



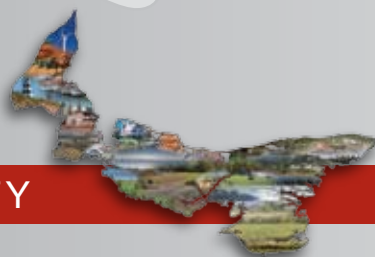
# Prince Edward Island Energy Strategy

Securing our Future:  
Energy Efficiency and Conservation



ONE ISLAND COMMUNITY

ONE ISLAND FUTURE



Securing our Future; PEI Environment and Energy Policy Series

---

- Volume 1: Prince Edward Island Wind Energy
- Volume 2: Prince Edward Island Energy Strategy
- Volume 3: Prince Edward Island Climate Change Action Plan

For more information contact:

Department of Environment, Energy and Forestry  
Jones Building, 4th Floor  
11 Kent Street, Charlottetown, PE, C1A 7N8

Telephone: (902) 368-4000





# Table of Contents

<b>1.0 INTRODUCTION</b>	<b>6</b>
Background	6
Energy Strategy Vision	6
Energy Strategy Objectives	7
<b>2.0 ENERGY OVERVIEW</b>	<b>8</b>
World Energy Markets	8
Canadian Context	8
Regional Perspective	8
PEI's Current Energy Profile	9
Energy Prices and Trends	9
Prince Edward Island's Energy Future	10
By 2013	10
By 2018	11
<b>3.0 ENERGY EFFICIENCY AND CONSERVATION</b>	<b>12</b>
Overview	12
Why Energy Efficiency?	13
The Potential for Energy Efficiency on PEI	13
Office of Energy Efficiency	14
Energy Efficiency Challenges	14
Appliances and Equipment	14
Demand Side Management	15
Demand Side Resources	15
Least Cost Procurement	15
Building Code and Energy Standards	16
Space Heating Efficiency	17
Transportation Efficiency	18
Government Leadership	20
Energy Efficiency Advisory Committee	20
Public Outreach and Education	20

# Table of Contents

<b>4.0 RENEWABLE ENERGY</b>	<b>22</b>
Overview	22
Wind	22
Small Wind Developments in PEI	24
Role of Government in Future Wind Development	24
Solar Technologies	24
Earth Energy	25
<b>5.0 BIOFUELS</b>	<b>26</b>
Overview	26
The Biofuel Potential in Prince Edward Island	26
Inter-Departmental Biofuels Committee (IDBC)	27
Biomass	27
Biomass Challenges	28
Liquid Biofuels	28
Pure Plant Oils	29
Biodiesel	29
Ethanol	29
Liquid Biofuel Challenges	30
Renewable Fuel Standard	30
Biogas	31
<b>6.0 ECONOMIC DEVELOPMENT</b>	<b>32</b>
Overview	32
Green Technology Cluster	33
Community-Based Renewable Energy Projects	34
<b>7.0 PATH FORWARD</b>	<b>35</b>



# INTRODUCTION

## 1.0 INTRODUCTION

### **Background**

The Province of Prince Edward Island has developed a North American, if not global, reputation in the development of renewable energy. PEI has always been viewed as an innovator in developing, demonstrating and deploying renewable energy systems with due regard for the environment. PEI has a strong reputation as a leader in the development of its wind resources with the highest per capita penetration of this renewable energy in its provincial electricity portfolio. PEI has been a leader in the use of biomass resources converting waste into thermal energy to heat municipal buildings. Despite these and other accomplishments, the Province does however continue to rely heavily on off-island sources of imported fossil fuel-based energy. Rising energy costs are having a negative impact on all Islanders, businesses and institutions and new measures must be put in place now to secure the Island's future prosperity.

In June 2004, the Prince Edward Island Department of Environment and Energy released its *Energy Framework and Renewable Energy Strategy*. Integral to the production of this document was input received from interested stakeholders and the general public.

The outcome of this consultative approach to the Island's energy policy development was a list of 19 action items for the government to pursue. Today, nearly all of these items have been accomplished with significant advancements made towards the incorporation of renewable energy (wind power) into the provincial energy mix. With the increasing costs of fossil fuel and the significant impact these costs have on all Islanders, the timing for a renewed vision and Provincial Energy Strategy with specific actions is now.

Fossil fuel energy use is having dramatic consequences for global warming and severely impacting the environment. The Government of Prince Edward Island has, in parallel with this new Energy Strategy, developed a Climate Change Strategy that will help serve to protect the Island's environment and lead to a more sustainable and economically robust future.

### **New Energy Strategy**

Maximizing the potential for the development of the Island's indigenous renewable energy assets and ensuring they are developed wisely requires long-term planning. The Provincial Government has developed a renewed Provin-

cial Energy Strategy that will build and expand on the success of the 2004 Strategy. In developing this new five and ten year energy vision for PEI, a discussion document was released in April of this year to stimulate and solicit feedback from the general public. Input from interested stakeholders was solicited and a series of public meetings were conducted across the Island in May. This new Strategy helps identify the role of the PEI Government in implementing energy efficiency and conservation measures, promoting renewable energy and the use of biofuels, encouraging new economic and development opportunities, and raising public awareness and education. This Strategy also outlines key actions for Government in creating a flexible energy policy framework that is capable of adapting and reacting to market and technological changes and protecting the environment. While the above reflects the role of government, each and every Islander has a responsibility and role to play in becoming more sensitive to, and aware of our energy and environmental future here in Prince Edward Island. The ultimate success of this Strategy will be dependent on the actions of Islanders and our ability to make fundamental changes in our attitude, behavior and approach to the use of energy resources.

## Energy Strategy Vision

As an Island community, PEI has unique needs and challenges in the field of energy. The Vision of this new Energy Strategy is to address the dangerous dependence on imported oil, which threatens the future social, economic and environmental prosperity of the Island, its residents and businesses. PEI's Leaders are committed to pursuing a self-sustaining energy system based on achievements in energy efficiency, conservation and renewable energy development.

## Vision

*To ensure a prosperous future for residents and businesses of Prince Edward Island based on the objectives of energy security, environmental sustainability and economic development.*

## Energy Strategy Objectives

To support this vision, the Province of Prince Edward Island has developed clear, long-term and comprehensive objectives (5 and 10 years) with specific Government Actions. Emphasis will be placed on developing a flexible policy framework that will provide the best options for maximizing our energy independence, becoming environmentally sustainable and contributing to future economic development opportunities.

### ENERGY SECURITY

- Greater Self Sufficiency
- Improved Price Stability
- Diversity of Supply

### ENVIRONMENTAL SUSTAINABILITY

- Increased Energy Efficiency and Reduced Consumption
- Renewable Energy Development
- Reduced GHG Emissions and Other Pollutants

### ECONOMIC DEVELOPMENT

- Support Growth of Local Industries and New Job Opportunities
- Research, Development & Demonstration of New Technologies
- Strengthen and Diversify Local Economy



# ENERGY OVERVIEW

## 2.0 ENERGY OVERVIEW

### World Energy Markets

World energy markets are facing several unfavorable conditions: increasing demand, dwindling supply, and rising costs. As economies develop and populations grow, particularly in countries such as China and India, energy supply is struggling to keep pace with rising demand. This, along with global terrorism, instability in the Middle East, geopolitical pressures, and commodity speculation, has resulted in rising energy prices. Large energy consumers such as Canada are especially vulnerable to the effects of rising energy costs and decreasing supply.

### Canadian Context

Energy is an important part of the Canadian economy in terms of both production and consumption. Canada is one of the largest per capita users of energy in the world and ranks second in the world in terms of oil reserves, behind Saudi Arabia. Like other countries around the world, Canada is experiencing a number of energy challenges including high and volatile energy prices, decreasing conventional reserves, the need to diversify supply, an ageing and constrained delivery infrastructure, and growing environmental concerns.

### Regional Perspective

Through the Council of Atlantic Premiers (CAP), the Atlantic Energy Ministers' Forum (AEMF) and the Conference of New England Governors and Eastern Canadian Premiers (NEG/ECP), the Atlantic Provinces have been working together on energy issues for several years. Most recently, in January 2008, the Atlantic Premiers released the *Atlantic Energy Framework for Collaboration*. The document highlights three priority areas for regional collaboration:

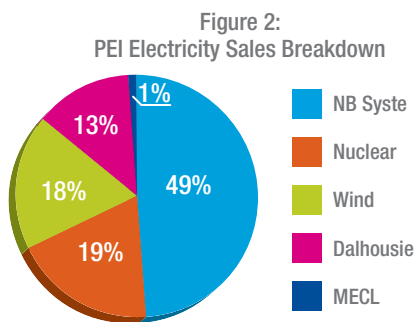
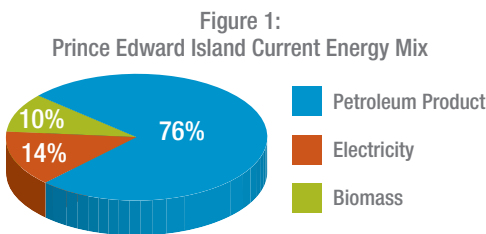
- Enhancing **energy efficiency** programming
- Increasing **renewable energy** development
- Assessing **biofuel** potential

The Atlantic Energy Ministers will guide the implementation of this framework with a progress report expected later in 2008. The NEG/ECP have expressed increased emphasis on energy in recent years and in June of 2007 adopted a series of recommendations for the promotion and development of energy efficiency, energy trade, renewable resources, and improved transportation initiatives.

## PEI's Current Energy Profile

Without a local supply of natural gas and oil resources, Prince Edward Island is heavily reliant on imported sources of energy. Imported oil accounts for 76 percent of PEI's total energy supply, with 46 percent of our dollars spent on transportation fuels and a further 30 percent on petroleum-based heating fuels. The economic impacts of the Province's reliance on imported energy are significant considering that roughly half a billion dollars is spent on off-Island energy resources annually, and this continues to climb.

The current energy mix (Fig 1.) in Prince Edward Island consists of petroleum products, electricity and biomass.

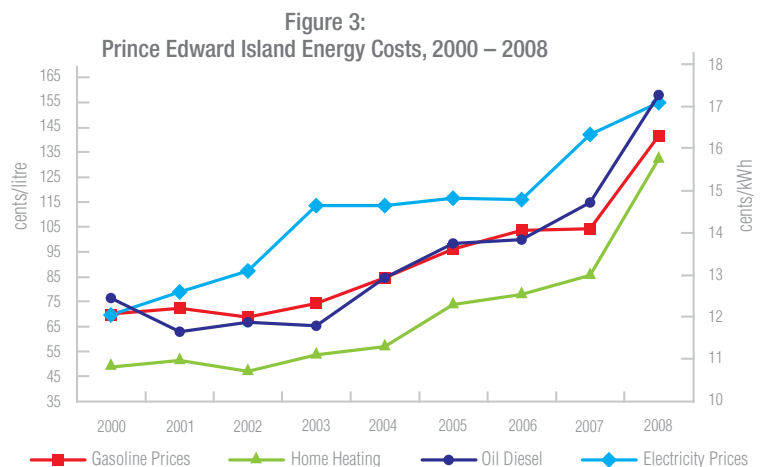


Fourteen percent of the Island's energy mix is electricity. Wind resources meet approximately 18 percent of the province's electricity supply with the remainder tied primarily to oil and nuclear power supplied by the New Brunswick Power Corporation and imported via two submarine cables connected to the mainland.

Ten percent of energy in PEI is supplied by biomass, which includes fuel wood, sawmill residue and municipal waste. PEI Energy Systems in Charlottetown uses municipal waste and wood biomass to supply thermal energy to commercial, residential and institutional buildings in the city. Developed in the 1980s and early 1990s by the PEI Energy Corporation, the Charlottetown District Heating System is another example of the Province of PEI leading in the development of renewable energy.

## Energy Prices and Trends

As shown in Figure 3, energy prices have steadily increased in recent years. Electricity prices have increased over 60 percent from 2000 to 2008 while gasoline prices and home heating costs increased 101 percent and 172 percent, respectively, over this time period. Much of the increase in fuel costs can be attributed to increasing oil prices, which has experienced a near seven fold increase over this time period, and a combination of increasing demand and decreasing supply of conventional energy resources. While the price of oil has been subject to recent fluctuations and its future prices cannot be fully ascertained, many experts suggest that price volatility will become the norm over the longer term.



With the price of crude oil peaking near \$150 US/barrel, the need to aggressively pursue alternatives to traditional fossil fuel based sources of energy has never been more apparent for PEI. Decreasing the Island's dependency on imported fossil fuel based energy sources will help to mitigate the effect of rising prices, improve the diversity of supply, and increase PEI's future energy security. Pursuing and promoting energy efficiency, conservation, renewable energy development including additional wind development and utilization of biofuels, will provide a hedge against rising energy costs and maintain the Island's reputation as a leader in alternative energy development.

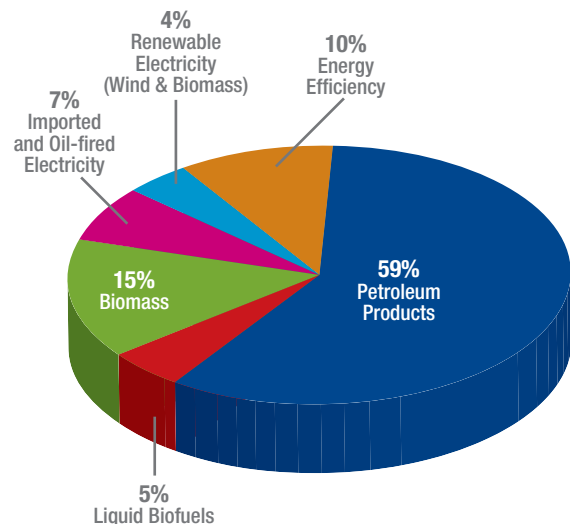
### Prince Edward Island's Energy Future

Achieving the objectives of energy security and environmental sustainability while creating economic development opportunities will require a variety of new policies, programs and initiatives directed at public education and awareness, energy efficiency and renewable energy development. The following Sections of this Energy Strategy outline different courses of *Government Action* that will be undertaken. The execution of these actions should lead to a number of anticipated outcomes.

### By 2013

Within five years of applying significant resources and policies to the development of the energy sector, the Province of Prince Edward Island will be less dependent on imported energy and will be well on the way to a sustainable energy future. The successful implementation of new programs and initiatives in energy efficiency should lead to a 10 percent increase in efficiency across all sectors. A goal has been set to bring a total of 500 MW of wind power on line by 2013, of which 100 MW will be for domestic use. A renewable fuel standard for gasoline (E5) and light fuel oil and diesel fuel (B10 or B10 renewable equivalent) would also be introduced. The environmental impacts of renewable fuel development will be addressed with a concurrent low carbon fuel standard. Developing the Province's abundant biomass resources should result in a 50 percent increase in biomass use and lead to 10 MW of new electrical generation capacity for Island utilities.

Figure 4:  
PEI Energy Mix 2013

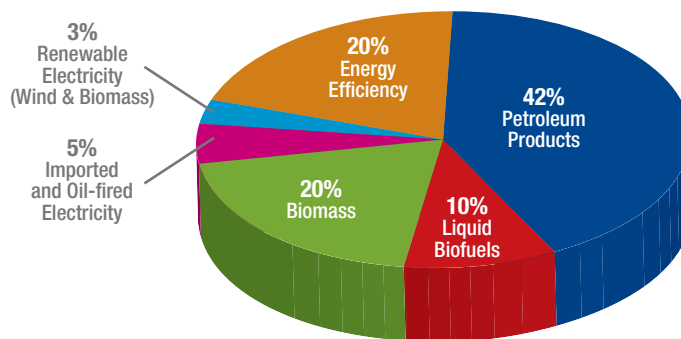


## By 2018

All indications suggest that the costs for fossil fuel-based energy sources will continue to climb. It is difficult to predict how high energy prices will be in ten years. As such, the Provincial Government will continue to aggressively pursue opportunities to increase the efficient use of PEI's energy resources. It is expected that an additional 10 percent increase in overall efficiency is an attainable goal and will be achieved through the constant updat-

ing of policies and programs across all sectors. Incremental wind developments will also be possible, most likely through community-based projects, and will be determined by domestic load growth. Renewable fuel standards could be increased to help achieve the Island's environmental goals and GHG reductions (E10 and B20 or renewable equivalent). Further developments in the effective utilization or biomass resources could result in a 25 percent increase in use and an additional 10 MW of electrical generation capacity.

Figure 5:  
PEI Energy Mix 2018





# ENERGY EFFICIENCY AND CONSERVATION

## 3.0 ENERGY EFFICIENCY AND CONSERVATION

### Overview

Energy efficiency refers to programs, initiatives, products, technologies and systems with the goal: to reduce the amount of electricity and/or fuel required to perform the same job or better than conventional means. Energy efficiency is considered to be the least costly, most reliable, locally abundant energy resource with the greatest potential to reduce greenhouse gas (GHG) emissions and protect the environment. Energy efficiency can generally be procured cheaper than producing or purchasing energy. For these reasons, energy efficiency will be a key component in PEI's transition to a sustainable low-carbon energy future. Conservation of energy is equally important and this will involve changing our behaviors and using less energy. We all have a role to play and must do our part to protect the environment and decrease our reliance on fossil fuels.

Improving the efficiency in the way energy is consumed on the Island will have direct benefits to individuals, businesses, governments, institutions and the environment. Energy efficiency covers a broad spectrum of improvements in:

- *Building practices: residential, commercial and institutional*
- *Energy-saving appliances and equipment*
- *Lighting & space heating*
- *Industrial & agricultural processes*
- *Transportation*

There are extensive opportunities in every community across the Island to develop our energy efficiency resources. During the public consultations, it was expressed by most participants that individuals, businesses, institutions, government and utilities all need to devote more attention and support to fully exploit these opportunities if PEI is to achieve a more sustainable and more cost-effective energy portfolio. With the ever-increasing cost of fossil fuels, energy conservation must become a priority for all Islanders.

*The least costly energy  
is the energy we don't use.*

## Why Energy Efficiency?

The potential for energy savings through increased energy efficiency and conservation have far-reaching benefits for all Islanders and the environment:

- *Reduces residential, commercial and institutional energy bills, and in particular, reduces the impact of high energy prices on low income families and individuals*
- *Reduces environmental footprint of our communities and Province- lowers emissions of GHGs and other pollutants associated with energy production and consumption*
- *Stimulates the PEI economy by reducing outflow of consumer energy dollars*
- *Increases local economic development opportunities and employment creation*
- *Enhances the reliability of our energy system*
- *Improves energy supply security and helps mitigate fluctuating energy prices*
- *Avoids or defers capital expenditures for upgrades to the electrical transmission and distribution infrastructure*

## The Potential for Energy Efficiency on PEI

In 2008, PEI's Department of Energy, Environment and Forestry released a study by the Vermont Energy Investment Corporation (VEIC) that examined the potential of cost-effective energy efficiency initiatives that could substantially reduce energy use and lower greenhouse gas emissions in PEI by 2017. The study examined the potential in the following sectors:

- *Residential*
- *Commercial and Institutional (C&I)*
- *Transportation*

The analysis of achievable potential, defined as the amount of energy cost savings that could

be attained through energy efficiency initiatives, was the primary objective of this study. By 2017, if implemented, the proposed programs in the Residential and C&I sectors would reduce forecasted electricity use by 11 percent and non-electric use by 8 percent. This translates into a cost savings of \$148 million over the ten-year implementation time frame and would reduce GHG emissions by nearly 132,000 tonnes by 2017. This study also suggests that investing in cost-effective energy efficiency initiatives could offset all forecasted electricity load growth, over the next decade. VEIC also noted that in 2017, the annual peak demand savings would be equal to 17.8 MW, roughly 8% below 2007 peak demand. This translates to nearly \$1 million in capacity savings for the utility and its ratepayers.

There is considerable cost-effective energy savings potential that could be pursued on PEI. Several programs have been recommended for consideration in PEI and developed with the following considerations:

- *Promote the benefits of energy efficiency to all Islanders*
- *Provide opportunity for all residential customers to participate*
- *Minimize barriers to participation for low income customers*
- *Include all fuels initiative- electricity, transportation and home heating fuels*
- *Strengthen relationships with on-island product retailers, builders and contractors*

Developing comprehensive programs to address the different market and non-market barriers to adopting energy efficient products and services has led to the formation of a dedicated agency for program delivery with regular review cycles to quantify the resource and update its contribution. Dedicated agencies are able to provide a "one-stop-shop" for energy efficiency information and programs.

## Office of Energy Efficiency

The Office of Energy Efficiency (OEE) was established in early 2008 to assist Islanders in reducing their energy consumption and minimize the environmental footprint of our daily activities.

The mandate of the Office of Energy Efficiency Program is to provide Islanders with advice and programs that will promote sustainable energy use and reinforce the importance of sound energy management for the economic, social, and environmental well-being of Island residents and businesses.

The Office of Energy Efficiency is also a one-stop center for provincial and federal energy efficiency programs and services. In addition to a number of current and recently announced residential programs, the OEE and the Department of Environment, Energy and Forestry are developing new programs to cover the C&I and transportation sectors.

## Energy Efficiency Challenges

While there are clear benefits to pursuing energy efficiency and conservation, achieving these gains has its challenges. Energy is consumed to produce a huge variety of products and services, heat homes and businesses, generate electricity, and power the transportation sector. Therefore all new energy efficiency initiatives will attempt to address some of these challenges:

- *The required coordination among diverse stakeholders- energy suppliers, utilities, governments, regulators, builders, equipment suppliers, and consumers (individuals and businesses)*
- *The associated costs for implementing energy efficient products and services*

- *The lack of energy efficiency information available to individuals and businesses*
- *The availability of energy efficient products and services in the PEI marketplace*
- *The lack of experienced and qualified trades persons and professionals*

Despite these apparent obstacles, it has been demonstrated in many other leading North American jurisdictions that to save a unit of energy is always more cost effective than purchasing that same unit of energy. Participants at the public meetings easily understood this concept and there was significant support expressed for Government to devote additional resources towards energy efficiency programs and initiatives in PEI.

## Appliances and Equipment

The use of energy efficient appliances and equipment saves money and can help save the environment. Using less energy by selecting energy efficient products means burning fewer fossil fuels and therefore reducing GHG emissions. By choosing the appliance or equipment with the highest rating, Islanders can reduce their energy consumption and help curb the effects of climate change. Energy rating labels and minimum energy performance standards for domestic appliances and industrial and commercial equipment help the consumer in making a more environmentally and cost effective decision when making a purchase for new, or replacement products.

### Government Action

***The Provincial Government, in consultation with the OEE, will adopt minimum energy efficiency standards for appliances, equipment and other energy consuming devices.***

## Demand Side Management

The 2004 Renewable Energy Act required Maritime Electric Company, Ltd (MECL) to file an electrical energy efficiency plan and demand side management strategy with the Island Regulatory and Appeals Commission (IRAC). Demand Side Management (DSM) refers to the planning, implementation, and monitoring of utility activities designed to encourage consumers to modify patterns of electricity usage, including the time of day and level of electricity demand.

MECL's *Demand Side Management and Energy Conservation Plan* was first filed in 2006 and consists of six programs with elements designed to address barriers limiting market transformation, public education and awareness, community-based initiatives, energy efficient product retailers, and research and evaluation of program effectiveness.

## Demand Side Resources

Demand side resources such as energy efficiency are widely viewed as reliable, low-cost energy resources. Repeatedly during the public consultations, there were comments and suggestions directed towards government to require utilities to increase investment in energy efficiency and demand side resource programs for all customers. There was an expressed desire to see government mandate the utilities to procure all cost-effective demand side resources and energy efficiency when proven cheaper than conventional supply options. It was also noted that if energy efficiency competes with traditional supply options to meet demand then these programs should be ratepayer funded.

System Benefit Charges (SBC) are one way to fund efficiency programs. A small fee is added to consumers' electricity bills, it is collected by

the utility for the government department or agency responsible for the delivery of energy efficiency programs. It provides a consistent source of funds to support energy efficiency. Generally speaking, there was relative opposition expressed during the public meetings in regards to the notion of implementing an SBC in PEI. For a smaller population, the introduction of an SBC may establish an artificial funding ceiling and may limit the reach and effectiveness of energy efficiency programming. To overcome this potential barrier and to institutionalize energy efficiency in a utility's resource procurement process, a least-cost procurement mandate will be evaluated and pursued as an alternative.

## Least Cost Procurement

The concept of least cost procurement was included in recommendations adopted in Resolution 31-1 by the Governors and Premiers at the 2007 Conference of New England Governors and Eastern Canadian Premiers (NEG-ECP):

*The Governors and Premiers instruct regulators and crown corporations to prioritize energy efficiency through planning and acquisition processes that let efficiency compete with supply and capacity and ensure that cost-effective and practical energy efficiency opportunities that are cheaper than prices bid for conventional supply or capacity are procured.*

A least cost procurement mandate establishes a minimum target for electric energy efficiency savings that can be met through a flexible resource planning process aimed at securing all cost-effective electric efficiency resources. Once a budget is established to capture all cost-effective energy efficiency, typically through an open stakeholder process, the corresponding amount can be assessed in utility rates to fund the efficiency programs. The utilities could administer the energy efficiency programs and/or a portion of the monies could be placed in a

dedicated fund to be used by the provincial Office of Energy Efficiency. Regardless of administration, it will be critical to develop an accountability framework to ensure that the funds are spent in an effective manner.

An essential underlying element of all of the above components for successful electric energy efficiency policies, programming and planning is a consistent and accurate means of measuring and verifying the realized savings from the activities designed to increase energy efficiency. The absence of establishing clear and accurate measurement and verification protocols has been the subject of much criticism in energy efficiency initiatives. The utilities, analysts and policy makers must have confidence in predicting the energy cost savings associated with their programs and initiatives if energy efficiency is to be recognized as an energy resource and compete with conventional supply options.

For electric energy efficiency programs to be successful, it is imperative that they have the full cooperation from the utility. In order to align utility incentives with the goals of this least-cost planning and procurement process, the province will consider reforms to the way utilities are compensated for the services they provide. Unless utility profits are decoupled from their volumetric sales, successful efficiency programs, and any provincial policy that reduces electricity use, will hurt utilities. If customers are using less energy, utilities' profits will decrease. The implementation of a decoupling mechanism may be helpful in aligning utility incentives with the opportunity to increase energy efficiency investment and lower customers' bills. This will be further explored in consultation between government and the individual utilities.

## Building Code and Energy Standards

Prince Edward Island is one of only two jurisdictions in Canada without a province-wide building code. The municipalities of Charlottetown and Summerside do require new buildings to comply with the National Building Code, but they do not attach an energy standard to it. The implementation of a province-wide building and energy code would ensure that all new buildings meet minimum standards for energy efficiency. A region's building stock accounts for a tremendous amount of energy consumption and greenhouse gas emissions. A large percentage of PEI's current building stock is old and inefficient and contributes significantly to the Island's energy appetite and environmental footprint. In each of the Public Meetings conducted across the province, a recurrent theme emerged with Islanders appealing to government to consider the adoption of a Provincial Building Code with Energy Standards. Building to a high standard of energy efficiency during initial construction will help ensure that the

### Government Actions

***The Provincial Government will establish a planning process in consultation with Island utilities and IRAC that prioritizes energy efficiency and encourages local utilities to procure all cost-effective energy efficiency, through investment in electricity energy efficiency programs, when it is cheaper than conventional supply or capacity resources.***

***The Provincial Government will provide the legislative and regulatory framework that will encourage utilities to implement a least cost procurement mechanism.***

province is not adding to the number of inefficient buildings that make up the current stock. High efficiency buildings experience reduced operating costs that will translate into savings over the entire lifespan of the building and help mitigate the effects of future energy price increases.

## Government Actions

***The Provincial Government will be adopting energy codes and standards as part of the process towards the adoption of the National Building Code throughout the province. The code, with some exemptions for small buildings, will provide unified building standards across the province, which will compliment standards for energy efficiency in buildings.***

***Building standards and an implementation timeline will be set with escalating targets for energy efficiency over the next 5-10 years.***

***Administration, inspection, education and ensuring compliance will be addressed with the roll out of the new Provincial Building Code and Energy Standards.***

***The Provincial Government will consider mandating the energy consumption labeling of houses and buildings with special recognition of best practice and best-in-class.***

***The Provincial Government, through the OEE, will continue to develop programs for increasing energy efficiency for Islanders that include direct incentives, loan programs, grants and rebates.***

There is a tremendous opportunity for PEI to reduce energy consumption and GHG emissions associated with its residential and commercial buildings through the implementation of a Provincial Building Code with Energy Standards. It was pointed out by several participants during the Consultations that this will require a coordinated and comprehensive effort to educate the public, the building community, the appropriate municipal and provincial divisions, train and hire inspectors, as well as to implement supporting administration and policing. It was also felt that the introduction of a provincial building code with energy standard would provide additional opportunities and build capacity in PEI's trades sector and stimulate local economic development.

The Consumers Council of Canada recently reported that 86% of those surveyed supported mandatory levels of energy efficiency for homes and responded that energy efficiency is an important factor in their decision to purchase a new home. In light of these findings and volatile energy prices, it is timely for the provincial Government to be pursuing the introduction of energy efficient building code policies.

## Space Heating Efficiency

Next to the transportation sector, space heating is the largest user of energy in the province, consuming approximately 30 percent of our total energy requirements. Improvements to existing homes and buildings to reduce energy consumption for space heating include:

- *Improved efficiency of the heating source (furnaces, boilers, etc.)*
- *Improved efficiency of the home or building structure (insulation, windows, etc.)*

It is important for Island residents and businesses to understand the most cost-effective approach to increase space heating efficiency. Increasing the efficiency of the heating source does not necessarily lead to energy savings if the structure is drafty and poorly insulated. Greater savings can be achieved by reducing the energy demand of the building and maintaining the existing heating system i.e. sealing drafts, adding more insulation, replacing inefficient systems and equipment, etc. Residential and commercial energy audits, performed by qualified professionals, can provide valuable information to consumers on the best and most cost-effective solutions for space heating efficiency. For more information on these audits and associated programs, please refer to the Office of Energy Efficiency website <http://www.gov.pe.ca/OEE>.

## Transportation Efficiency

Historically, Prince Edward Island has been more dependent on automobiles than any other province. The Island has the most extensive network of roads and highways, limited urban transit, an automobile dependent tourism industry and a heavy reliance on the trucking industry to move goods in, out and around the province. As such, the transportation sector consumes 43 percent of our energy and is the single largest source of greenhouse gas emissions. Over 80 percent of registered vehicles on the road in PEI are considered light duty vehicles. In addition, the number of annual kilometers traveled has increased by nearly 20 percent since 1990.

The Provincial Government introduced a hybrid tax incentive in 2004 to encourage the purchase of hybrid vehicles. Participants in May's Public Meetings encouraged the Government of PEI not to limit this incentive to hybrids only, but to set minimum fuel economy standards and expand the program to include any vehicle that

meets these requirements. The idea of implementing California-like vehicle emission standards was also suggested.

The Provincial Government operates hundreds of vehicles in their fleet and purchasing more fuel-efficient vehicles has been part of their strategy to reduce fuel costs and cut greenhouse gas emissions for the past several years. The Government's own Transportation Efficiency Standard requires that fuel efficiency be part of vehicle procurement considerations for all future leased or purchased vehicles for public use.

Public transportation, in some jurisdictions, has been shown to be an effective means to improve air quality, relieve traffic congestion, and reduce fuel consumption and greenhouse gas emissions. A public transit system was launched in Charlottetown in 2005 and currently operates seven different routes across the city with plans to expand into Stratford this year. Two hydrogen-powered buses were added to the fleet in 2007. Several submissions in response to the Public meetings suggested the need for a sustainable **province-wide** public transportation system. It was purported that such a system would further reduce greenhouse gas emissions from personal vehicles, promote economic development as well as address issues of social equity and isolation.

Invariably, transit systems are a highly subsidized public service. The costs of implementation and ongoing annual operation can be significant. In the absence of a critical mass of transit users in PEI and relevant market research data concerning the number of daily users, it is difficult to quantify what effect, if any, an expanded transit system would have on meeting the Island's energy and environmental objectives. The results of the VEIC analysis suggest that from an energy and environmental perspective, expansion of the public transit system would not have a positive impact on meeting GHG or

other environmental goals. This does not however undermine the social issues and argument surrounding an expanded system. As time goes on and energy prices continue to rise, more Islanders may opt for public transportation at which time the overall environmental impacts may improve.

According to the VEIC Study on the potential for energy efficiency in the transportation sector in PEI, there are many initiatives that could be implemented, and are currently under consideration by the Government of PEI:

- *Anti-idling and speed reduction campaigns*
- *Telecommuting and compressed work weeks*
- *Traffic signal synchronization*
- *Efficient traffic signal and highway lighting technologies*
- *Public outreach and education*

## Government Actions

***A review of the Provincial Hybrid Tax Incentive will be conducted to expand the program and set minimum fuel economy standards.***

***The adoption of California-like vehicle emission standards was announced in 2007. The PEI Government will work with neighboring provinces and states to encourage adoption.***

***A review of the effectiveness of the Transportation Efficiency Standard, with a view to more stringent government wide enforcement, will be undertaken.***

***Government will continue to evaluate the feasibility of a province-wide public transit system and determine the effectiveness of the current system in reducing greenhouse gas emissions and meeting provincial energy and environmental targets.***

Several suggestions also emerged from the public around the need to implement smart growth policies in municipal land-use planning. Land use decisions can significantly impact GHG emissions and promote more sustainable transportation practices. For example, new developments that are pedestrian-oriented, transit accessible and designed with active transportation in mind will encourage residents to make more environmentally friendly decisions about their transportation needs. This does not only impact transportation, careful urban planning and land use policies may lead to more energy efficient development practices.

## Government Actions

***Government is currently reviewing the feasibility and cost of the transportation initiatives with a view to implementing and introducing several new efficiency programs.***

***The Provincial Government will support a review of current land use and development policies and attempt to encourage sustainable options for future land developments that are tailored to maximize energy efficiency and promote GHG reductions.***

## Government Leadership

The demonstrated leadership of the Provincial Government in recognizing energy efficiency as a priority resource is a crucial step in the development of energy policy. The government is in a unique position and will seek to develop closer ties between the diverse stakeholders involved in the administration and implementation of energy efficiency in PEI. There was a strong desire expressed during the public meetings to have government lead by example and position the province at the forefront of energy efficiency performance for publicly funded buildings in PEI.

### Government Action

**Government will adopt advanced energy and environmental standards for all publicly funded buildings.**

## Energy Efficiency Advisory Committee

The suggestion of creating an energy efficiency multi-stakeholder advisory board was contained in several submissions to government. Recognizing the range in diversity of energy efficiency stakeholders and the need to raise awareness and educate the public, the Government of PEI will seek to develop a multi-representational Energy Efficiency Advisory Committee. This committee will be composed of a broad group of individual stakeholders from the public, private, non-governmental and utility sectors that will work collaboratively to identify all cost-effective investments in efficiency as well as assisting to plan and design programs for implementation. This committee will serve to increase transparency and accountability as well as raise awareness of energy efficiency needs and opportunities in Prince Edward Is-

land. The committee will exist in an advisory capacity only and all regulatory approval issues will remain with the Island Regulatory Appeals Commission (IRAC). In New England, Massachusetts just announced such a stakeholder council and they are underway in Rhode Island, Connecticut and Maine where they are proving to be a highly effective means for advancing energy efficiency goals.

### Government Action

**Recognizing the range in diversity of energy efficiency stakeholders and the need to raise awareness and educate the public, the Government of PEI will seek to develop a multi-representational Energy Efficiency Advisory Committee.**

## Public Outreach and Education

There are a variety of common practices and tools to market to and educate consumers concerning energy efficiency and conservation. Several participants and submissions at the Public Meetings called for more resources devoted to public outreach and education. The Province is planning to work with the above Advisory Committee to develop and pursue a number of the following strategies:

- *Point-of-purchase materials*
- *Utility bill inserts*
- *Direct mail campaign*
- *Internet- central website*
- *Booths at home shows*
- *Public relations events*
- *Media outreach*
- *1-800 number for expert advice*

In addition to these public awareness activities, community-based outreach activities will also be considered to invoke real behavioral change amongst Islanders. Large information-based campaigns are effective in promoting awareness but do not often result in sustainable behavioral change. Recognizing that the majority of the commercial sector in PEI is comprised of small to medium-sized enterprises, it will be important for the Province to promote community- and workplace-based energy efficiency and conservation measures to this targeted group of stakeholders.

### **Government Action**

***Government, through the OEE, will develop a number of comprehensive public awareness and education programs directed at energy efficiency for all residents, businesses and institutions in PEI.***





# RENEWABLE ENERGY

## 4.0 RENEWABLE ENERGY

### Overview

Prince Edward Island is the only Canadian province without substantial resources in fossil fuels, hydroelectric or nuclear energy. As a result, the province imports nearly 85 percent of its energy needs from mostly petroleum-based off-Island resources. This heavy reliance on out-of-province suppliers makes PEI consumers and residents particularly vulnerable to fossil fuel price volatility and supply disruptions. Pursuing renewable energy development offers an alternative to conventional sources and will provide greater control on the Island of energy prices, security, and diversity of supply. Promoting renewable energy development will address many environmental issues, particularly climate change and the reduction of greenhouse gases.

In 2004, the Department of Environment, Energy and Forestry oversaw the development and implementation of the *Renewable Energy Act*, which provided a number of policy instruments (e.g. net metering, feed-in tariffs, designated development zones, and a renewable portfolio standard) to increase the development of renewable energy. A Renewable Portfolio Standard (RPS) was introduced requiring utilities to acquire at least 15 percent of electrical energy from renewable sources by 2010.

### Wind

As a percentage of domestic use, PEI is a North American leader in the development of wind energy. The Provincial Government, through the PEI Energy Corporation, developed Atlantic Canada's first utility-grade wind farm in 2001 at North Cape when the economics of large-scale wind within the region was not fully understood. Since that time, the PEI Energy Corporation has expanded its North Cape facility and developed the East Point Wind Farm that has resulted in the Province owning and operating 40.56 MW of wind power. Now that electrical generation from wind has been demonstrated to be competitive with non-renewable sources, there are private wind developments that have been completed. Several more private wind farms are in the planning stages. In the April 2008 Speech from the Throne, Premier Ghiz announced that the Province of Prince Edward Island will be developing up to 500 MW of wind generation capacity in the province over the next five years in partnership with Maritime Electric Company and private developers.

In addition to demonstrating the economic feasibility of utility-grade turbines, the Province has promoted wind development through regulatory measures. Under the Renewable Energy

Act, utilities on PEI must meet at least 15 percent of their electrical energy sales from procuring power from renewable resources by 2010. Presently, almost 18 percent of the electricity on PEI is acquired from wind power meaning the renewable portfolio standard has been met by Island electrical utilities. Government feels it is now appropriate to establish a new renewable portfolio standard

## Government Action

***The Provincial Government will double its renewable energy portfolio standard from 15% to 30% by 2013.***

Prince Edward Island has a world-class wind resource and there continues to be strong interest in locating wind farms in the province. Most of the future development of wind must be marketed off-Island and may be sold at a premium to offset electricity from traditional sources that release harmful air and greenhouse gas emissions. The benefits to PEI for exported wind power are mainly accruing from lease payments for landowners where the turbines are situated, the economic stimulus from short-term construction opportunities, a limited number of operations and maintenance jobs, and provincial revenues from the environmental attributes associated with green power production. There is an opportunity to maximize these benefits through the promotion of additional large-scale wind farm developments. During the Public Meetings there was concern voiced around the tangible benefits to individual Islanders for further large-scale wind developments occurring on PEI. Islanders also questioned why local utilities were not buying more wind energy to meet local requirements.

Maritime Electric Company, Ltd. has drafted an Open Access Transmission Tariff (OATT) that remains before the regulator, the Island Regulatory and Appeals Commission. The OATT will provide nondiscriminatory access for wind developers and other potential users at a regulated rate for service. MECL has proceeded with a process to determine transmission requirements for future large-scale wind projects in PEI that will lead to increased transmission capacity for wind power developers. Both these initiatives will provide future wind developers limited transmission capacity for their exported power. Maximizing wind potential will require additional cable capacity between PEI and the mainland.

Wind energy is PEI's most prospective renewable energy resource. Given its intermittent nature, it is a challenge to incorporate a high percentage of wind into the electricity grid. The scheduling of wind energy is also problematic due to the intrinsic variables of weather forecasting. Research and development (R&D) groups, particularly the Wind Energy Institute of Canada (WEICan, formerly the Atlantic Wind Test Site) at North Cape, advance wind technology through various projects and initiatives with other private and government agencies. Pursuing a high integration of wind on PEI provides R&D opportunities for WEICan that have application in other provinces, remote parts of Canada and other parts of the world. Given our unique situation in PEI, energy storage R&D initiatives involving hydrogen fuel are also being developed to address the intermittent nature of wind power generation.

## Government Actions

***The Provincial Government will attempt to maximize the benefits of future large-scale wind developments for all Islanders, including developments built for both the export and domestic markets.***

***The Provincial Government will work to secure additional cable capacity to facilitate the export of commercial wind power.***

***The Provincial Government will continue to provide support to WEICan and encourage R&D opportunities for small-, medium- and large-scale wind developments.***

## Small Wind Developments in PEI

A repeated theme during the public meetings was the need for the Provincial Government to consider the benefits and encourage smaller wind developments in PEI. Several participants felt that there was too much emphasis placed on large-scale projects and the benefits of smaller, more community-focused wind energy projects deserved attention. A growing trend in Europe has been a shift away from large wind farms to more community-based and distributed models, which has led to significant local economic development benefits.

## Government Actions

***The Provincial Government will evaluate and develop appropriate policy mechanisms, such as net-billing and the allocation of electrical capacity, to facilitate the development of smaller community-based wind and other renewable energy projects.***

***Government will continue to explore opportunities for economic development in the manufacturing, service and maintenance of small wind energy systems.***

***Government, through the PEI Energy Corporation, will consider developing additional wind capacity in PEI specifically for meeting on-island demand and increasing the Island's energy security.***

## Role of Government in Future Wind Development

The PEI Energy Corporation's ownership of the North Cape and East Point wind farms is an invaluable asset to WEICan. Provincial ownership means that data for research and development is accessible to WEICan and has enabled the Corporation to be an active partner in understanding and promoting wind energy developments in PEI. Having access to actual public assets in the field is an important element to the success of research and development opportunities for WEICan and PEI. In addition to the above, significant wind farm revenues are now being generated by the PEI Energy Corporation and flowing back to the province, thereby contributing to the diversification of supply and stabilization of the cost of electricity. There was a strong desire by most public participants to see the Province of PEI continue to develop this resource.

## Solar Technologies

Solar energy technologies capture the sun's energy for practical applications. There are many modern technologies for harnessing solar energy to produce food, heat, light and electricity. Applications span the residential, commercial, industrial, agricultural and transportation sectors. The pervasive use of solar technologies peaked in the 1970s and early 80s during the first fuel crisis; government grants, incentives, and demonstration systems caused an explosion of growth in Canada. PEI, at one time, had the highest per capita residential use of solar hot water units in the country.

Passive solar design in new construction can provide practical lighting and comfortable temperatures by tailoring building orientation, proportion, window placement, and material components to the local climate and environment.

Solar thermal applications make up the most widely used category of solar energy technology. These technologies use heat from the sun for water and space heating, industrial process heat, cooking, water distillation and disinfection.

Electricity can be generated from the sun by photovoltaic technology (PV). The primary obstacle to increased use of photovoltaic systems is their high initial cost. Continuous price reductions have been occurring. In some off-grid locations photovoltaic systems can be cost effective versus the costs of running power lines. With many jurisdictions now providing tax and rebate incentives, PV installations make up the largest part of the solar residential market worldwide.

With increased public concern over escalating fuel prices and regard for the environment, the use of solar technologies as a renewable fuel source has regained momentum and is the fastest growing sector in renewable energy. Solar technology maturation and the rising cost of fossil fuels are making solar systems a more attractive alternative to conventional sources of energy. Throughout the public consultation process, there was interest expressed by the public for Government to promote the greater deployment of small-scale renewable technologies like solar and geothermal heating systems.

## Earth Energy

Earth energy systems, or geothermal systems, are terms used to describe a renewable energy alternative to traditional oil, propane, ventilation and air conditioning (HVAC) systems. This technology transfers the heat located immediately under the earth's surface into a residence or building in winter, and is able to provide cooling functions in the summer when the outside temperature is higher than ground temperature (8-12°C). There were repeated calls from the public for government to provide incentives for geothermal heating systems during the public consultations.

Twenty percent of the average energy demand in a residential home is for water heating, and most geothermal units include a component to heat water for potable or sanitary use. Earth energy systems are ideally suited to meet the HVAC needs of commercial, industrial and institutional (e.g. schools and post-secondary) users. Natural Resources Canada (NRCan) and the US Environmental Protection Agency state that earth energy systems are the most energy-efficient, environmentally clean, and cost-effective space conditioning systems available in the market today.

### Government Action

***The Province of PEI will continue to support the installation of small-scale renewable heating technologies like solar and geothermal heating systems through grants, loans, tax and other financial incentives.***



# BIOFUELS

## 5.0 BIOFUELS

### Overview

Growing crises in the agricultural and forestry sectors, rising fuel prices, concerns about the security and supply of energy resources, and growing awareness of the impact of traditional energy resources on the environment (e.g. climate change) have greatly increased interest in renewable and sustainable energy technologies, and in particular, biofuels. Biofuels represent a potential opportunity to transition PEI to a sustainable bio-economy in which agricultural and forestry products, co-products and waste materials are used to produce energy. An aggressive biofuels portfolio, incorporating low carbon intensive fuels into the current energy mix could complement Prince Edward Island's efforts to further renewable energy development, reduce greenhouse gas emissions, and provide an additional revenue source for the agricultural and forestry communities.

Fuels made from renewable resources are referred to as biofuels or renewable fuels. Primary sources of feedstock for biofuels include: agricultural crops and crop residues, manure, residues from food processing industries, trees, logging and forestry products, industry residues, organic portion of municipal solid waste, sewage sludge, and industrial, commercial and institutional waste.

Common biofuels include wood, crop by-products like cereal straw or perennial grasses, pure plant oils, ethanol, biodiesel, waste cooking oil, and biogas. Biofuels can be used for space heating, electricity generation, and transportation. Pure plant oils are processed from biomass or field crops (e.g. canola). Biodiesel can be made from plant oils or animal fat, while ethanol can be made from high starch crops, such as corn, wheat, or high sugar crops like sugar cane or sugar beets. Many liquid biofuels can be blended with fossil fuels and used in traditional applications to reduce our reliance on petroleum products and reduce greenhouse gas emissions.

### The Biofuel Potential in Prince Edward Island

In September 2007, Executive Council established and directed the Environmental and Renewable Industries Committee (ERIC) to examine the potential for local biofuel development. With members from eight government departments and agencies, ERIC was mandated to collect relevant data on the quantity and quality of available feedstocks from primary resource sectors and submit policy recommendations regarding the sustainable development of these resources.

In determining the potential for biofuel development in Prince Edward Island, a number of factors were considered by ERIC. Specifically:

- *Availability of and/or potential to grow feedstocks for biofuel development*
- *Local and/or regional markets for biofuels*
- *Benefits to Islanders from local biofuel development*
- *Evaluate biofuel potential based on full life-cycle sustainability criteria*

## Inter-Departmental Biofuels Committee (IDBC)

The Government of Prince Edward Island established the Inter-Departmental Biofuels Committee (IDBC) in March 2008 following the acceptance of the ERIC Final Report. The Committee is tasked to evaluate and advise Government on the role bioenergy projects and proposals can play in the province's energy future.

As a cross-departmental body, IDBC will act as the central evaluation committee for bioenergy proposals that come to the attention of the Provincial Government. IDBC includes representatives from several government departments including Agriculture, Fisheries, Aquaculture and Rural Development, Innovation and Advanced Learning, Transportation and Public Works, Provincial Treasury and Environment, Energy and Forestry. The IDBC maintains links to energy experts in the private sector, government and academia.

In evaluating bioenergy submissions, IDBC will consider the economic, environmental and social benefits that may be derived for the people of Prince Edward Island. IDBC will work with proponents of approved submissions to identify applicable federal and provincial government assistance programs. With respect to the evaluation of proposals for biofuel projects or

biofuel demonstrations, the Committee will review each submission using the following assessment headings:

- *Agricultural sector development*
- *Forestry sector development*
- *Development benefits and Risk*
- *Technical feasibility*
- *Financial feasibility*
- *Environmental benefits*
- *Climate change impact*
- *Barriers to progress*

## Biomass

Ten percent of energy in PEI is currently supplied by biomass, which includes fuel wood, sawmill residue and municipal waste. PEI Energy Systems in Charlottetown uses municipal waste and wood biomass to supply thermal energy to commercial, residential and institutional buildings in the city. There are many biomass resources in PEI that, if developed properly, could contribute to additional incorporation of renewable energy into the province's overall energy mix.

Biomass from forest and agricultural sectors is the most readily available feedstock for biofuel development in Prince Edward Island. Wood supplies from Island forests (softwood, hardwood, post-harvest material, plantation thinnings, roadside material etc.) could represent a significant feedstock for space and water heating. Agricultural crops such as straw and hay could be further developed as potential feedstocks. Markets for biomass systems include the residential, commercial and institutional sectors. Tax exemptions, low interest loans and other financial incentives for wood heat systems (wood and wood pellets) has increased the popularity of these systems and resulted in a larger market for wood and wood pellets.

Biomass fired district-heating systems for municipalities or small communities could represent a viable market and provide long-term employment to many rural Islanders. With sustainable forest management systems and practices, larger-scale forest biomass production could facilitate improvements in the productivity, quality and value of PEI's struggling forestry sector. The development of markets for agricultural biomass could also help strengthen the farming community. The availability of biomass feedstocks could feed distributed cogeneration facilities across the Province. Such facilities could be of interest to Island utilities as a source of base load electricity generation that could be further developed to reduce dependency on imported fossil fuels.

## Biomass Challenges

Some potential obstacles to the further development of biomass fuel in PEI, include the need:

- *To better understand the need to modernize labor regulations for the staffing of small heating plants*
- *To better understand the environmental and health concerns associated with biomass emissions (i.e. wood smoke)*
- *To determine the proper role that local biomass resources can play to meet the electrical and thermal requirements of Islanders*
- *To ensure that increasing the use of local biomass resources is accomplished in a sustainable fashion*

## Government Actions

***The Provincial Government will review existing codes and regulatory barriers affecting the further development of biomass fuel in PEI.***

***Government will lead by example in demonstrating biomass technologies in select public buildings across the Island.***

***Government will actively promote the use and encourage the installation of biomass heating systems in homes and businesses.***

***Government will further investigate the use of biomass in urban district heating systems and the potential for cogeneration facilities with the Island utilities.***

***Government will only be supportive and promote biomass installations that meet acceptable emissions levels.***

## Liquid Biofuels

The Federal and most Provincial Governments outside of Atlantic Canada have supported the growth of liquid biofuels to mitigate the environmental impacts of fossil fuel combustion and create new markets for the agricultural sector. More than half of Canadian provinces have existing policies relating to the production and/or consumption of biofuels. The Federal Government recently announced a regulation requiring a 5 percent and 2 percent average renewable content in Canadian gasoline and diesel fuel by 2010 and 2012 respectively. The 2007 Federal Budget indicates an investment of \$1.5 billion over seven years as an operating incentive to producers of renewable alternatives to gasoline and diesel, i.e. ethanol and biodiesel respectively. While policies have yet to develop in Atlantic Canada, there has been clear direction from the New England Governors and Eastern Canadian Premiers (NEG/ECP) and the Council of Atlantic Premiers (CAP) regarding the need

to assess and develop local biofuel opportunities. If PEI is to achieve environmental goals and greenhouse gas objectives, the introduction of a biofuel policy is required given that 46 percent of energy consumption in PEI is from the transportation sector and 30 percent of energy consumption is from petroleum-based heating fuels.

## Pure Plant Oils

Canola and soybeans are currently grown on just over 4 percent of Prince Edward Island's cropland. Canola is particularly well suited for our climate, and has a high energy content. Acreage of canola and soybeans are currently not sufficient for broad-scale use of pure plant oils, but could support pilot initiatives and be further developed once market demand is demonstrated.

Pure plant oils have a number of applications and potential markets. Pure plant oil can displace light fuel oil for space and water heating applications and diesel in transportation applications; however modifications to combustion equipment may be required. Engine modifications (dual fuel) would be required if pure plant oil was expected to play a significant role in the transportation sector. Large commercial, institutional, and industrial users of oil may also represent a suitable market for pure plant oils. Canola and waste vegetable oil are already being used in some commercial fleets in Prince Edward Island.

## Government Action

***The Provincial Government will identify and explore opportunities and applications for the utilization of pure plant oils.***

## Biodiesel

Currently, there are limited feedstocks available for the production of biodiesel. Oil-seed crops, such as canola, could be further developed on Prince Edward Island provided the right market incentives are given. Biodiesel is more likely to be compatible with transportation applications than pure plant oils as its use requires little or no modification to existing equipment. Many major diesel engine manufacturers already warrant the use of low-level blends of biodiesel and diesel fuel.

The potential market for heating oil is significant, with 76 million litres used each year in Island homes and 62 million litres used in commercial and institutional facilities. Demand for diesel and light fuel oil in the region exceeded 3 billion litres in 2006. At blends of 5 to 20 percent, the inclusion of biodiesel into heating oil and diesel fuel could create a regional demand for biodiesel exceeding 600 million litres per year.

From a life-cycle sustainability perspective, biodiesel (depending on the feedstock) can produce significantly fewer greenhouse gas emissions than diesel or light fuel oil. The use of biodiesel, produced domestically or imported, will help the Province to meet its renewable energy and environmental goals.

## Ethanol

Ethanol is a transportation fuel, suitable for use in vehicles in blends of up to 10 percent, without the need for any engine modifications. The current availability of local feedstocks (e.g. corn, wheat, sugar beets) to produce ethanol is limited on PEI. Similar to biodiesel crops, concerns exist around the type of feedstocks for ethanol production and the availability and effect on agricultural land. However, many sectors of the Island's agricultural industry are fac-

ing serious challenges from declining revenues. Switching to the cultivation and production of energy crops could help mitigate and improve this downward trend.

Current gasoline demand in Prince Edward Island is 234 million litres (regional demand is 2.5 billion litres). At a 10 percent ethanol blend, provincial demand for ethanol would be 23 million litres, with regional demand near 250 million litres.

Like biodiesel, ethanol can reduce greenhouse gas emissions, depending on the feedstock and technology platform. Concerns regarding the environmental sustainability of ethanol production have been directed primarily at older first generation facilities in the corn-based industry in the United States. More efficient second-generation technologies, new plant designs and the potential advent of cellulosic ethanol are addressing these concerns resulting in substantially lessened environmental impacts.

## Liquid Biofuel Challenges

Biofuels produced from energy crops grown on Prince Edward Island could reduce our dependence on imported fossil fuels, reduce the emission of greenhouse gases and other air pollutants, and potentially provide the agricultural and forestry sectors with alternative sources of revenue.

There are, however, challenges to be considered in the development of liquid biofuels in PEI:

- *Determining the proper transition for the production of locally grown feedstocks to meet market demand*
- *Finding/creating the land use balance between food and energy crop production*
- *Understanding the full environmental, social and economic impacts of individual feedstocks and technology platforms for the production of liquid biofuels*

## Renewable Fuel Standard

A similar concept to a Renewable Portfolio Standard is the Renewable Fuel Standard (RFS). RFSs set targets for a percentage of transport fuel to be acquired from renewable sources such as ethanol or biodiesel. The introduction of RFSs in other countries has led to the rapid development and growth of the biofuel market and has produced significant economic benefits. The Federal Government recently announced a regulation requiring a 5 percent average renewable content, such as ethanol, in Canadian gasoline by 2010. There are however no assurances that renewable fuels will be available in all Canadian jurisdictions. It is therefore important that the Provincial Government establish its own RFS to ensure that Islanders have access to renewable fuels.

### Government Action

***The Provincial Government will consider the introduction of escalating Renewable Fuel Standards for ethanol and biodiesel. A Provincial E5 and B10 (or B10 renewable equivalent) mandate will be introduced by 2013 and doubled by 2018.***

Climate change concerns and the desire to reduce GHGs in transportation fuels, has led to the concept of a Low Carbon Fuel Standard (LCFS), initially introduced in California and endorsed by the Provinces of Ontario and British Columbia, as well as the State of Massachusetts. An LCFS is a performance-based and technology neutral approach that focuses on GHG reductions, as opposed to mandating specific fuel types. This focus on GHG reduction allows innovation in the industry to develop alternative clean fuels at the lowest cost. The LCFS incorporates a full life-cycle carbon analysis.

## Government Actions

***The Provincial Government will endorse the concept of a Low Carbon Fuel Standard (LCFS), as a guiding policy framework to reduce GHGs, through the increased use of environmentally and economically sustainable alternative biofuels.***

***The Provincial Government will engage the neighboring Provinces and States in formulating a collaborative regional approach to GHG reduction through the adoption of low carbon fuel standards.***

Biogas production is occurring in Prince Edward Island. Methane is being used on site at wastewater treatment facilities and industrial operations. Several commercial food processors are building bio-digesters fuelled by food processing waste to offset some of their energy costs. Whether it is in existing markets, isolated industrial users, or as part of other biogas initiatives, the most appropriate and economic use of these feedstocks requires further assessment. The ADAPT Council of PEI is currently investigating the potential for the cost-effective use of biogas in PEI farming operations.

## Biogas

Biogas is a type of biofuel in the form of a gas that is produced by the anaerobic digestion or fermentation of organic matter. Agricultural and marine byproducts, crops, sewage sludge, municipal solid waste or any other biodegradable feedstock, under anaerobic conditions, can produce methane and carbon dioxide. The production of biogas could represent a significant biofuel for space heating applications or electricity generation.

Despite the considerable sources of raw material for the production of biogas on PEI from agricultural, marine-based and waste resources, the potential for this biofuel may be limited to specific and localized applications. Manure generated by livestock production can be used to generate methane and still provide fertilizer, but at present the cost of capturing the methane exceeds its value as a renewable fuel. Fish processing waste from the mussel, lobster and crab industry could be used as a feedstock to produce methane. However, the logistics and necessity of removing shell from the feedstock have proved challenging and the potential for nutraceutical and pharmaceutical uses may represent a competing market.





## 6.0 ECONOMIC DEVELOPMENT

### Overview

Conserving energy while aggressively pursuing energy efficiency and renewable energy development and biofuels will not only contribute to a sustainable energy future, but will also help transition the Island to a prosperous economy and protect the environment. There is broad recognition that PEI has already begun to make this shift and is evidenced in the growth of the aerospace, bioscience and information technology clusters. These industries have experienced rapid success in part because of the Provincial Government's support and attention to prioritizing these high growth economic opportunities. The release of the Provincial Government's economic development strategy this spring, *Island Prosperity - A Focus for Change*, has set aggressive targets for economic growth. Renewable energy has been identified as a priority sector for development and support recognizing the importance of this industry in the future sustainability and prosperity of the Island economy.

The development of clean energy producing technologies is now a multi-billion-dollar enterprise that is positioned firmly in the business mainstream of industry giants and investment firms. As the global community faces unprec-

edented challenges from high energy prices, dwindling fossil fuel reserves, increased demand and climate change, green technologies promise to be the economic engine of the future. In order for Prince Edward Island to reap the benefits of this explosion and next high growth opportunity, the time to put the right policies in place and make decisions about the Island's future prosperity is today.

Renewable energy technologies have emerged from the groundwork laid by the computer, Internet and biotechnology industry revolutions and are providing unprecedented opportunities for economic development, wealth creation, high-growth career development, and innovative solutions to a variety of global issues. Green technology development cuts across a variety of sectors from electricity generation to transportation fuels to water to advanced manufacturing and materials. Wind power, bio-fuels, solar and earth energy, fuel cells, electric and hybrid vehicles are just a few examples of emerging subsectors of the green technology revolution sweeping the globe. There was overwhelming support expressed during the public meetings for Government to continue support for the development of the renewable energy sector. Participants indicated that support should be provided to all sub-sectors and not

be limited to wind only. It was felt that all areas deserved attention, with a particular focus on smaller-scale community-based renewable energy projects.

## Government Action

***The Provincial Government, through Business Development Inc., will provide support by way of different financial incentive mechanisms to businesses supplying, developing or manufacturing renewable energy technologies in PEI.***

## Green Technology Cluster

A business cluster is a geographic concentration of interconnected businesses, suppliers, and associated institutions in a particular field. While agriculture, fisheries and tourism have historically been the drivers of the Island economy, emerging sectors like aerospace, bioscience and IT are now contributing more to the overall shift to a knowledge-based economy. A critical capacity, a North American reputation and a firm track record in renewable energy development already exists on PEI. A strategic plan could be designed and implemented to leverage the strengths of the Island's current resources to guide the growth and development of a Green Technology Cluster (GTC).

The *Wind Energy Institute of Canada* (WEICan) is a leader in the development of this local renewable resource and has attracted international collaborations between academic institutions, researchers and the private sector. Holland College's strong focus in applied education makes it ideally positioned to assist this industry initiative by graduating skilled technicians in efficient technologies and renewable energy. The University of Prince Edward Island

has been a leader in 'greening' its campus and supporting research and development. PEI Energy Corporation, PEI Energy Systems, local utilities, the agricultural and forestry sectors can all work together in strengthening a Green industry and promoting economic development on the Island. Several private sector companies have established or are interested in establishing renewable energy industries and technologies in PEI.

Policy incentives and the support of a made-in-PEI GTC could greatly enhance the economic benefits and opportunities for Islanders:

- *Attract investment dollars for companies, institutions and governments*
- *Forge relationships and collaborations locally, regionally and internationally*
- *Accelerate technology transfer and commercialization*
- *Build capacity - new industries will attract experts from various fields*
- *Contribute to the creation of new jobs*
- *Lead to export opportunities*

The key to success for the growth of technology clusters are governmental policies and mechanisms that stimulate capacity building, research and development, technology commercialization (proof of concept) and transfer, small business support, and public outreach and education. There is a key opportunity for PEI that should not be overlooked- the potential for this region to become a world-renowned hub or cluster for green tech companies, R&D activities, and showcases for the Island itself to walk the walk in its use of energy efficiency and conservation, renewable energy resources and biofuel development. The payoffs can be substantial in terms of overall economic growth and provides additional opportunity to overhaul a region's image into a place that attracts more conventions, more tourism and more people who want to live in Prince Edward Island.

## Community-Based Renewable Energy Projects

Strong, diverse, local economies are the backbone of a vibrant Island community. Realizing the advantages that can accrue through local ownership of distributed or community-based energy projects has resulted in the most accelerated and successful growth of renewable energy in other jurisdictions around the world. This model is designed and implemented to accomplish the complementary goals of environmental and regional economic sustainability resulting in the local control and retention of substantial revenues from the sale of power back to the grid operator (local utilities).

When the revenues generated by these community-owned projects flow back into the local municipalities, the whole community benefits from the economic spin-off. Long-term fixed price contracts for the various forms of renewable energy sources (wind, solar, biomass & earth energy) are a key economic policy mechanism that benefits the broadest spectrum of local communities and residents. In all 5 communities across the Island during the public meetings there were repeated calls from Islanders for Government to consider different mechanisms that would facilitate the development of community-based energy projects.

### Government Action

*The Provincial Government has identified the renewable energy sector in PEI as a priority and will actively market and support the development of a green technology cluster.*

*The Provincial Government will evaluate the most appropriate policy mechanism (e.g. net-billing, standard offer contracts etc.) and provide the proper regulatory framework to facilitate the development of community-based renewable energy projects in PEI.*



# PATH FORWARD

## 7.0 PATH FORWARD

To achieve our objectives of energy security, environmental sustainability and economic development will require specific Government action in the form of support, incentives, legislation or regulations. The intent of this Provincial Energy Strategy document has been to present new action in areas of energy efficiency and conservation as well as other policy mechanisms to promote the use of renewable energy including biofuels and economic development. We have entered an era of high energy pricing with increasing concerns around the effect that our fossil fuel use is having on the environment. In concert with the implementation of the action items outlined in this strategy, will be specific measures taken by Government to address climate change. These are outlined in the Provincial Climate Change Strategy.

The Government of Prince Edward Island is committed to working with the neighboring Provinces and New England States on energy and environmental issues that collectively affect our region and quality of life. This new Strategy for the Province will not be a static framework; it will be flexible and capable of adapting to new market opportunities and technological change. We have attempted to lay out the broad framework with input from interested stakeholders and the public. It is now time to put these recommendations into Government Actions.

In addition to the programs, initiatives and Government Actions outlined in this Strategy, The Department of Energy, Environment and Forestry will be actively developing new and innovative means to engage Islanders to help them find ways of dealing with the new reality of high energy prices. The Provincial Government will be constantly updating programs and policies to reflect the needs of Island residents and businesses and will take a proactive approach in promoting public awareness and education across Prince Edward Island.

***Each and every Islander has a role to play in using energy in the most efficient manner possible and protecting the environment for future generations.***

# Notes

---

## Notes

---

# Photos Credits

Cover: PEI Energy Corporation; iStockphoto.

Page 06: iStockphoto.

Page 08: Ron Garnett, AirScapes International Inc.

Page 12: iStockphoto.

Page 21: Ron Garnett, AirScapes International Inc.

Page 22: PEI Energy Corporation.

Page 26: SXC.

Page 31: iStockphoto.

Page 32: National Research Council.

Page 32: iStockphoto.



