performance indicators for the energy efficiency utility related to short and long-term energy savings and equity criteria and create incentives and disincentives for the energy efficiency utility tied to meeting performance indicators.
- 5) Legislate that energy efficiency funds collected through rates or through a carbon tax will remain in an energy efficiency fund and not become general funds of the province.
- 6) Immediately develop a comprehensive labour market strategy for all forms of energy efficiency

## **Electric Efficiency**

- 7) Establish a minimum efficiency standard of 1% of annual incremental savings levels in 2011 and onwards, and determine if cost-effective savings are available above this level.
- 8) Legislate that the UARB must order the procurement of all cost-effective energy efficiency resources. Define cost-effectiveness through the societal cost test.

- 9) Define a base planning assumption consistent with holding load growth flat and then reducing it from by 1% a year by 2020.
  - a. 2011 – Efficiency resource is 1.2% of annual electric load
  - b. 2013 – 2% of annual electric load
  - c. 2016 – 3% of annual electric load
- 10) Commission a study on decoupling utility profits from sales to be completed by 2010.

### **Multi-Fuel Efficiency**

- 11) Fund non-electric energy efficiency through a dedicated carbon tax with funds placed into a *Climate Change Action Fund*.
- 12) Implement a combined heat and power action plan that includes:
  - a. The development of an encouraging standard interconnection policy for CHP and the implementation of an immediate and encouraging CHP feed-in tariff;
  - b. An initial CHP study to estimate the potential savings and aid in long-term planning;
  - c. Policies to ensure that CHP is deployed as a “bundled” service complementarily to natural gas deployment by mandating CHP and efficiency as component of natural gas distribution franchises;
  - d. The full consideration of CHP as an eligible energy efficiency technology within energy efficiency portfolios such as those of the proposed Energy Efficiency Utility; and
  - e. Demonstration and commercialization support for micro-scale CHP.
- 13) Include on-site renewable energy as an efficiency improvement including: passive solar shelter design, solar water and air heating systems, solar electricity, biomass and biogas and on-site wind turbines.
- 14) Enhance capacity and confidence in the solar hot water, or on-site renewable energy, industry by requiring that any new solar system installed in the province with government incentives meet the relevant product standards and be installed by a certified installer
- 15) Create zero or reduced interest loans for on-site renewable energy, such as solar hot water
- 16) Develop a solar utility for Nova Scotia that will sell thermal units of solar energy
- 17) Share costs and benefits of on-site renewable energy overtime though financing mechanisms such as municipal local improvement charges
- 18) Provide consistent and long-term incentives

- 19) Develop solar access laws, solar-ready mandates and solar obligations for new buildings
- 20) Fully consider fuel switching and fuel choice as measures in an multi-fuel energy efficiency portfolio

### **Efficiency Standards**

- 21) All new houses achieve EnerGuide 80 by 2011, EnerGuide 90 by 2020
- 22) All new houses oriented to utilize solar energy
- 23) Ban the utilization of electric resistance heat in new housing
- 24) Establish a performance indicator for at least 50% of all new buildings and homes to be net zero energy by the year 2015.
- 25) All new buildings constructed to achieve a 30% improvement in building efficiency above standard building code and meet LEED Silver standards by 2012 and performance indicators to achieve 50% improvements in efficiency.
- 26) Operating and standby efficiency of all major energy using products to be regulated by 2011
- 27) Phase out all inefficient lighting by 2013 utilizing a technology non-specific measure
- 28) By 2012, mandate the energy consumption labelling of all products, houses, buildings and vehicles with special recognition of best practice and best-in-class (e.g. Energy Star)
- 29) By 2015, or earlier, introduce mandatory upgrading of energy efficiency at the time of sale or re-commissioning of all houses and buildings.

### **ENERGY POVERTY**

- 1) Introduce a Universal Service Program for both electricity and home heating fuel to ensure against unsustainable energy burdens through energy efficiency, fixed credits, emergency assistance and arrearage management.
- 2) Establish a minimum amount of funding in energy efficiency portfolios for programs that will be accessible to low-income Nova Scotians.

## **RENEWABLE ENERGY**

- 1) New Renewable Energy Principle for Electric System  
*Nova Scotia's existing electricity system will operate and adapt to complement the development of renewable energy in Nova Scotia, within reasonable social cost ranges, in order to aggressively reduce greenhouse gas emissions and encourage economic development.*
- 2) Upgrade transmission and distribution infrastructure in a planned and coordinated fashion, in order to build a grid for a decentralized energy future.
- 3) Achieve deep GHG reductions by prioritizing research, experimentation and development consistent with a decentralized energy (with energy storage) pathway to enhance innovation, avoid risk and increase autonomy and security, while also exploring Hydro Quebec imports and carbon capture and storage.
- 4) Establish a public committee to determine technology-specific feed-in tariffs for all forms of renewable energy and energy resources.
- 5) Create an Independent System Operator that will develop expertise in renewable energy balancing and energy storage solutions.
- 6) Commission a study to identify potential areas for pumped hydro renewable energy storage (e.g. hydro-wind systems), compressed air storage and other energy storage options.
- 7) Create feed-in tariff rates that are differentiated based on the potential for energy storage.
- 8) Develop standard renewable energy siting rules, policies, and planning guidelines and provide equal scrutiny to the effects of fossil fuel generation as renewable energy generation.
- 9) Develop Renewable Energy Resource Centres in both rural and urban communities to provide support with technical, financial, resource, interconnection and site and permit issues.

## **SUSTAINABLE ENERGY INNOVATION**

- 1) Consistently increase annual low-carbon technology deployment support to \$24 million by 2015 and \$53 million by 2025
- 2) Immediately increase annual low-carbon R&D support to \$16.3 million.
- 3) Special consideration for research and innovation projects to encourage energy storage for government support.

- 4) Create an appropriate price for carbon and/or institute appropriate regulations to leverage private-sector R&D and innovation in carbon capture and storage and coal gasification technologies.
- 5) Make taxpayer investments in carbon capture and storage R&D if taxpayers can retain equity in CCS infrastructure
- 6) Create an ocean energy R&D strategy that maximizes experimentation with multiple technologies, in multiple locations, in cooperation with multiple research institutions.
- 7) Consider how ocean energy relates to the entire Bay of Fundy ecosystem.
- 8) Direct revenues from ocean energy production into local coastal communities
- 9) Undertake targeted government intervention in specific companies or industries to accelerate, not impede, the transition towards a green energy future.
- 10) Create a *Sustainable Prosperity Transitions and Training Division* within the Department of Labour that will be mandated with implementing an active labour market policy to transition from old jobs to new, by providing direct social support, job transfer assistance and skills upgrades in collaboration with workers and their unions.
- 11) Develop a group of experts in green technologies and processes within an *Office of Sustainable Prosperity Strategy* that will be tasked with leading the transition both within and between sectors of the economy consistent with economy-wide carbon reduction policies.

## **PLANNING FOR CHANGE**

- 1) Commit to developing a systematic approach to identifying risks and vulnerabilities around the province and by sector.
- 2) Identify priority areas for LIDAR mapping and in other areas. Provide support for lower cost mapping, risk assessment and modelling techniques suitable for use by municipal governments and community groups
- 3) Assume leadership in adaptation by developing and implementing a provincial coastal management strategy that addressed land use in coastal areas of the province and addresses climate change impacts.
- 4) Actively seek out and support the development of planning based adaptation approaches by partnering with the Canadian Institute of Planners, Dalhousie University School of planners, and the Union of Nova Scotia Municipalities.

- 5) Develop a Statement of Provincial Interest in support of climate change adaptation planning and developing the necessary policies and guidelines to support effective planning for change
- 6) Encourage preservation and protection of natural shorelines through aggressive and systematic acquisition of coastal lands and discouraging public or private investment in shoreline hardening.
- 7) Prioritize preventing loss of wetlands, avoiding any further loss of salt marshes and other vulnerable coastal wetlands, and prioritizing restoration of damaged wetland systems
- 8) Prevent development on and adjacent to beach systems to maximize their resiliency and give them room to move backwards and migrate inwards as they naturally do.
- 9) Strengthen and enforce existing rules around gravel extraction, and motorized vehicles on beaches as well as other activities, which weaken beach systems.
- 10) Work with the Union of Nova Scotia Municipalities to make changes to the Municipal Government Act to facilitate planning for climate change adaptation.
- 11) Conduct water planning at the watershed level through management bodies that include local stakeholders, municipal government, scientists and provincial officials
- 12) Engage insurance industry, property developers and other stakeholders in the development of policies and criteria for assessing what types of vulnerable infrastructure is a priority for protection and maintenance.
- 13) Integrate climate change adaptation into existing public policy initiatives such as the Water Strategy, Coastal Framework, and Natural Resources Management Strategy.
- 14) Seek funding to create a provincial coastal monitoring program.

## **FOREST MANAGEMENT & CARBON STORAGE**

- 1) Utilize ecosystem-based management to mimic natural disturbance patterns and to maintain canopy closure at levels that prevent accelerated decomposition of organic matter.
- 2) Re-establish annual allowable cut rates with the merchantable volume calculations extended to include tops and large branches suitable for biomass.

- 3) Consider carbon released from soil in planning of harvest rotation length.
- 4) Control harvest intensity to allow for ongoing recruitment of snags and downed woody debris.

## **GOVERNANCE**

- 1) Integrate Sustainable Prosperity into all government departments by establishing *Sustainable Prosperity Officers* in each department that will be tasked with implementing the goals outlined in the EGSPA
- 2) Revise the Public Utilities Act to include relevant revisions and amendments for a low-carbon future.
- 3) Create an *Environmental Advocate* to represent the Nova Scotia Environmental Network before the NS Utility and Review Board
- 4) Ensure government departments implementing the Climate Action Plan and Energy Strategy are properly resourced

## **TOWARDS ACTION**

- 1) Recognize that an ongoing process of strategic policy and policy implementation will lead us towards a low-carbon future
- 2) Develop and attach to the Climate Action Plan and Energy Strategy an initial set of legislative and/or regulatory language and initial budget recommendations for implementation.