Toward a Greener Future

Nova Scotia's 2009 Energy Strategy

January 2009

NOVA SCOTIA
Department of Energy

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Executive Summary

Toward a Greener Future

Energy is central to almost everything Nova Scotians do. Our work, our home lives, our essential services, our transportation systems, and our community activities all require energy.

Change is sweeping through our energy economy. World fuel prices have swung wildly, and science has shown a pressing need for more sustainable energy sources. Nova Scotia currently produces most of its electricity by burning imported coal, a fuel that degrades our air, changes our climate, and leaves us vulnerable to world prices and supplies.

We have many options. Our coastline experiences some of the fastest average wind speeds and strongest tidal currents in the world. We have fallow agricultural land and forests that may be able to produce sustainable amounts of biomass to create electricity or be converted to fuel for cars and trucks. Experts believe we have significant untapped reserves of natural gas—a cleaner burning fossil fuel—under our ocean floor. Our onshore gas reserves could be even larger. Simple conservation measures could save large amounts of energy that is needlessly wasted in our homes, buildings, and vehicles.

We also have many challenges. We have limited access to electricity outside our provincial borders. We lack the large hydro resources that give most of Canada a clean, dependable local supply of electricity. Tidal technology is only in its infancy and needs time to develop. Offshore exploration is expensive and offers no guarantees of success.

We must act now despite much uncertainty. We don't know when or how much the price of energy may rise in the years ahead, only that the long-term trend is upward. We don't know what future mix of renewable energy technologies will best suit our needs, only that our current way of producing energy depends too much on a single fossil fuel.

Nova Scotia is a small province committed to sustainable prosperity. We treasure our environment, and we take responsibility for protecting it. At the same time, we want our economy to grow and our children to prosper. Nova Scotia's Environmental Goals and Sustainable Prosperity Act reflects these goals, including two key targets by 2020:

- 10 per cent less greenhouse gas emissions than 1990 levels
- economic performance to the Canadian average or better

Smart energy choices are essential to achieving these targets. They will help determine the future prosperity of our children and grandchildren. The 2009 Energy Strategy makes deliberate, practical choices and targeted investments to:

- protect our environment
- build a strong, sustainable economy
- help Nova Scotians adjust to rapid change

Policies and Actions

The strategy's formal framework is outlined in the Appendix; the strategy's specific policies and actions are listed below.

Conservation and Efficiency

By 2020, Nova Scotia will increase energy efficiency in the province by 20 per cent

To reach this goal, the province will foster a culture of energy efficiency and conservation in Nova Scotia by:

- giving people and businesses access to the information they need
- providing more money for energy efficiency and conservation
- supporting more home energy audits
- ensuring that more homes undergo efficiency upgrades
- offering interest-free loans to increase the efficiency of existing housing
- ensuring that new housing and buildings are more energy efficient
- providing incentives for more energy-efficient heating (near term)

Renewable Energy

We will require and encourage more renewable electricity energy.

To reach this goal, the province will:

- set a 2016 interim requirement for renewable electricity energy
- set a 2020 target of at least 25 per cent for renewable electricity energy and work with stakeholders to identify opportunities to exceed the target
- create new opportunities for small-scale producers of renewable electricity
- fund environmental and technical research on ocean energy
- act on commitments made in response to the tidal Strategic Environmental Assessment (SEA)
- support the development of renewable thermal energy in Nova Scotia

Electricity

To enhance our energy security, we will use less imported coal, and more diverse sources of clean, local, and renewable energy.

To reach this goal, the province will:

- begin a Green Grid initiative:
  - encourage transmission grid expansion (to increase our capacity for intermittent renewable energy sources)
  - assess opportunities to strengthen grid connections with our neighbours (to enable the import and export of clean energy)
  - fund a study of options for transmission grid upgrades and for regional interconnection and operation
- help the UARB identify policy tools to reduce electricity demand, including rate design and technology
- encourage small-scale producers of green electricity (by increasing the net metering limit 10-fold to 1 MW from 100 kW and by calculating net use with a three-year rolling average)
- support the continued expansion of cleaner-burning natural gas use across the province
- support "smart meter" pilot projects to determine their effectiveness in helping households save energy

Offshore Petroleum

We will encourage renewed offshore exploration and development, with its enormous potential for building future prosperity.

To reach this goal, the province has recently or will:

- invest offshore petroleum revenues in expenditures that offer enduring benefits
- invest an additional $18.8 million in research to better understand our offshore geological potential (and share the results with industry and the public)
- invest an additional $4.7 million in research on the environmental impacts of offshore exploration and development, including ocean energy
- invest up to $500,000 in research to support decision making on the Georges Bank moratorium
- align our offshore legislation and regulation with best practices worldwide

- match local capabilities to local and international partnership opportunities
- build capacity so our firms can work on offshore projects here and abroad
- maintain Nova Scotian presence at local, national, and international prospecting trade shows
- develop skills through scholarship and training programs
- build on our experience with offshore strategic energy agreements

Onshore Petroleum

We will encourage onshore energy exploration and development.

To reach this goal, the province will:

- create a modern regulatory framework with legislation and regulations for onshore petroleum exploration and development
- work with New Brunswick to create a harmonized approach to operational regulation
- create an onshore petroleum registry
- streamline reporting requirements
- examine our onshore royalties to ensure that they are competitive and reflect the cost of exploration and production
- support geoscience research
- produce a petroleum atlas
- support local supply and employment opportunities as projects move into production

Technology and Knowledge-Based Growth

We will support Nova Scotians' ongoing participation in a changing energy industry.

To support this goal, the province will:

- identify emerging skill sets in energy occupations and support training
- identify opportunities for communities to participate in energy projects
- help local suppliers (in both renewable and non-renewable projects) develop new markets in Nova Scotia and around the world
- develop skills through scholarship and training programs
- support Fundy tidal demonstration centre ($5 million)
- support practical research that removes barriers to needed energy development through programs such as the following:
  - Offshore Energy Technology Research (OETR) association (total of $22 million in funding to date)
  - Offshore Energy Environmental Research (OEER) association (total of $8 million in funding to date)
  - ecoNova Scotia's Environmental Technology Program ($9.5 million)
  - Carbon Capture and Storage Research Consortium of Nova Scotia ($5 million)

Downstream Energy Opportunities

Nova Scotia's energy markets will remain competitive and open for imports and exports.

To support this goal, the province will:

- give the Department of Energy the lead government role on exploring and promoting downstream energy opportunities.
- expand our capacity to import and export electricity (to diversify our energy sources and opportunities)
- continue to support the domestic use of natural gas

Social Accountability

The province will continue to consult widely and seek advice on sustainable energy policy.

To support the success of the 2009 Energy Strategy, the province will:

- continue to consult with and provide information to citizens, industry, environmental groups, municipalities, other governments, and First Nations on energy trends, policies, and plans
- monitor and respond to skills shortages and press for completion of amendments to the offshore accord covering occupational health and safety and operational safety
- create marine renewable energy legislation and update other energy legislation and regulation

Change Is Certain

1

In the world of energy, the unexpected has become routine. Tightening supplies and political turmoil inflate prices one month; a global banking crisis lets the air out the next. At the end of each roller-coaster ride, prices seem to settle higher than before.

Amid this uncertainty, some facts are clear. We waste too much energy. We use fuels that pollute our environment and alter our climate. We depend too much on imported fuel sources. We depend too heavily on a single fuel source—coal—to generate electricity.

Over the next decade, solutions to these problems will inspire changes in our production and use of energy. Some of the changes will alter patterns of life and business that we have taken for granted for a long time.

Given the uncertainty around energy prices and technologies, our energy strategy must be flexible. At the same time, our strategy must offer a degree of certainty to attract the enormous investment needed for new energy developments.

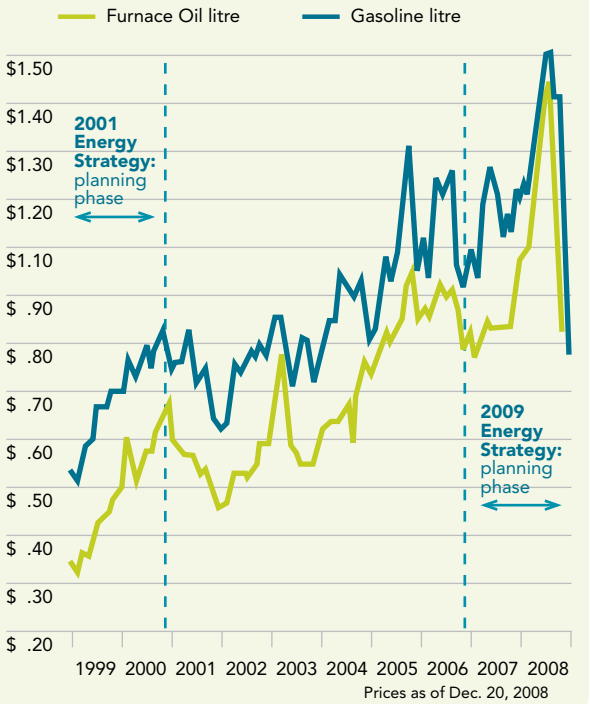
The province last produced a comprehensive energy strategy in 2001, and many of its objectives and actions remain valid today:

- exploring/developing our petroleum resources
- increasing renewable energy resources
- allowing a limited opening of our electricity marketplace to wholesale customers
- reducing air pollution
- understanding the environmental impacts of energy development
- translating offshore expertise into a globally competitive export industry
- using offshore revenues for lasting purposes like debt reduction and R&D

But circumstances have changed. Energy prices have become increasingly volatile and unpredictable. Onshore oil and gas exploration has increased, but offshore exploration has not. Climate change has gained widespread recognition as a real and urgent concern.

In the spring of 2007, with all-party support, the Nova Scotia Legislature passed the Environmental Goals and Sustainable Prosperity Act. The act established a wide-ranging set of environmental goals, including the goal of establishing Nova Scotia as one of the cleanest and most sustainable environments in the world by 2020. The 2009 Energy Strategy will play a key role in helping us reach our goals.

Energy Prices 1999-2008: Growing Volatility



Where We Are: 2009

2

Nova Scotia is essentially an energy island: our electricity grid has a slim 350-megawatt connection with New Brunswick. By contrast, New Brunswick enjoys 1400 megawatts of interconnection with Quebec and New England. This means that we have to produce almost all of the electricity we use. To tap into clean sources of power elsewhere, we need stronger connections with our neighbours.

In addition, almost 80 per cent of our electricity is produced with imported coal and coke, our dirtiest fuels. Our coal-fired plants still have decades of useful life. The transition to a cleaner energy supply will require us to develop more renewable energy sources, such as wind, biomass and tidal. To tap into widely scattered, intermittent sources like these, we will need to strengthen the transmission grid inside Nova Scotia.

Production of natural gas, a cleaner fuel than coal, has made a major contribution to our economy. Revenues from the Sable Offshore Energy Project account for nearly one-tenth of the provincial budget this year and a significant share of our GDP. However, production from Sable has peaked (or will peak soon), and royalties from that project will decline. Deep Panuke is the only other Nova Scotia offshore project moving into production, and its total gas and royalties are expected to be much smaller than Sable. If we are to retain the revenues, jobs, and business opportunities we've enjoyed from Sable, we need to attract new, large-scale offshore developments.

Higher prices have spurred onshore exploration, leading to promising developments of shale gas in Hants County and coalbed methane in Cumberland County. An onshore field can often produce for decades and may supply large volumes of gas over its lifespan. However, because onshore Nova Scotia is a new petroleum frontier, we earn lower royalty rates from onshore gas compared to the offshore, and production from unconventional fields such as shale and coal is less certain.

In terms of energy conservation, on a per capita basis, Nova Scotians rank with some of the highest consumers of energy in the world. This means we have a lot of potential savings: in money, in energy, and in greenhouse gas emissions.

Where We Are Going: 2020

3

The Environmental Goals and Sustainable Prosperity Act has implications for all aspects of life in Nova Scotia, the energy sector in particular. It includes the following 2020 targets:

- 10 per cent lower greenhouse gas emissions than 1990
- economic performance at the Canadian average or better

These are ambitious targets: increase our rate of growth and decrease our use of energy, through periods of great market uncertainty. But the 2009 Energy Strategy is designed to make these targets achievable. Our goals are clear:

- to protect the environment
- to build a strong economy
- to help Nova Scotians adjust to rapid changes in energy markets

Our approach is also clear:

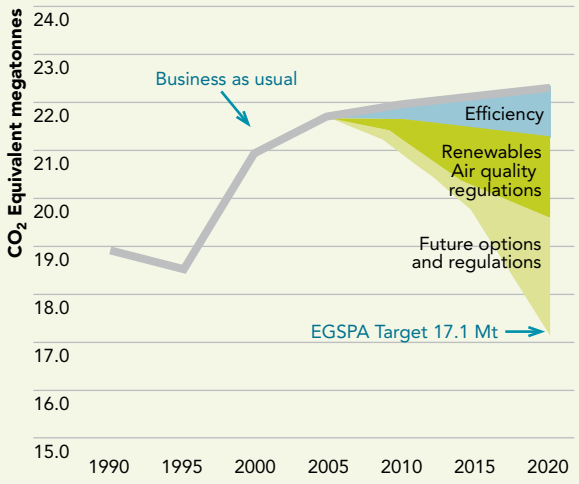
- save money and energy (through efficiency and conservation)
- run a cleaner province (through a stronger, greener electricity grid and interconnections)
- benefit from the resources we have in our own backyard (through onshore and offshore petroleum and renewable energy resources and industries)

Nova Scotia has already taken some important steps toward those goals:

- establishing the Renewable Energy Standard, resulting in nearly 20 per cent of total electricity production from renewable energy by 2013
- creating Conserve Nova Scotia, helping over 300,000 Nova Scotians make energy efficiency part of their everyday lives
- creating the Offshore Strategic Energy Agreement, ensuring jobs and benefits from the Deep Panuke natural gas project
- investing in research that will help remove barriers to resource development

The 2009 Energy Strategy elaborates on both the province's goals and approach; please read the following pages to see these plans in detail.

Nova Scotia GHG Reductions Target



When We Get There 4

2007	• Renewable Energy Standard regulations enacted • Environmental Goals and Sustainable Prosperity Act created • Green vehicle policy adopted by government
2008	• Creation of 2009 Energy Strategy
2009	• Major study of electricity system • Independent electricity conservation agency begins operation • First tidal device enters Bay of Fundy, pending environmental approvals • Sustainable procurement policy created by province • EnerGuide minimum rating of 80 on new residential dwellings
2010	• First GHG emission cap for Nova Scotia Power • First gas expected from Deep Panuke project • Final deadline for ecoNova Scotia grants • Emissions standards for new motor vehicles • Deadline for decision on Georges Bank moratorium review
2011	• Exploration deadlines for offshore parcels offered in NS07 and NS08 call for bids • Energy efficiency codes for new commercial buildings
2012	• Georges Bank moratorium deadline
2013	• Deadline for Renewable Energy Standard: 10 per cent of NSPI electricity (post-2001 supplies) must come from new clean renewable sources
2015	• Demonstration facility for energy efficiency and sustainability • Second GHG emission cap for Nova Scotia Power
2016	• New interim renewable energy requirement goes into effect
2020	• Third GHG emission cap on Nova Scotia Power • Deadline for greenhouse gas reductions to 10 per cent below 1990 levels • New renewable energy target of at least 25 per cent total electricity supply • Deadline for 20 per cent increase in energy efficiency

Conservation and Efficiency 5.1

Policy

By 2020, Nova Scotia will increase energy efficiency in the province by 20 per cent.

Actions

- Create an independent administrator to deliver an electricity and conservation and efficiency program.
- Meet the growing demand for home energy audits, upgrade rebates, and equipment incentives through Conserve Nova Scotia.
- Provide interest-free loans for efficiency upgrades (near term).
- Create new regulations to increase the efficiency of new housing and small buildings in 2009.
- Support the Nova Scotia Utility and Review Board to identify and act on the most cost-effective options for meeting future electricity requirements and emission reductions.

Using our existing energy supplies more efficiently serves all our energy goals. In fact, efficiency is Nova Scotia's best opportunity to meet both our economic and environmental goals in the energy sector.

Energy efficiency and conservation:

- produce permanent savings in fuel costs and greenhouse gas (GHGs)
- increase our energy security
- create new businesses and employment
- buy time for alternative energy technologies to mature
- lessen our impact on the environment
- offer a safe choice in an unpredictable world.

Nova Scotia's energy consumption has been growing at an average rate of about 1 per cent per year. We now use about 14 per cent more energy than we did in 1990. As a result, we produce more greenhouse gases.

The 2009 Energy Strategy supports the Council of the Federation's medium-term goal of 20 per cent greater energy efficiency by 2020. This would effectively eliminate annual growth in our energy demand, and it supports the Climate Change Action Plan for Nova Scotia.

Many of the improvements will come in the electricity sector. In 2006, the Nova Scotia Utility and Review Board (UARB) directed Nova Scotia Power Inc. (NSPI) to determine the least expensive way to meet future demand while meeting current and expected environmental rules. The company's Integrated Resource Plan confirmed that the most cost-effective way is to invest in measures that help consumers and industry use less electricity.

The province will create an entity to manage the UARB-approved plan to improve electricity energy efficiency. Creating this separate entity was a key recommendation of stakeholders. Spending ratepayer dollars on conservation and efficiency may cost a bit more in the short term, but will save a lot more in the long run.

Immediate Action

Create an electricity conservation and efficiency agency:

- **Spring 2009:** legislative support/agency forms
- **Fall 2009:** operational

The Integrated Resource Plan predicts that by 2018 investing in efficiency will save 2,300 gigawatt-hours (gWh) of electricity per year. That's the same as eliminating the need to build a new 400-megawatt power plant.

The province also supports the UARB's proposal for an early review of the Integrated Resource Plan. Such a review would enable Nova Scotia Power and other interested parties to consider speeding up improvements in energy efficiency.

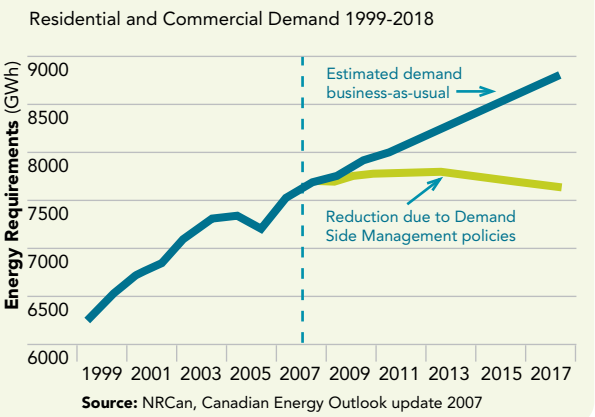
Grid improvements, new metering technologies, rate structures that encourage conservation, and proven incentives for electricity efficiency and conservation are all areas for consideration as different organizations approach the issue of energy efficiency.

The province commissioned a study of opportunities for improved efficiency in other energy sources, including furnace fuel, natural gas, and automotive fuel. The study found potential savings in all areas. It identified commercial buildings as a particularly fruitful place to invest in energy saving programs. Last spring's spike in fuel prices underscored the need to improve the energy efficiency of our homes and vehicles.

Some energy efficiency and conservation measures—walking to work, taking the bus, switching to more efficient compact fluorescent light bulbs—don't cost much. Others—buying a new appliance, insulating, installing an energy-efficient furnace—require an upfront outlay of cash long before savings are achieved. Incentives offered by Conserve Nova Scotia shorten the time required to achieve energy savings. The province responded to increased demand for energy-saving programs by increasing Conserve Nova Scotia's funding for 2008–2009. A new program of zero-interest loans for energy upgrades also helps homeowners cope with the upfront cost of conservation measures.

Government will help by implementing regulations that require new homes and buildings and vehicles to be more efficient, as the Environmental Goals and Sustainable Prosperity Act requires. Education programs will give citizens the knowledge to make better choices about what we buy and how we live.

Electricity Demand with Demand Side Management



Source: NRCan, Canadian Energy Outlook update 2007

Key Facts

Since Conserve Nova Scotia was created in 2006, it has:

- helped more than 300,000 Nova Scotians make energy efficiency and conservation part of their daily lives
- established more than 50 programs and initiatives
- encouraged over 9,400 homeowners to complete energy evaluations

Renewable Energy 5.2

Policy

We will require and encourage more renewable electricity energy.

Actions

- Set a 2016 interim requirement for renewable electricity energy.
- Set a 2020 target of at least 25 per cent for renewable electricity energy and work with stakeholders to identify opportunities to exceed the target.
- Create new opportunities for small-scale producers of renewable electricity.
- Fund environmental and technical research on ocean energy.
- Support the Atlantic Energy Cooperation initiative.
- Evaluate the idea of royalties for large-scale renewable projects while maintaining a competitive investment climate.
- Act on commitments made in response to the tidal Strategic Environmental Assessment (SEA).
- Collaborate with New Brunswick on research and regulation of tidal energy in the Bay of Fundy.
- Support the growth of renewable thermal energy in Nova Scotia.

After conservation and efficiency, renewable energy is Nova Scotia's best opportunity to meet our energy goals.

To create a sustainable economy, Nova Scotia needs to use more diverse energy sources and a much greater supply of clean renewable energy. Nova Scotia has wind, tidal, solar, biomass, and other renewable sources.

But these sources also present challenges. Our biomass resources need evaluation for sustainability and cost. Solar, wind and tidal resources provide energy only when the sun shines, the wind blows, or the tide flows. They are intermittent and variable; we can't call them up in the required amounts whenever we need energy.

So we need backup energy sources we can draw on when renewable supplies are unavailable. If we had abundant hydro power, we could collect water behind a dam and release it to a turbine whenever our intermittent energy sources flagged. Unfortunately, Nova Scotia has already tapped most of its limited hydro resources. Coal-fired power plants start up and shut down very slowly; they can't be ramped up quickly. This makes them well suited to providing base load—the steady supply of electricity required around the clock—but they have limited use for balancing the output from intermittent power supplies.

The need for backup power limits our ability to add new intermittent renewable energy. In 2007, the province commissioned a wind integration study to determine just how much intermittent renewable power our electrical grid could handle without costly upgrades. The study concluded that NSPI could meet the province's Renewable Energy Standard 2010 requirement (adding 5 per cent renewable energy post-2001 supply), although some operational tweaking may be needed. The study found that meeting the 2013 RES (an additional 5 per cent of total supply post 2001, for a total of 10 per cent new renewables) may require modest investment in transmission capacity and additional load management techniques.

A Stronger Grid

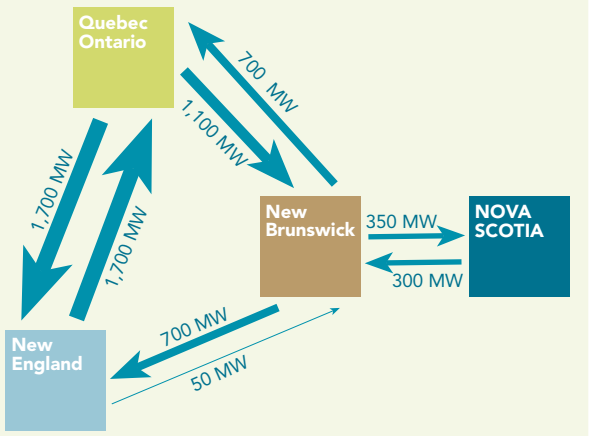
To move beyond the 2013 standard will require large investments in our transmission system. We need new lines to serve wind turbines in remote locations. We need more capacity to move electricity around the province, so that if the wind is blowing at Digby, but not at Lingan, we can move power from one place to another. We also need a more robust interconnection with our neighbouring provinces. All of these actions have a price tag, but a stronger grid may be a better investment than a new fossil fuel plant.

The problem of intermittency in alternative energy sources is one case where bigger is better. The bigger the market served, the more renewable energy a system can absorb. A better-connected Atlantic Canada would enable each province to add more renewable energy than it can on its own.

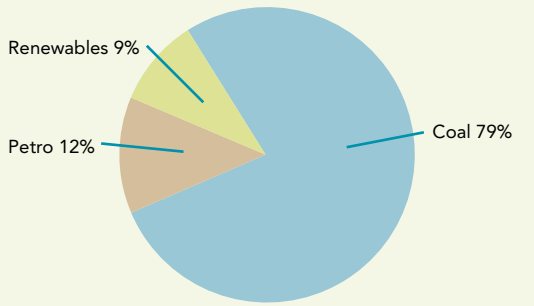
New and strengthened ties also mean we could sell clean energy when we had a surplus and call on clean energy supplies from other jurisdictions when we needed them. Nova Scotia's demand for electricity varies widely from season to season. On the coldest, darkest winter evening, when our lighting and heating needs are greatest, our electricity use can peak above 2200 megawatts (MW). On a warm summer night, we need only about 700 MW. A more robust interconnection with our neighbouring provinces would let us buy and sell power more easily, balancing everyone's needs as temperatures, wind speeds, customer demands, and other factors vary from region to region.

A grid that supports imports and exports is inherently more stable and reliable. Through the Atlantic Energy Cooperation initiative, all four provinces are working towards this goal and seeking federal support. (See Green Grid in section 5.3.)

Regional Grid

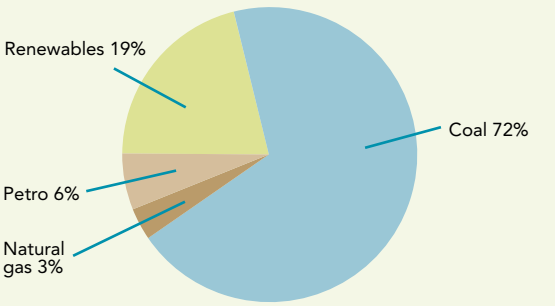


Sources of Electricity: Nova Scotia 2000



Source: NRCan, Canadian Energy Outlook update 2007; Nova Scotia Power Inc.

Sources of Electricity: Nova Scotia 2013



Source: NRCan, Canadian Energy Outlook update 2007; Nova Scotia Power Inc.

New Technology

Emerging technologies may help some intermittent power producers store energy for later use. A Cape Breton wind energy company hopes to use windmills to pump water to a reservoir for release to a turbine when power is needed. However pump-storage uses a lot of real estate. Another developer plans to test batteries to store electricity generated at a wind farm, but this technology is currently too expensive for most projects.

A study by the U.S.-based Electric Power Research Institute (EPRI) identified the Bay of Fundy as the most potent site for tidal power generation in North America. Each day, 100 billion tonnes of seawater flow in and out of the Bay of Fundy—more than the combined flow of all the freshwater rivers in the world.

Nova Scotia already has North America's only operational tidal power station at Annapolis Royal. This 20 MW generator operates like a conventional hydro turbine, gathering water behind a dam and then releasing it to generate power. New in-stream technology—resembling underwater windmills—holds potential for harnessing this resource with less impact on the surrounding environment. EPRI estimates that in-stream tidal technology could generate 300 megawatts of green, emission-free energy from just two locations in the Bay of Fundy. Some researchers believe the energy potential in the area is much greater, or that other forms of tidal technology—such as a tidal lagoon—could provide an energy supply.

In-stream technology is still in the early stages; it will take time to test and refine these devices. Because Nova Scotia has an opportunity to become a world leader in this area, we have taken action to evaluate the Bay of Fundy's potential for use with renewable ocean energy technology by inviting developers to demonstrate in-stream tidal devices in a common facility in the Minas Passage area of the bay. The Offshore Energy Environmental Research (OEER) association will use $2 million from a recent provincial grant (part of the Crown Share Adjustment Payment) for research work in marine environmental and technical research. The province will create marine renewable energy legislation before allowing commercial-scale projects. Research and regulation of tidal energy in the Bay of Fundy will proceed in collaboration with New Brunswick.

Another emerging option is biomass, which includes wood, wood waste, fast-growing grasses and trees as well as construction waste such as lumber. Biomass has the potential to displace coal and supply firm, predictable amounts of electricity. It is also an attractive economic opportunity to use Nova Scotia fuel sources to lessen our dependence on foreign coal. Nova Scotia Power proposes to meet some of the Renewable Energy Standard with biomass power from independent producers. Biomass could also be mixed with coal and used in existing plants. Biomass supply, cost and sustainability are all now being studied by the Province, NSPI and other stakeholders.

Other renewable energy options include solar and geothermal. Heat pumps and solar hot water heating are already a reality. Solar electricity needs new technology breakthroughs to be a wide-spread option. And while hydrogen is not a renewable fuel, it could become an important storage medium for renewable fuels.

Many of these emerging technologies are now technically feasible, but at a high cost. It's not necessary that we develop them all simultaneously; what's critical is that we keep our options open and watch carefully for commercial breakthroughs.

New Targets

Over the next 12 to 18 months, the province will use the results of technical studies and consultations to set new requirements for renewable electricity use for 2016 and 2020. At a minimum, the provincial goal is at least 25 per cent renewable energy by 2020.

It may be possible to exceed this goal, to as much as 40 per cent by 2020, through a combination of domestic wind, biomass and tidal and imported renewable energy. But understanding these options and their implications for the Nova Scotia electrical system requires further work. Firm legal targets will be set after the studies are complete and the options are properly tested.

Fixed Price vs Competition

The province is committed to the policy of ensuring that Nova Scotians realize the lowest price possible for green energy. Increasing the power limits for net metering gives communities and businesses direct access to potentially multi-million dollar power projects. For larger projects, we will continue to require utilities to purchase renewable

energy through a competitive bid process rather than a set price. Results from the 2008 energy survey support this direction: Nova Scotians are willing to pay more for renewable energy, but still want it at the lowest price possible. For more information on net metering, see Small-scale generation on page 19.

Key Facts

- 88 per cent of Nova Scotia's electricity comes from fossil fuels
- 46 per cent of our greenhouse gas emissions come from electricity production

By 2013, the Nova Scotia Renewable Energy Standard (RES) will bring total electricity supply from renewables to nearly 20 per cent.

Royalties

Most renewable energy sources use public resources: rivers, tidal currents, sunshine, the wind. The province supports the principle that taxpayers should receive a reasonable share of the revenue from projects derived from provincial energy resources, with due regard for the cost of producing them. At the moment, most renewable energy projects are only marginally profitable, and regulations demand that electricity customers benefit from these technologies at the lowest possible cost. The Department of Energy is committed to evaluating how this principle may be practically applied in a way that is fair to Nova Scotians and the private sector.

We don't know how lucrative wind, biomass, or tidal power projects may be 10, 20, or 50 years down the road, but history provides a cautionary example. When the Churchill Falls hydro project was developed in the 1960s, neither the Newfoundland government nor anyone else foresaw the rapid increase in energy prices that would occur over the next decade; hardly anyone anticipated the consequences of a 65-year contract at very low rates.

As new technologies and markets emerge, a case for royalties may arise. Other jurisdictions, including Prince Edward Island, are considering the issue now. Under present economic conditions, Nova Scotia is content to receive an indirect fiscal benefit from renewable energy developments in the form of municipal taxes based on a special model of assessment. However, the province reserves the right to impose royalties for projects if conditions change. The province will evaluate the business case for and against royalties for large-scale renewable projects while maintaining a competitive investment climate.

Any such system will be consistent with the principles of competitiveness, flexibility, and profit-sensitivity that have guided our offshore oil and gas royalties. Such an approach serves the goal of protecting our environment while building a strong economy by promoting energy diversity and security.

Credit Crunch

The current slowdown in the credit and equity markets has affected all capital projects around the world, and the wind industry is no different. Building commercial wind projects depends on big upfront spending by investors. At the start of 2009, those investment dollars are scarce. Wind projects across North America have felt this credit crunch, and many projects have been delayed. In Nova Scotia, this credit situation could make it difficult for Nova Scotia Power to meet its obligations under the Renewable Energy Standard (RES) in a timely fashion. Fortunately, there are a number of ways to meet the RES targets, and Nova Scotia Power has contracted nearly twice the wind power they need to meet the first deadline in 2010. The Province will continue to watch the situation closely.

Electricity 5.3

Policy

To enhance our energy security, we will use less imported coal, and more diverse sources of clean, local, and renewable energy.

Actions

- Begin a Green Grid initiative:
  - encourage transmission grid expansion (to increase our capacity for intermittent renewable energy sources)
  - assess opportunities to strengthen grid connections with our neighbours (to enable the import and export of clean energy)
  - fund a study of options for power grid upgrade and regional interconnection
- Help UARB identify policy tools to reduce electricity demand, including rate design and technology.
- Encourage small-scale producers of green electricity (with a 10-fold increase to the net metering limit—to 1 MW from 100 kW—and by calculating net use with a three-year rolling average).
- Support the continued expansion of cleaner-burning natural gas use in Nova Scotia.
- Support "smart meter" pilot projects to help households save energy.

Three decades ago, a provincial government policy decision to produce electricity from coal led the Nova Scotia Power Corporation to build several large coal-fired plants.

Today, we urgently need to develop alternatives to coal—to diversify our energy supplies, enhance our energy security, ensure price stability, and reduce our environmental footprint.

But those coal-fired power plants, worth hundreds of millions of dollars, have many years of useful life left. Abandoning them abruptly would place an unacceptable financial burden on everyone who uses electricity in the province.

A key purpose of the 2009 Energy Strategy is to plan an orderly transition from dirty coal to cleaner and more sustainable energy sources. Doing so requires an intricate balancing act, complicated by the uncertainty surrounding energy markets and emerging technologies.

As detailed in previous sections, the 2009 Energy Strategy encompasses a variety of steps to encourage energy conservation, increase renewables, and diversify supply.

Transmission Line Map

Natural Gas

Although natural gas is a fossil fuel, it burns more cleanly than coal or oil, uses more efficient burning technology, and produces fewer greenhouse gases. Aside from hydro, it is our only rapid-response option for backing up intermittent renewable energy supplies. So by shifting more of our coal-fired generation to locally produced natural gas, we can improve our environment while creating a more diverse and secure energy system. Our investment in geotechnical research to attract offshore exploration supports this goal. Natural gas co-generation and district heating are efficient ways to use this energy.

Coal

Nova Scotia has substantial reserves of coal, and international developers have proposed a major new coal mine at Donkin. If these resources are developed for our own use, they will need controls and treatment technologies to curb air pollutants and contain greenhouse gases. Investment in research to determine the suitability of our geology for storing carbon emitted by coal-fired thermal generators will advance the prospect of a pilot project to demonstrate emerging carbon capture and storage technology.

Key Facts

Nova Scotia Power system in 2008:

- about 2,300 MW peak capacity
- about 1,900 MW from mostly coal and petcoke (Lingan, Point Aconi, Point Tupper, Trenton) and from oil/natural gas (Tufts Cove) and diesel (Tusket, Burnside, and Victoria Junction)
- about 400 MW from hydroelectric, tidal, wind, and biomass

Winter peak load in 2007: ~2,260 MW
Summer peak load: ~700 MW
Largest load centre: Halifax (over 30 per cent—or ~680 MW—of winter peak)

New Power Generation

Many future electricity options are expensive and require careful planning to make sure we invest in the right equipment in the right places at the right time.

Conservation, efficiency, and renewables can delay any need for major new power plants. When the need for new plants does arise—either to replace aging coal-fired plants or to back up intermittent renewable production—we may want to purchase clean power from neighbouring provinces. Any decision to do that will depend on:

- the outcome of the Green Grid technical study
- discussions with partnering provinces on opportunities to expand and upgrade regional transmission interconnection
- New Brunswick's decision to proceed with a second nuclear power station at Point Lepreau and any negotiations between Nova Scotia Power and New Brunswick Power on purchasing this electricity
- negotiations between NSPI and Newfoundland and Labrador Hydro on importing new clean hydro power from new generation at Lower Churchill Falls
- negotiations with the Government of Canada on its March 2008 announcement of an "east-west grid"

The 2009 Energy Strategy strongly supports exploration of opportunities to expand and integrate the regional energy grid and seeks federal support for an Atlantic regional grid to share new nuclear, large hydro, and enhanced renewable energy development.

The province will also continue to allow utilities in Nova Scotia to purchase electricity from outside our borders, including nuclear power.

The province will consider a combination of the following three options to transform our electricity sector:

- more intermittent renewable energy sources such as wind and tidal sources in Nova Scotia, backed by natural gas
- more stable and controllable renewable energy sources such as biomass
- importing clean energy from neighbouring jurisdictions

Small-scale Generation

Many organizations and individuals in Nova Scotia are keen to produce their own power from clean alternative sources. They, too, face the problem of intermittency. One solution is to use a two-way meter, also known as net metering. When a renewable producer generates more power than it can use, a two-way meter lets that producer get credit for any excess electricity that flows to NSPI. When the renewable producer doesn't generate enough for its own needs, the meter lets it draw down on its credit.

The Utility and Review Board (UARB) already allows limited use of net metering. The 2009 Energy Strategy will adjust the existing rules to encourage greater use of this technique.

The new rules for net metering will:

- increase power limits 10-fold to 1 MW (1,000 kW) from 100 kW
- lengthen the period for calculating net use to three years from one year
- allow customers to meter multiple accounts within a defined distribution zone (within a 1-MW limit)
- cap total provincial net metering at 20 MW and review the impact on the electrical system within five years

Smart Meter Pilots

By tracking and controlling electricity use, smart meters can save everybody money. This technology helps shift energy use more evenly through the day, away from times of peak demand (in the evening when lights, heat, and cooking load the system) to times of lesser demand (such as overnight, when heating and lighting are down). The more we reduce the peak load, the less we need new power plants.

These smart meters are proven to save energy in places where electric heating is common. But there may also be savings if consumers see how much energy they use, or if they can adjust the time when they heat water, use the dishwasher, wash and dry their clothes, or use other electronics. We are encouraging Nova Scotia Power to conduct pilot projects to find out if smart meters make sense for Nova Scotians.

Electric Cars

As new transportation technology such as electric plug-in cars enters the market, it will be important to make sure the recharging doesn't take place during peak times. Again, smart meters and rates that support time shifting can help delay or avoid the need for expensive new power plants as new technology moves into common use.

Ultimately, technology like electric cars could play a double role: charging at times when renewable resources are strong (high winds or peak tidal speeds) and feeding/selling power back to the grid if needed (and the car is plugged in).

For that reason, it may be wise to adopt smart technology into building codes, as it is also less expensive to install during construction.

Being Alert to Innovation

New (or improved) technologies may create new opportunities. A breakthrough in batteries or electricity storage could dramatically improve our ability to use intermittent sources like wind or tidal. Low-cost methods of creating hydrogen or solar-based electricity could easily change our energy future.

Although none of these currently represent a low-cost alternative, the 2009 Energy Strategy commits the province to monitor energy technology development closely: when new opportunities arise, Nova Scotia will be ready to act.

Immediate Action: Green Grid Options

A stronger power grid can help deliver more clean energy.

January 2009: Research begins to:

- examine options to enhance and strengthen the electricity transmission infrastructure in Nova Scotia
- identify and assess opportunities and challenges of an expanded regional transmission system (including New Brunswick, Prince Edward Island, Newfoundland and Labrador, Quebec, and the United States)
- assess system operator alternatives

Potential benefits of a stronger grid include:

- reducing dependence on expensive imported fuels
- cutting emissions beyond 2020 target
- promoting growth of wind and tidal energy with backup supply opportunities
- increasing system stability and reliability

Offshore Petroleum 5.4

Policy Direction

We will encourage renewed offshore exploration and development, with its enormous potential for building future prosperity.

Actions

- Invest $18.8 million to support geoscience research.
- Invest $4.7 million for marine energy and environmental research.
- Modernize offshore exploration and development legislation and regulations (in collaboration with the federal government).
- Market the results of this work to the global energy industry.
- Assess the economic impact of offshore activity from Sable Project onwards.
- Produce new scientific research to prepare for the decision on whether to review the Georges Bank moratorium.
- Negotiate offshore strategic energy agreements (OSEAs) for all new large offshore projects.
- Match local capabilities to local and international partnership opportunities.
- Build capacity so our firms can work on offshore projects here and abroad.
- Maintain Nova Scotian presence at industry prospecting shows, locally, nationally, and internationally.

Over the last three decades, seismic testing has surveyed much of the seabed and deep geological formations off Nova Scotia. Exploration led to the Cohasset Project (1992–99), the Sable Offshore Energy Project (1999–present), and the Deep Panuke project, scheduled to begin production in late 2010.

Economics

Exploration and development have contributed greatly to Nova Scotia's economy and provincial finances. Sable revenues now account for nearly 10 per cent of provincial revenues, which pay for public services like health, education and debt reduction. Offshore development has an important role to play in building a strong economy.

Environment

Less obvious is the role offshore development can play in protecting our environment.

Experts estimate that as much as 40 trillion cubic feet of natural gas potential lie off our shores. Natural gas burns more cleanly than oil or coal and produces fewer greenhouse gases and other harmful emissions. Natural gas can also help us use more renewable energy to generate electricity. The gas turbines at Tufts Cove in Dartmouth are nimble: they can power up and down on short notice, making them ideal backups to intermittent renewable energy sources like wind and tidal.

In our development of energy resources we also ensure that there are no significant adverse effects on the environment.

Federal Agreements

A 2005 agreement between Canada and Nova Scotia enhances the benefits we receive from offshore development. The agreement confirmed our right to be the principal beneficiary of offshore development. Without that understanding, the formulas for calculating federal transfers to the province would claw back much of what we earned offshore. The agreement requires Ottawa to reimburse Nova Scotia for 100 per cent of any reduction in federal transfer payments caused by offshore revenues, including royalties, licence forfeiture payments, and corporate income taxes from offshore profits. The agreement continues until at least 2012.

In 2008, the province reached an agreement with the federal government on another form of offshore revenue. It set forth a method for calculating what is known as the Crown Share Adjustment Payment. This adjustment compensates Nova Scotia for offshore rights lost when Ottawa cancelled the National Energy Program. The initial payment, covering previous years, totaled $234 million. The payment for 2008–2009 is forecast to be $95 million. These payments have been used mainly to reduce debt. Resolving this issue was a key objective of the 2001 Energy Strategy, and it has now been accomplished.

Encouraging New Projects

All this gives Nova Scotia a strong motivation to encourage new offshore exploration and development. Unfortunately, despite years of exploration, Nova Scotia's offshore geology remains a puzzle in parts. On several occasions, seismic surveys and geological studies have identified promising exploration targets, only to have drilling fail to confirm commercial amounts of oil or gas. As a result, major operators have let their offshore Nova Scotia licences expire. While many believe there is more oil and gas off our shores, oil companies that invested here in the early part of the decade have turned to areas with newly identified potential in other parts of the world.

How can we rekindle their interest or bring in new players? Several international studies show that modest government investment in geoscience research has kick-started exploration in locations facing similar challenges. These studies suggest new geological and geophysical research could encourage a fresh round of exploration. Consultants have also urged the province to examine policy barriers to exploration and development by modernizing regulations to reflect new technologies and best practices elsewhere.

The Plan

The 2009 Energy Strategy includes the Nova Scotia Offshore Renewal Plan (released in October 2008). The plan includes four principal areas for action: geoscience, policy, regulation, and marketing.

Geoscience tops the list, propelled by an $18.8-million investment from the initial Crown Share Adjustment Payment to support research by the Offshore Energy Technical Research (OETR) association, a non-profit group that includes Saint Mary's University, Dalhousie University, and the Department of Energy. Geoscience experts will manage the project.

The full Nova Scotia Offshore Renewal Plan is available at the Department of Energy's website: ***www.gov.ns.ca/energy***
Geoscience research details are available at OETR's website: ***www.offshoreenergyresearch.ca/***

Immediate Action: Offshore Renewal

2009

- $15-million "Filling the Gap" geoscience project begins
- early findings on prospective areas lead to additional research
- new regulations on drilling, production, conservation come into force
- work begins on amendments to offshore infrastructure access legislation

2010

- new public seismic data
- new understanding of regional geoscience
- marketing campaign by province

Georges Bank

In the 1980s, Canada and Nova Scotia banned petroleum exploration and development on the Canadian portion of Georges Bank. In 2010, Ottawa and Nova Scotia must decide whether circumstances have changed enough to make it worthwhile to carry out an extensive public review of the moratorium. The review would provide a recommendation on whether to extend the ban or end it in 2012.

To make a decision on having a review, federal and provincial ministers will need the best information available. The province has committed $500,000 to support new research by the Offshore Energy Environment Research (OEER) association. Together with new research by the federal Department of Fisheries and Oceans, and work on updating our geoscience knowledge, our objective will be to fully understand what has changed since the last review, including:

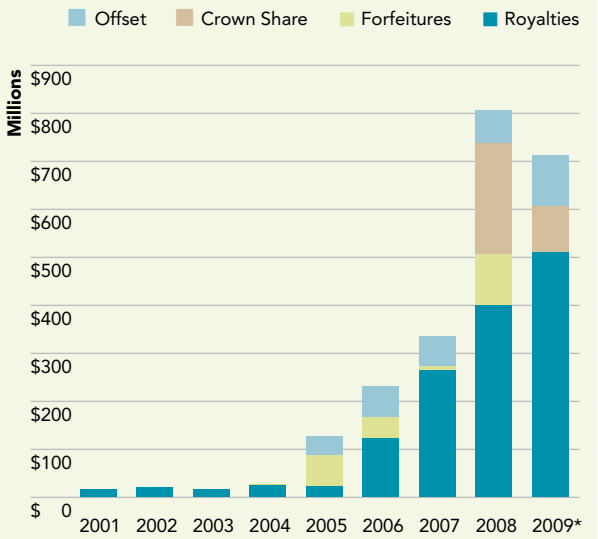
- our understanding of the Georges Bank ecosystem
- modern exploration and production technology
- regulatory and industry best practice
- current market commercial prospects for oil and gas in the area
- fishing and energy industry coexistence

The province is following the process laid down by the last review. No decisions about the moratorium on Georges Bank have been made.

Enduring Benefits

The development of offshore resources, whether on the Sable Island area, or elsewhere, involves the extraction of finite resources. Once used, they are gone forever. This places a special responsibility on the province. If we use the revenues from offshore gas development to pay for current expenses, we deprive future generations of their benefits. The province is committed to using a significant portion of revenues from offshore oil and gas (ie. the Crown share) for enduring purposes, such as research and development or paying down debt. Holding to this principle ensures that future generations as well as our own will benefit from these resources.

Provincial Revenues: Sable Offshore Energy Project



Fiscal year ending March 31

Source: Provincial Accounts, and *Fiscal Update of Dec. 2008 for FY 2008-09

International Partnership

Nova Scotia's opportunities are closely linked to global opportunities. The energy sector is project based: as exploration shifts to development and then production, jobs and business opportunities change. Workers and firms need to export their expertise to other regions while they wait for the next project in Nova Scotia. This keeps people working between projects, preserves their skills, and may help their businesses grow as they gain international expertise.

Research has identified the Caribbean, Latin America, and Asia as key export markets offering opportunities for continuity and growth. The province will act on this research and help our local firms expand their reach.

Offshore Strategic Energy Agreement

The 2001 Energy Strategy commits the province to pursue voluntary offshore strategic energy agreements (OSEAs) for large-scale offshore projects.

An OSEA is an agreement between the province and an offshore petroleum developer. These agreements create binding commitments reflecting the strategic role a particular project can play in the development of our offshore sector. The OSEA may include such features as employment commitments, industrial benefits, royalties, and research and development funding.

In 2006, the province and EnCana Corporation signed the first of these OSEAs for the Deep Panuke offshore natural gas project. It included:

- a top tier net revenue rate of 32.5 per cent, 12.5 per cent above high-risk generic rate
- a guarantee of 1.35 million hours of work in Nova Scotia, (850,000 hours by Nova Scotians), including jobs related to project engineering, design, procurement, fabrication, and manufacturing
- a benefits fund for research and development, training, and disadvantaged people
- onshore rig manufacturing in Nova Scotia (creating new skills and possibly assisting our own onshore petroleum development)

The onshore rig manufacturing commitment broke new ground in establishing ways to benefit Nova Scotians. Similar opportunities to expand capabilities in areas outside the specific project will continue to be pursued.

We don't know when the next project will come, where it will be located, what technologies it may use, or how much processing it will require. The OSEA is a flexible tool that changes to fit each project's circumstances. A new element of the 2009 Energy Strategy is to use the OSEA to encourage community benefits.

Supply Community

Offshore production has fostered an important offshore service industry. Unlike royalties, which flow only during production, the provision of goods and services creates economic benefits during all phases of petroleum activity, from exploration through development, production, and decommissioning. The value of offshore goods and services provided by Nova Scotia companies here and in export markets will likely approach the value of all royalties received by the province. To date, the offshore industry has created work for about 1,175 people each year in direct benefits, with about 770 indirect jobs annually. From 1996 to 2006 the Sable project alone has generated about $2.3 billion in contracts awarded.

Our emerging renewable energy sector, especially in the area of tidal power, will likewise create opportunities for local companies to provide goods and services, including exports.

Provincial Revenues: Sable Offshore Energy Project

Impact of Sable Offshore Energy Project (SOEP):

- **Total provincial revenue:** $2.8-3.6 billion (est., life of project). Revenues to date (2008): $2.27B (*figures do not include corporate income tax payments).
- **Employment:** 1175 direct; 770 spin-off (annual avg. person years, 2001-2007).
- **Economic impact:** $980 million annual contribution to GDP (avg. 2001-2007)
- **Contracts:** $2.3 billion awarded to Nova Scotia goods and services suppliers during exploration, development and production (1996-2006).
- **Export development:** SOEP experience has allowed many Nova Scotia companies to expand into foreign markets.

Source: Nova Scotia Department of Finance (*2009: estimate)

Key Facts

- **Royalties:** Third largest own-source of provincial revenue
- **Resource potential:** More than 40 trillion cubic feet of gas potential; more than 2 billion barrels of oil potential
- **Current project:** Sable Offshore Energy Project, producing about 400 million cubic feet per day of natural gas
- **Next project:** EnCana's development of Deep Panuke natural gas field (first gas 2010)

Onshore Petroleum 5.5

Policy

We will encourage onshore energy exploration and development.

Actions

- Create modern regulations for onshore petroleum exploration and development.
- Work with New Brunswick to create a harmonized approach to operational regulation.
- Create an onshore petroleum registry.
- Streamline reporting requirements.
- Examine our onshore royalty regime to ensure it is competitive and reflects the cost of exploration and production.
- Support geoscience research.
- Produce a petroleum atlas.
- Support local supply and employment opportunities as projects move into production.

Several factors have brought a sharp increase in onshore petroleum exploration in Nova Scotia. Rising prices and improved technologies for tapping unconventional gas reserves were key factors, and the existence of a gas pipeline offered access to markets that had not been possible before.

Activity

At the end of 2008, exploration companies have completed four onshore wells and three seismic programs, together with continued operations on existing coalbed methane wells. Potential exists throughout the province:

- In Hants County, drilling and seismic testing are underway; approval in principle has been given for a commercial shale gas lease.
- In Springhill, a production agreement for coalbed methane properties has been given; the operator is seeking partners on a similar property in the Stellarton area.
- In West Lake Ainslie, the licence holder wants to carry out seismic testing.

Benefits

Onshore exploration produces jobs for Nova Scotians and income for Nova Scotia businesses. One company has spent an estimated $30 million on its project since 2007. Like offshore natural gas, onshore petroleum can help diversify Nova Scotia's energy supply, enhance our energy security, and provide a source of fuel to back up intermittent energy sources like wind and tidal.

Encouraging New Projects

To encourage further interest in onshore petroleum, the Department of Energy will create an Onshore Petroleum Resources Management Plan.

The department will also work with New Brunswick to minimize barriers to investment between the two provinces. Geology knows no boundaries, and both provinces will benefit from similar approaches to operational regulation.

Royalties

Royalties for onshore petroleum were established in a time of low prices, little exploration, no gas pipeline, and no commercial discoveries. These circumstances have changed, but significant risks remain. The Department of Energy will review current onshore royalty rates, balancing our offshore royalty experience with the practical realities of attracting investment to what is, in prospecting terms, a new frontier.

Key Facts

Eight active onshore petroleum exploration licences:

- three in coalbed methane and five in conventional oil, gas, and shale gas
- Stealth Ventures project estimates one trillion cubic feet of coalbed methane potential in place
- An independent assessment of Triangle Petroleum's project estimates 69 trillion cubic feet of shale gas potential in place
- Alton Natural Gas planning a natural gas storage facility and pipeline

5.6 Technology and Knowledge-Based Growth

Policy

We will support the ongoing participation of Nova Scotians in a changing energy industry.

Actions

- Identify and support new skills for workers.
- Identify potential community opportunities in energy projects.
- Help local suppliers (in both renewable and non-renewable projects) develop new markets in Nova Scotia and around the world.
- Support practical research that removes barriers to energy development through programs such as:
  - Offshore Energy Technology Research association ($22 million in funding to date)
  - Offshore Energy Environment Research association ($8 million)
  - ecoNova Scotia's Environmental Technology Program ($9.5 million)
  - Fundy tidal demonstration centre ($5 million)
  - Carbon Capture and Storage Consortium of Nova Scotia ($5 million)

All of the goals in the 2009 Energy Strategy require commercially viable projects to make things happen. In some cases, knowledge gaps hold these projects back. We need to better understand what gaps exist.

Recognizing the importance of technology and research and development, the province has invested in a number of projects, including the following:

- The Offshore Energy Technology Research association (OETR) is a non-profit organization fostering research to enhance petroleum exploration and development on Nova Scotia's offshore. OETR's members are Saint Mary's University, Dalhousie University, and the Nova Scotia Department of Energy. ($21.6 million to date)
- The Offshore Energy Environment Research association (OEER) is a non-profit group fostering offshore energy and environmental research and development focused on renewable energy resources and their interaction with the marine environment. OEER's members are the Department of Energy, Acadia University, St. Francis Xavier University, and Cape Breton University. ($8.04 million to date)
- The ecoNova Scotia Environmental Technology Program (ETP) will help Nova Scotia organizations reduce GHG emissions through demonstration, adoption, and commercialization of environmental technologies and innovations. ($9.5 million)

- The in-stream tidal demonstration centre in the Bay of Fundy will help advance the technology and study its performance and possible effects. ($5 million)
- The Carbon Capture and Storage Consortium of Nova Scotia is a non-profit group fostering research that could lead to the demonstration of this technology in Nova Scotia. Carbon capture and storage would allow coal-fired generating plants to produce electricity with virtually no GHG emissions. The consortium members are the Department of Energy, Nova Scotia Power, and Dalhousie University. ($5-million federal grant)

These investments underscore the province's commitment to supporting practical research that removes barriers to energy development.

Domestic Growth

Our quest for sustainable prosperity will bring new energy projects to many parts of Nova Scotia. Wind and possibly tidal developments will be widely scattered in rural areas.

Offshore exploration and development, a cornerstone of the 2009 Energy Strategy, has the potential to bring new economic activity and business opportunities to all parts of Nova Scotia. To better understand future opportunities, the province is funding a study of the economic impacts of the last 12 years of offshore activity.

Recent exploration for coalbed methane and shale gas in Cumberland and Hants counties may bring commercial production to those onshore communities.

Research has begun to identify present and future capabilities and opportunities in wind and tidal energy, including the following:

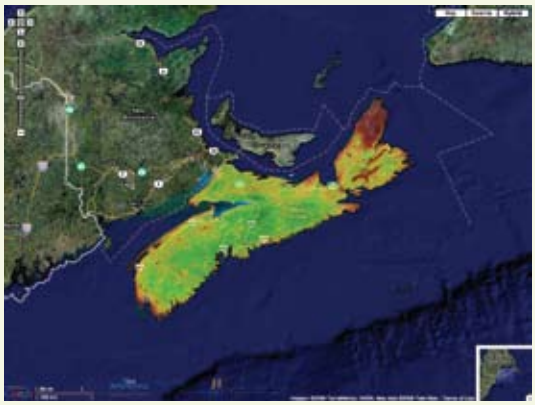
- the Nova Scotia wind atlas
- the Wind Integration Study
- the Strategic Environmental Assessment of tidal energy in the Bay of Fundy
- the upcoming study of options for transmission upgrades and regional interconnection

The province has also begun to consider opportunities in biomass by sponsoring the recent Atlantica Bioenergy task force report, in collaboration with New Brunswick and Maine. This report looks at opportunities to integrate bioenergy technology into existing forest industry operations.

Key Facts

In 2008, Nova Scotia:

- launched a Google-based online wind atlas
- released the first-ever Sable-area 3-D digital seismic data
- researched electromagnetic imaging as a prospecting tool
- signed an energy training agreement with Venezuela's national oil company



Source: www.nswindatlas.ca

Downstream Energy Opportunities 5.7

Policy

Nova Scotia's energy markets will remain competitive and open for imports and exports.

Actions

- Identify and promote opportunities for investment in downstream energy projects.
- Diversify domestic market through the growth of natural gas distribution.
- Support private-sector development with timely information and marketing.

Downstream

Finding a gas field four kilometres below the ocean floor is one thing. Turning that gas into a marketable product—"downstream"— is also big business, requiring refineries, gas plants, fractionation plants, and gas storage facilities. There may be additional opportunities for petrochemical and related manufacturing plants, when resource volumes and economics permit. Liquid natural gas (LNG) terminals and storage facilities have also emerged as potential projects—if North American gas prices can attract supply from abroad.

Downstream energy facilities like these take hundreds of millions of dollars of capital investment to establish. They employ highly skilled trades people and professionals, and they provide short- and long-term contract opportunities for local businesses.

Downstream energy facilities in Nova Scotia include a refinery in Dartmouth, a gas plant in Goldboro, and a fractionation plant in Point Tupper. Potential projects include a natural gas storage project at Alton, a petro-chemcial and LNG facility in Goldboro, and an LNG plant at the Strait of Canso.

Downstream Leadership

The 2009 Energy Strategy gives lead responsibility for coordinating downstream promotion activities to the Department of Energy, activities previously shared by the Department of Energy, Nova Scotia Economic Development, and Nova Scotia Business Inc. While we seek out new opportunities, the province will also demand that any new operation meets the highest standards for managing GHGs and air pollutants like sulfur dioxide (SO_2) and nitrogen oxides (NO_x).

Domestic Use

Among all these potential downstream projects, currently our best opportunity for growth is the use of natural gas in our province. The production of natural gas off Nova Scotia has introduced a new fuel to compete with oil, and competition is generally good for consumers. In most Canadian homes and businesses, natural gas is the fuel of choice for heating and hot water. It's generally cheaper, it burns more efficiently, it produces fewer emissions, and it's a Nova Scotia resource. These advantages mean there is little need for government to intervene in the marketplace.

The 2009 Energy Strategy supports the continued use of the Gas Market Development Fund, which is funded by the Sable Project and administered by the province. This fund will continue to support measures that increase the use of natural gas in our province. The province will also continue to work with industry and consumers to understand any regulatory barriers to widespread use of gas in the province.

Open Markets

Nova Scotia has a strong interest in maintaining open markets for the import and export of energy. In many cases, local markets are simply not big enough to support the huge investments required to develop energy projects. The Sable Offshore Energy Project could not have been developed without the New England market, but it is giving Nova Scotians increasing access to a local market for gas. Similarly, expanding our access to the North American electricity grid for imports and exports will help Nova Scotians increase their access to local renewable sources. (See page 17, section 5.3 for more detail.)

Key Facts

Natural Gas

- produced in Nova Scotia
- lower emissions than oil, coal, or other imports
- 3,000 customers and growing
- province has supported major conversions for public facilities in Burnside, Amherst, Dartmouth, and Halifax

Social Accountability 5.8

Policy

The province will continue to consult widely on sustainable energy policy.

Actions

- Consult with citizens, industry, environmental groups, municipalities, other governments, and First Nations.
- Align government policy, regulation, and legislation with economic and environmental goals.
- Monitor and respond to energy skills shortages.
- Press for completion of amendments to the Offshore Accord covering offshore occupational health and safety and operational safety.
- Harmonize regulation and modernize legislation and regulations.
- Create marine renewable energy legislation.
- Encourage climate change adaptation.
- Monitor, update, and share energy trends and developments with Nova Scotians.
- Report progress on the 2009 Energy Strategy through annual business planning and accountability reporting (available to the public on the Department of Energy website).

Consultation

In developing the 2009 Energy Strategy, the province had a responsibility to consult openly and consistently.

To support the success of this strategy, the province will continue to consult with citizens, industry, fishing groups, environmental groups, municipalities, other governments, and First Nations on energy trends, policies, and plans.

Environment and Economy

In the energy sector, the province is committed to two central goals: protect the environment and grow the economy. These will remain the two central criteria in evaluating any action both now and in the future.

The 2009 Energy Strategy integrates the goals, regulations, and legislation contained in the Environmental Goals and Sustainable Prosperity Act and the Climate Change Action Plan for Nova Scotia. The table on page 33 shows how some of these policy schedules interact.

Workforce

Given the globally competitive nature of the energy industry, the province is committed to working with universities and the Nova Scotia Community College to monitor emerging skills requirements and shortages. Three areas require priority attention: technical skills required for new renewable technologies, skills required to implement energy conservation and efficiency programs, and skills required for gas distribution.

Health and Safety

The province has a responsibility to protect workers in the energy sector. The investigation into a death in Nova Scotia's offshore in the 1990s identified gaps in occupational health and safety legislation as it applies to offshore workers. The governments of Canada, Nova Scotia, and Newfoundland and Labrador agree on legislative changes that will firmly ground worker safety and worker rights in law, but the process of turning that agreement into law in three diverse jurisdictions has proven long and complex. All parties are working to bring it to a conclusion.

Ocean Energy Oversight

Ocean energy is a public resource. The province has a responsibility to ensure that, if developed commercially, it will be managed in a safe, orderly manner, just like other natural resources. We need marine renewable energy legislation to ensure that ocean energy projects take place with appropriate licensing, environmental protection (including disclosure of environmental data and other information), community benefits, and appropriate provincial revenue. Legislation will also ensure that projects fulfill their promise to achieve net greenhouse gas reductions.

Preparing for Change

We expect climate change to have a significant impact on the energy industry. The province and industry share a responsibility to consider the impact of climate change on our energy infrastructure and plan necessary steps to adapt to expected impacts.

The Department of Energy will work with industry to identify energy facilities at risk and ensure that climate change is taken into account when designing future projects. The facilities that could be affected include transmission systems, power plants, and offshore structures. At Utility and Review Board hearings, the department will encourage and support necessary investments in climate change adaptation by Nova Scotia Power Inc. Regional integration of the electrical grid, supported by the province for other reasons, may improve system reliability.

Information Sharing and Consultation

Our communities want to ensure that developments take place in a manner that respects their social and cultural well-being. First Nations want to be consulted in the early phases of new energy developments. Municipalities want a fair share of the benefits that accrue from these projects. Homeowners and businesses want accurate information to help them make informed energy choices.

The province is committed to providing timely, accurate information to everyone involved in or affected by energy developments. To this end, the province will:

- build new capacity to analyse energy trends and impacts
- develop new partnerships with First Nations and formally consult when rights may be infringed
- work with communities and businesses to understand energy opportunities
- continue a dialogue with fishing organizations and non-governmental organizations on energy impacts and seek to resolve conflicts through research, public policy, and, where necessary, legislation and regulation

Reporting

The province will report on progress in meeting the formal policy objectives and actions of the 2009 Energy Strategy through the Department of Energy's annual business plan and the provincial accountability report. As noted throughout this document, strategies require flexibility; while the policy goals remain constant, the proposed actions may need adjustment along the road to 2020 to take changing circumstances into account. See the Appendix for the 2009 Energy Strategy Framework.

Key Facts

To prepare this strategy, the province:

- held 13 public consultation workshops, with participation by more than 250 people
- met with 19 organizations
- considered 145 written submissions
- surveyed 2,900 Nova Scotians

All 2009 Energy Strategy materials, including submissions, workshop notes, and the survey are available at **www.gov.ns.ca/energy**

Getting to 2020: A Shared Goal

Nova Scotia's 2009 Energy Strategy and its Climate Change Action Plan are closely linked in a shared goal of reducing greenhouse gas (GHG) emissions to 10 per cent below 1990 levels by 2020.

Depending on future energy demand and other factors, this 2020 goal translates to a range of at least 5 megatonnes (MT) of GHG reduction.

The strategy and action plan both contribute towards that goal.

Actions	Estimated GHG Reduction
Energy Efficiency/Conservation	
• improvements to existing houses and buildings • natural gas conversions • new building standards • transportation efficiencies	1.7–3.0 MT
Renewables and Air Quality	
• 2013 renewable energy standard regulation • expanded net metering • air quality regulations	0.8–1.1 MT
Future Cleaner Energy Actions	
• post-2013 renewable energy • clean energy imports • cleaner energy options (e.g. natural gas co-generation) • NSPI GHG emission caps and enhanced air quality regulations	2.5–3.4 MT
TOTAL 2020	**5.0–7.5 MT**

The Outcome

6

Sustainable Energy for Nova Scotia

Energy planning is a challenging business. World fuel prices soar one month, plummet the next, all seemingly without reason and beyond our control. Science warns that the fuels we rely on most put our environment at risk. And reshaping our energy systems is like driving an aircraft carrier: we can't turn on a dime.

What we can do is make prudent decisions to secure our environment and our economy. We can invest in measures that enhance energy efficiency and reduce energy waste. We can begin to substitute cleaner local fuels for dirty imported ones. We can build transmission systems that let us use more clean, local, renewable energy resources. We can support research that supports our decision making with the best possible information. We can diversify our energy sources, thereby enhancing our energy security.

This strategy makes a series of choices about how to deploy our limited resources. It begins with those that offer the greatest immediate impact: energy conservation and efficiency. It offers speedy transition to renewable technologies like wind that are already economic. It lays the foundation for grid improvements that will allow much greater use of intermittent renewable energy. As the grid becomes ready to accommodate more renewable energy, research and pilot projects will help us decide which of the emerging technologies such as tidal or biomass is most feasible. The strategy builds in flexibility, so we can adapt as changing circumstances and new information warrant.

This strategy lays a path for Nova Scotia to:

- meet the energy targets in the Environmental Goals and Sustainable Prosperity Act
- integrate economic growth, social goals, and environmental protection in energy use and production
- achieve greater energy security through a diversity of sources
- become a leader in energy efficiency and conservation, just as we led Canada in waste reduction
- curb and reduce greenhouse gases and other air emissions
- achieve rapid growth in the development of renewable energy resources
- develop modern, flexible policies, laws, and regulations
- increase jobs and revenues from our offshore and onshore
- achieve permanent fiscal benefits from our offshore
- find new energy-related economic opportunities.

In these ways, the choices laid out in the 2009 Energy Strategy serve three overarching goals: protecting our environment, building a prosperous and sustainable economy, and helping people and businesses adjust to rapid, unpredictable change.

Appendix

Formal 2009 Energy Strategy Framework

Vision

A sustainable energy future by developing and using energy in a manner that integrates economic growth, diversity in supplies, social goals, and respect for the environment, for generations today and tomorrow. Sustainability is:

- moving away from the use of carbon intensive fossil fuels
- using less energy per household, vehicle, etc.
- growing the resource sector
- reinvesting revenues from non-renewable resources

Principles

- sustainability in use and development
- equity
- flexibility and diversity
- private-sector investment
- inter-jurisdictional respect and collaboration

Values

- engagement/consultation
- conservation/efficiency
- progress/prosperity
- transparency
- accountability

Strategy Goal

A significant and measurable contribution to Nova Scotia's sustainable prosperity.

Objectives and Key Actions

- **Objective:** Reducing GHGs and saving energy through energy efficiency and conservation
  Key Actions: Conserve Nova Scotia and new Electrical Efficiency Agency Programs
- **Objective:** Secure, competitive, and sustainable energy supplies
  Key Actions: Expanding and greening the grid; green/clean energy; net metering
- **Objective:** Sustainability from energy resource revenues
  Key Actions: Use non-renewable revenues (Crown Share Adjustment Payments) to reduce debt and invest in research and development
- **Objective:** New energy economic opportunities
  Key Actions: Offshore; onshore; growth in renewables; plans and actions
- **Objective:** Achieving social accountability
  Key Actions: Policy research, analysis, reporting, consultation, legislation, and regulation

Thank You

The province would like to thank the more than 300 individuals and organizations who contributed to the creation of the 2009 Energy Strategy and its companion, the Climate Change Action Plan.

Many of the policies contained in these documents have been directly influenced, informed, or created by the work of the participants in the energy consultation process through 2007 and 2008. The province is grateful to everyone involved; their insight will continue to inform Nova Scotia's approach to energy now and in the future.

NOVA SCOTIA
Department of Energy