

Electricity and Climate Change



The Canadian electricity industry is taking action on climate change. Electricity generators have made gains in areas such as low-emission technologies, energy efficiency, emerging renewable power, and emission offsets. However, the Kyoto timeframe and targets are very difficult to reconcile with the continuing need for affordable, reliable electricity. The electricity sector will continue to reduce greenhouse gas emissions growth but substantial absolute reductions are only possible in the long-term, and subject to the right policy conditions.

Electricity and the Canadian Economy

Electricity permeates Canada's economy

About one-quarter of all the energy used by Canadians is electricity, and there is no substitute in most applications. Canadians use electricity in their jobs and homes, without giving it a thought, because it is affordable and reliable.

Businesses know that electricity affects productivity, growth and profitability; and they count on affordable, reliable and high quality power when they make investment decisions.

Canadian electricity companies know that the economy demands a constant, reliable supply of electricity; they also know that Canadians look to the electricity sector to meet high standards of environmental performance.

Canada steadily demands more electricity

Electricity demand growth parallels or exceeds population growth. Canadians use electricity more efficiently than ever before, but every year there are more of us using it. Forecasts show that demand will grow by 1-1.5% per year during the next decade and beyond.

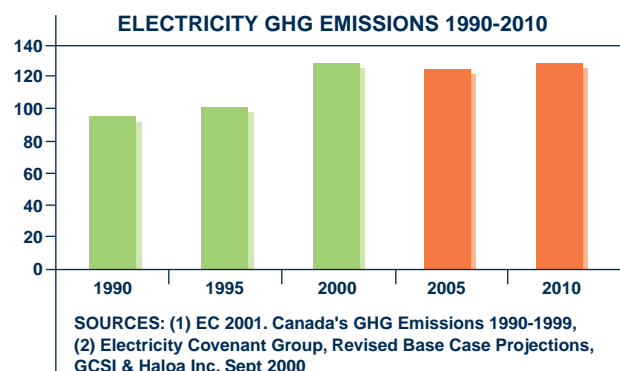
This growth is inescapable. New appliances are more efficient, but more consumers are using them. Business and industrial processes are more efficient, but population and economic growth create more businesses, buildings and manufacturing facilities – all demanding more electricity.

Consequently, we will need new investment in electrical generation, transmission and distribution. Over the next two decades, expanding and modernizing our electrical system will require investments equivalent to almost 40% of our existing capacity.

Electricity and GHG Emissions

Electricity is only part of the GHG emissions picture and it is also part of the solution

The electricity sector contributes 18% of Canada's total GHG emissions. In comparison, electricity in the US creates approximately 34% of total US emissions. Canada's mixture of low GHG emitting plants makes the difference. We



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generate nearly two thirds of our electricity (61%) from non-GHG emitting hydro, followed by thermal sources such as coal, oil and gas (25%), nuclear (13%) with others making a small contribution.

The Canadian electricity industry has already slowed the rate of GHG emissions growth. Despite these efforts, it is likely that overall economic growth will push GHG emissions in 2010 to around 130 MT, or about 35% above 1990 levels.

Electricity is an important means of solving the GHG problem, provided our plan is based on careful answers to three questions: "Why?" "When?" and "How?"

WHY there are more emissions

Increasing electricity demand is one of the main factors for increasing GHG emissions, despite government and industry initiatives to encourage energy efficiency. Demand in 2010 is likely to be 30% higher than in 1990. If there were no change to Canada's generating plants, our GHG emissions growth would correspond exactly to demand growth.


However, changes in generation technology also have an effect. Relatively low emissions in the early 90s were followed by a sharp increase in 1997/98, primarily due to the lay up of the Pickering A and Bruce A nuclear power stations in Ontario.

WHEN technology change will have an effect

When Canada's nuclear reactors come back into service over the next few years, most of the increase in emissions from using coal to replace nuclear will be cancelled out. New hydro and small renewable sources will also have a modest but positive effect in reducing emissions growth by 2010.

However, fossil-fired generation will continue to meet much of the growth in demand for electricity. Even in hydro-rich British Columbia and Québec, fossil-powered generation will supplement hydro. Most of this additional generation will use natural gas, which releases GHG emissions, albeit much less than coal. Substantial new hydro resources are available, but the majority of new facilities may not be on-line until beyond 2010, due to regulatory process and construction time.

HOW we can reduce emissions – challenges and opportunities – now, in 2010 and beyond



Challenge:

Demand is growing at around 1.3% per year.

Opportunity:

Invest more in energy efficiency with the aim of slowing that growth.

Challenge:

Low GHG electricity sources such as hydro must overcome increasing regulatory barriers.

Opportunity:

Reduce regulatory barriers. Work with communities to speed up approvals and reduce costs.

Challenge:

Canada's nuclear installations need to be brought back on line and have their lives extended.

Opportunity:

Ensure that regulatory approaches are efficient and that new capital is available.

Challenge:

New, low GHG renewable sources such as wind are only a small part of the mix.

Opportunity:

Implement measures to help new technologies become cost-competitive by ensuring their access to markets.

Challenge:

Coal-fuelled power, although high in GHG emissions, is by far the most economic option in many regions.

Canada has hundreds of years of secure coal supplies.

Opportunity:

Invest in clean coal technologies. Begin to deploy virtually emissions free, coal-fired power in the next decade.

A Made in Canada Solution for Electricity

A sustainable policy for combating climate change, together with its regulations, standards, government incentives and tax measures, must be based on physical and economic realities.

Coal is the challenge – and part of the solution

Canada must develop and deploy clean coal technology. For example, Integrated Gasification Combined Cycle (IGCC) technology combined with CO₂ capture and disposal can substantially reduce GHG (and other) emissions. However, these technologies will not reach the demonstration stage until 2008-2012; and large-scale deployment will occur well past 2010.

If we close existing coal-fired plants now, or convert them before we have more efficient technology, the costs will be very high. Costs to consumers will rise, markets will be exposed to increased fuel cost volatility and system reliability will be compromised. The issue is one of timing.

Many other solutions are potentially available – if we give them time

Over time, in addition to new, cleaner fossil fuel technologies, Canada can further develop low GHG alternatives. By making the right investments now, we can change our electricity system in fundamental ways by the next decade. Gas will be an important option because of its flexibility, clean burning characteristics and application in distributed generation systems. New hydro still has significant potential. A new generation of nuclear reactors will be available, as will wind and other renewables.

Canada's plan must respect regional differences and fuel diversity

The electricity solution that works in one region of Canada may not be appropriate in another. Canadians live in different environments, each with different fuel resources and constraints. British Columbia, Manitoba and Québec are rich in hydro. Alberta and Saskatchewan depend on coal. Most regions have access to natural gas. Ontario has an established nuclear fleet in its mix of sources. We should capitalize on this diversity. Each province and territory needs its own electricity GHG emissions strategy within a coherent Canadian approach.

The electricity industry proposes to adopt binding performance limits

The electricity industry has put forward an Emissions Performance Equivalence Standard (EPES) based on the emissions rate of a combined cycle gas turbine (CCGT). This standard will lead to more than a 50% reduction in net CO₂ intensity compared to existing coal-fired plants.

Under the EPES proposal:

- New facilities must be at or below the standard.
- 40+-year-old facilities must meet or exceed the standard.
- Less than 40-year-old facilities can continue to emit without restrictions until they are 40, but they must then meet the standard.
- Credits can be earned by new facilities whose performance exceeds the standard.
- Credits will help wind, hydro and other non-GHG resources.

Several key policy steps are essential in order for the proposal to be economically manageable. A portfolio of offset possibilities must be available through sinks and international credits. Tax treatment needs to be brought up to date. Regulatory barriers must be reduced. And R & D investments must be accelerated.

Canada's Industry is Taking Action Now – Coast to Coast

British Columbia

BC Hydro avoided 1.2 million tonnes of GHG emissions in 2000 by purchasing electricity from independent power producers such as small hydro and wood waste facilities.

Alberta

In 2000, TransAlta purchased emission reductions offsets of 1.7 million tonnes of CO₂. TransAlta is an important investor in Vision Quest, one of Canada's pioneer wind energy companies.

EPCOR's new high efficiency Genesee 3 facility will produce GHG emissions net of offsets no higher than a combined cycle gas turbine (CCGT) unit while significantly reducing other air emissions as well.

Saskatchewan

SaskPower's demand side management program helped customers reduce energy consumption, thus avoiding 3,000 tonnes of CO₂ eq. Along with other coal based power companies SaskPower, as part of the Canadian Clean Power Coalition, is investing in clean coal technologies including CO₂ capture and sequestration.

Manitoba

Manitoba Hydro is working with First Nations to plan and develop two northern hydro projects. Two coal-fired units at Selkirk Generating Station will be converted to natural gas in 2002, and new natural gas-fired combustion turbine generators come on line in 2002.

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Ontario

In 2000, Ontario Power Generation offset almost 33% of its GHG emissions with the use of 12.6 million tonnes of CO₂ eq Emission Reduction Credits (ERCs). OPG is a recipient of the US Environmental protection agency's Climate Protection Award.

Québec

The 100 MW private wind farm Le Nordais in the Gaspé Peninsula sells enough power for 12,000 households to Hydro-Québec under a 25-year agreement. Hydro-Québec recently signed an agreement with the Crees on remediation of mercury contamination, Cree employment on the La Grand Hydroelectric Complex, and Cree consent to the Rupert-Eastmain Diversion Project.

Nova Scotia

Nova Scotia Power Inc. (NSPI) converted its Tufts Cove generating station in 2000 to be able to use both oil and gas from Sable Island. NSPI is the co-sponsor of the Climate Change Public Education and Outreach Hub of Nova Scotia.

Newfoundland

Newfoundland and Labrador Hydro displaced diesel generation on Labrador's South Coast by making arrangements to deliver energy to the L'Anse au Loup system from Hydro Québec's Lac Robertson Hydro Plant.

New Brunswick

NB Power is conducting siting studies for wind power, converting oil-fired units to gas, and avoiding 3 million tonnes of CO₂ eq each year by generating power at the LePreau nuclear plant.

Prince Edward Island

Maritime Electric is purchasing all of the energy produced by PEI Energy Corporation's 5MW wind farm in North Cape, PEI. This is estimated to reduce 13Kt of CO₂ annually associated with Maritime Electric's energy supply portfolio.

(CO₂ eq = carbon dioxide equivalent)

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Getting to a low GHG emissions future

Climate change is an issue requiring long-term solutions. That means acting now so that fundamental change can occur over several decades. An excessive focus on the near term risks higher costs and slower progress.

The electricity industry makes investments that come into service from three years to over ten years from the decision point and they are expected to have lives of several decades. In order to ensure that the right investments are made it is essential to develop a long-term framework with several key characteristics:

- **the right incentives and obligations to start action now with the expectation of significant results ten to twenty years out.**
- **a high degree of stability for investments – with rules that are reasonably predictable several years in advance**
- **the right mix of government policies pertaining to taxation, regulatory barriers, rules for investments in offsets and investment in R and D.**
- **flexibility to accommodate multiple solutions, fuels and technologies and to account for Canada's regional diversity.**

Resources:

Natural Resources Canada
<http://www.nrcan-rncan.gc.ca/>

Environment Canada: GHG Division
http://www.ec.gc.ca/pdb/ghg/ghg_home_e.cfm

Canadian Clean Power Coalition
www.candiancleanpowercoalition.com

Edison Electric Institute <http://www.eei.org/>

United States Energy Information Administration
<http://www.eia.doe.gov/>

International Energy Agency <http://www.iea.org/>



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