Green Power Programs in Canada — 2007

Prepared for Environment Canada

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About the Pembina Institute

The Pembina Institute creates sustainable energy solutions through research, education, consulting and advocacy. It promotes environmental, social and economic sustainability in the public interest by developing practical solutions for communities, individuals, governments and businesses. The Pembina Institute provides policy research leadership and education on climate change, energy issues, green economics, energy efficiency and conservation, renewable energy and environmental governance. More information about the Pembina Institute is available at http://www.pembina.org or by contacting info@pembina.org.

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Disclosure

In November 2003, the Pembina Institute launched its own green power program, selling green power certificates that represent the environmental attributes of wind power generated by Vision Quest Windelectric. In 2007, Pembina revised its program slightly and sold certificates generated through Bullfrog Power. The program had two objectives: to support the growth of the green

power sector and to support the work of the Pembina Institute. The Pembina Institute recognizes that there may appear to be a conflict of interest between promotion of its own green power certificate marketing program and maintenance of objectivity in this report. However, the authors are confident that the report's objectivity remains wholly unaffected, because the report seeks only to describe and evaluate in a transparent and standardized way the essential features of green power programs in Canada, without passing judgement on them or highlighting some programs more than others. The report also reproduces in full (edited only for clarity) the answers provided by green power program proponents to questions about barriers to the implementation of such programs.

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1. Introduction

1.1 What Is Green Power?

While different stakeholders hold slightly different opinions about what defines "green" power, generally it refers to electricity with two key characteristics:

- it is produced from renewable sources, and
- its production has low adverse impacts on the environment, human health and communities.

Electricity production from fossil fuels, especially coal, is a major source of greenhouse gases (GHGs) that cause climate change, as well as the regional air pollutants that contribute to acid deposition and smog. Electricity production was responsible for more than 17% of Canada's GHG emissions in 2005,[1] and for 25% of Canada's sulphur dioxide emissions in the same year.[2] Electricity production is also a major source of the toxic metal mercury, primarily from coal combustion, accounting for 34% of Canada's air emissions of mercury in 2003.[3]

Green power, on the other hand, has zero or near-zero net GHG emissions. Green power sources like wind, hydro and solar power also have zero emissions of regional air pollutants. Green power, therefore, has an important role to play in Canada's efforts to address climate change and air pollution. Production of green power can also avoid the adverse impacts on watersheds and landscapes associated with conventional electricity generation, and prevent the pollution and other environmental impacts resulting from the production, distribution (and, where applicable, disposal) of fossil and nuclear fuel wastes.

In addition to its environmental benefits, green power has important benefits for energy security, regional development, economic diversification and creation of skilled jobs:

- Most green power production has no need for supplies of fuel that can be subject to major price fluctuations and international disputes. Green power's lack of fuel price volatility risk can make it competitive with conventional electricity for long commercial contracts.
- Unlike conventional electricity generation, which involves a small number of very large, centralized facilities, green power development often results in a network of numerous small-scale plants with a wide geographic distribution and the promise of economic stimulus in multiple, and, especially in the case of wind power and biogas, rural locations.
- Green power generation projects typically have much shorter development times than larger centralized projects.
- Rental fees from wind turbines located on private land provide ranchers and farmers with a consistent source of revenue that supplements and supports their annual incomes.

[1] National inventory report

[2] Environment Canada. March 2007. *CAC Emission Summaries – Sulphur Oxides Emissions for Canada.* http://www.ec.gc.ca/pdb/cac/Emissions1990-2015/EmissionsSummaries/SOx_e.cfm

[3] Environment Canada. 2004. Undated. *Sources of Mercury – Canadian Releases*; http://www.ec.gc.ca/MERCURY/SM/EN/sm-cr.cfm?SELECT=SM

- Wind facilities, solar facilities and biomass-fired facilities all generate more jobs per megawatt-hour (MWh) in the construction, manufacturing and installation sectors than do coal- and natural gas-fired facilities.[4]

Precise definitions of green power vary because of different views on which levels of adverse environmental, health and social impacts are considered to be sufficiently low, and on which sources are considered to be renewable.[5] The issue of certifying green power generation facilities or products, which depends on adopting particular definitions, is discussed further in Section 4. There is, however, broad agreement that green power sources include wind, solar, sustainably produced biomass with low air emissions during combustion, low-impact run-of-river hydro, geothermal, ocean current tidal, and wave energy. The following paragraphs provide brief summaries of the four technologies that currently dominate Canada's green power capacity: wind, small-scale hydro, wood-waste biomass and biogas. Solar photovoltaic technology is also included since it is likely to become a dominant green power contributor in the future.

Wind: Wind energy is one of the fastest-growing sources of energy in the world. By 2007, Canada ranked 11th in the world in wind power capacity. As of January 2008, Canada's installed capacity was 1,856 megawatts (MW)[6]. Canada's geographical characteristics result in a considerable wind resource. A very large additional potential exists along the west and east coasts, in lakefront areas in the Great Lakes region and in many parts of the Prairies provinces. Small wind turbines can be used for remote small-scale or grid applications, and larger wind farms are used for grid-connected applications.

Low-impact run-of-river hydro[7]: As of December 31, 2006, Canada's installed capacity of hydro facilities of 50 MW or less was 3,401 MW.[8] An assessment completed for the Canadian Hydro Association estimates 163,000 MW of undeveloped hydropower resources, 45,000 MW of which are economically feasible.[9] Of this 45,000 MW, small hydro constitutes 15,000 MW. According to an unpublished CANMET Energy Technology Centre study of emerging

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[4] D. Kammen, K. Kapadia, and M. Fripp, *Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate?* (Renewable and Appropriate Energy Laboratory, University of California, Berkeley, 2004) http://rael.berkeley.edu/files/2004/Kammen-Renewable-Jobs-2004.pdf (last accessed April 30, 2008).

[5] For the Pembina Institute's views on what constitutes green power, see Marlo Raynolds and Andrew Pape-Salmon, *Pembina Institute Green Power Guidelines for Canada* (Drayton Valley: The Pembina Institute, 2002) http://www.pembina.org/pub/23 (last accessed April 30, 2008).

[6] Canadian Wind Energy Association, *Canada's Current Installed Capacity: 1,856 MW* (2008 [cited April 30 2008]); available from http://www.canwea.ca/images/uploads/File/fiche_a_29_janv_08.pdf.

[7] In some cases, the term "small-scale" is used to denote "low-impact run-of-river" facilities because the term "small-scale" is more common and has more relevant data than "low-impact run-of-river." However, the term "small-scale" only refers to the installed capacity (normally under 50 MW) and does not necessarily refer to the scale of impact. In some cases, "small-scale" is a useful surrogate for "low-impact run-of-river" because small-scale facilities are less likely to include reservoirs and they are less likely to impede the passage of fish. "Small" facilities may have adverse impacts that are not insignificant and cumulative impacts may exceed those of a large facility having the same total capacity.

[8] CANMET Energy Technology Centre, *Emerging Hydropower Technologies R&D in Canada: A Strategy for 2007-2011* (Not publicly available yet)

[9] Canadian Hydropower Association, *Hydropower for a Sustainable and Renewable Energy Mix - Submission to the Council of Energy Ministers* (Whitehorse: 2006) http://www.canhydropower.org/hydro_e/pdf/CEM_2006_CHA_Submission_July06.pdf (last accessed April 23, 2008).

hydropower technologies,[10] developing 2,250 MW may be socio-economically appropriate using currently available technologies. Improved technologies could improve the suitability of another 2,250 MW. Therefore, an additional 4,500 MW of small hydropower may be suitable for development in the near future.

Wood-waste biomass: Canada's largest biomass resource is wood. Many facilities in Canada's forest products industry now use bark, sawdust, shavings and/or other wood residues for large-scale production of electricity and heat for their own needs. As of December 31, 2006, there were 32 wood refuse facilities in Canada, totalling approximately 848 MW.[11] It is projected that Canada will produce surplus wood residues in 2010 with an energy content of 57.6 petajoules (16,000,000 MWh) under a business-as-usual scenario.[12] Whether a given wood-waste-fired electricity generation facility can be considered to be producing green power depends on issues including sustainability of harvesting, appropriateness of waste management and emissions of air pollutants.

Landfill/digester biogas: Biogas sources include municipal solid wastes and livestock wastes. Anaerobic decomposition of biomass wastes in landfills or digesters produces methane-rich "biogas" that can be used as fuel for electricity generation. By 2006, Canada was generating approximately 111.2 MW of electricity from 11 municipal landfill gas facilities,[13] and there are significant opportunities for increasing this amount.[14] Whether a biogas-fired electricity generation facility can be considered to be producing green power depends on a number of factors, including emissions of air pollutants and whether biogas production discourages diverting waste from a landfill.[15]

Solar (photovoltaic): The International Energy Agency estimated that Canada's installed capacity of photovoltaics in 2006 would be 20.5 MW.[16] Despite the relatively high capital costs of solar photovoltaics, it is being used on an increasing scale, which along with advances in technology is bringing the cost down every year. Cost reductions and investment are being driven by policies like feed-in tariffs that guarantee access to the grid and pay a premium based

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[10] CANMET Energy Technology Centre, *Emerging Hydropower Technologies R&D in Canada: A Strategy for 2007-2011*

[11] Statistics Canada, *Catalogue 57-206-XIB* (2006) as referenced by Michael Paunescu

[12] National Climate Change Process Forest Sector Table, *Options Report: Options for the Forest Sector to Contribute to Canada's National Implementation Strategy for the Kyoto Protocol* (1999) p. 24;

[13] National Round Table on the Environment and Economy, *Case Study on Renewable Grid Power Electricity* (2004 [cited April 30 2008]); available from http://www.nrtee-trnee.ca/eng/publications/renewable-power-grid-electricity/3-power-grid-renewable-grid-power-eng.html.

[14] National Climate Change Process, *Municipalities Issue Table Foundation Paper* (1998)

[15] Generally, composting and recycling waste have fewer adverse environmental impacts than landfilling waste. Therefore, biogas production that discourages composting and recycling is not considered as "green" as biogas production that does not discourage composting and recycling. There is also some debate about whether the source, municipal solid waste, is considered renewable. However, since EcoLogo certifies facilities that generate power from landfill waste, landfill biogas is included in this report. Refer to section 4.1 for more information about EcoLogo.

[16] International Energy Agency, *Annual Report - Implementing Agreement on Photovoltaic Power Systems* (2006) http://www.iea-pvps.org/products/download/rep_ar06.pdf . Estimate is based on NRCan's assumption that installed capacity would grow by 20% in 2006.

on current technology cost.[17] This has made the solar PV market the fastest growing energy source globally. Ontario's new feed-in tariff or Standard Offer Program, guaranteeing a sale price of $0.42/kWh for electricity derived from solar resources, is expected to lead to a significant increase in the amount of installed solar PV capacity in Canada. Even though solar resources in northern countries are generally weaker than in tropical and equatorial regions, Canada's potential solar resource for heating and electricity is enormous. The City of Regina receives an annual average PV potential of 1,361 kWh for every kW of installed capacity. As a comparison, this potential is greater than Sydney, Australia and Rome, Italy.[18]

1.2 Categories of Green Power Programs

While green power provides benefits to individuals and communities, it generally remains more costly in purely monetary terms than many conventional power alternatives on the current electricity market. Companies, utilities and governments that recognize the benefits have developed policies and programs to offer, encourage or require green power. These policies and programs can be grouped into three large categories: (1) broad market instruments, (2) mandatory green power requirements, and (3) voluntary green power marketing or acquisition programs. The scope of this report is focused on the voluntary green power programs with some discussion of mandatory requirements. Broad market instruments have limited use in Canada and were excluded from the scope but are discussed briefly below.

Broad market instruments work by internalizing some of the real costs of pollution such as damage to the environment and human health into marketplaces. Including these costs could lead to green power becoming less costly than conventional power in many cases. While not currently comprehensive or uniform across the country, this trend has begun in Canada with the recent implementation of a carbon tax in British Columbia in 2008 and an intensity based carbon offset system in Alberta in 2007.

Some governments and utilities also include additional costs when making purchasing decisions. For example to guide its purchases of green power, the federal government uses a comparison of its price with the "full" price of conventional power, where the latter is calculated using a full environmental net cost accounting model.[19]

Green power may also be acquired by entities that are legally required to do so, such as a utility working under a Renewable Portfolio Standard or required to pay a premium for renewable power sources through a feed-in tariff. Provincial or other governments may set goals to acquire green power to meet an environmental or economic development objective. In these cases, the additional cost of the green power is normally absorbed by the utillity or passed on to all customers. These programs are discussed in section 5.

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[17] Roger Peters and Tim Weis, *Feeding the Grid Renewably* (Drayton Valley: Pembina Institute, 2008) http://www.pembina.org/pub/1599 (last accessed April 30, 2008).

[18] Natural Resources Canada, *Photovoltaic potential and solar resource maps of Canada* ([cited April 23 2008]); available from https://glfc.cfsnet.nfis.org/mapserver/pv/rank.php?NEK=e.

[19] Leslie Welsh, "The Government of Canada's Incentive Programs" (presented at the How to Profit from the Business of Renewable Energy, Toronto, October 20-12 2003).

A certain amount of green power capacity has been developed in Canada without specific intervention or incentives by governments or electric utilities.[20] This power is marketed to consumers willing to pay an additional price for power generated from renewable energy. In provinces with competitive retail markets like Ontario, green power generators can sell electricity directly to consumers. Consumers may be individual customers, businesses wanting to show social responsibility, or governments wishing to accelerate development of renewable power sources. This is the focus of this report and covered in sections 2, 3 and 4.

We have divided the programs responsible for most of the green power development currently occurring in Canada into green power marketing programs and green power acquisition programs.

1.2.1 Green Power Marketing Programs

Green power marketing programs are administrated either by utilities or third parties and include selling electricity bundled with the associated environmental attributes ("renewable electricity programs") or stand-alone environmental attributes.

1.2.2 Green Power Acquisition Programs

Green power acquisition programs include government, utility and private sector initiatives to purchase green electricity or stand-alone environmental attributes. In some cases, acquisition programs are regulated or legally binding while other programs are voluntary.

1.3 Objective

The objective of this report is to describe the status of green power programs operative in Canada in 2007, the environmental benefits of these programs, green power certification schemes and other policies that support green power. This report serves as an update to *Green Power Programs in Canada – 2003*, prepared by the Pembina Institute for Environment Canada. This report also provides a brief discussion of expected changes to the status of green power in Canada.

1.4 Scope

The scope of this report includes programs that were active at the end of 2007. In some cases, programs that were operational at some point between 2003 and 2007, but not at the end of 2007, are discussed herein.

Utility programs, third party programs and some corporate initiatives lie within the scope of this report.

This report is not intended to provide a comprehensive description of every source of green power in Canada. Instead, this report focuses on programs that served to acquire or market green power, relevant certification standards and the related environmental benefits of green power.

[20] Of the 1,856 MW of installed wind power capacity, approximately 241 MW have been developed without support of the federal government. Similarly, 20.5 MW of photovoltaic electricity capacity has been installed without federal government support. Michael Paunescu, Senior Economist, Renewable Energy, Natural Resources Canada. July 7, 2008.

2. Green Power Programs Active in Canada in 2007

2.1 Green Power Marketing Programs

Green power can be marketed as a single product including the electricity itself and the environmental attributes of the green power. Alternatively, the electricity and environmental attributes can be sold separately as a stand-alone product. Figure 1 illustrates how the stand-alone environmental attributes retail stream differs from the bundled electricity and environmental attributes retail stream.

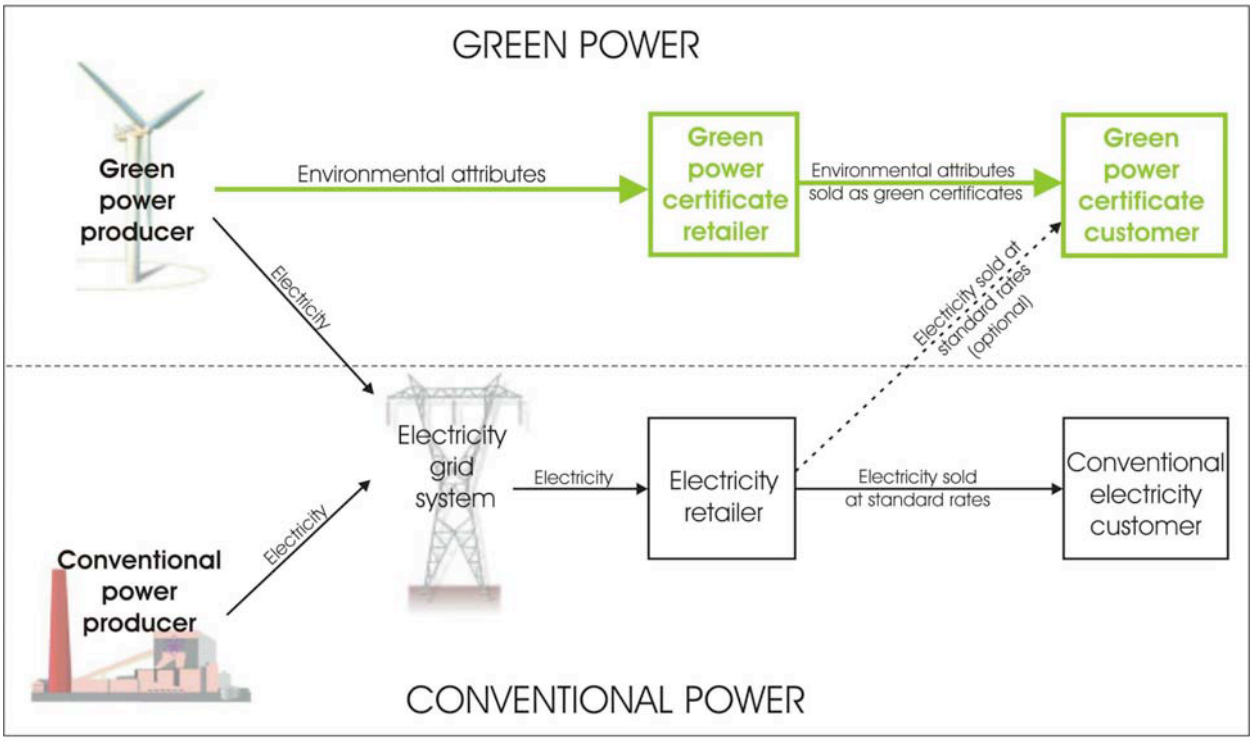

Figure 1: Retail stream of green power certificates (Source: Whitmore and Bramley (2004))

Programs administrated by utilities or third parties to sell green power (Renewable Power Programs) or stand-alone environmental attributes (Green Certificate Programs) to consumers are described in this section.

Certification is an important element of green power and stand-alone environmental attributes. Certification ensures that a single product is not sold to two customers, which is a risk that is distinct to non-certified sales of green power and stand-alone environmental attributes. Certification helps avoid the situation wherein a consumer is deceived about an environmental benefit or wherein a marketer overstates an environmental benefit or makes poorly substantiated

claims.[21] Some marketers interchange facility certification and electricity certification when discussing the product. Interchanging these terms may unnecessarily confuse the consumer.

All certification must be conducted by a reputable third party. The main certifier in Canada is TerraChoice, which is mandated by Environment Canada to administer the EcoLogo program. Certifiers have the mandate to provide assurance of whether a product is produced according to a specific protocol. They do not have the mandate to estimate or verify emissions reductions. TerraChoice certifies electricity (among many other products) and it licenses green power marketers. According to TerraChoice, EcoLogo-certified electricity loses its certification if it is marketed by a non-licensed marketer. EcoLogo certification is widely perceived to apply to facilities, which is contrary to statements made by TerraChoice[22]. This contradiction creates a significant amount of confusion among retailers, customers and other stakeholders alike.

Three certification systems are discussed in Section 4.

2.1.1 Green Power Programs

Definition: selling green power that utilities or third parties generate themselves or acquire, from other electricity contracts, to customers as a differentiated product (often at a premium).

This section covers green power that is sold by utilities to residential, commercial or institutional customers. Program motivations range from expanding products and services offerings to improving branding through a green power program.

Some of the utility green power programs operating in Canada in 2007 sourced their green power from generators that they operate, while others purchased green power for their marketing programs from other sources. For example, the Oakville Hydro Green Light Pact program purchases its green electricity through another utility green power program, Ontario Power Generation Evergreen. For initiatives covered in this section, the green power is marketed as a discrete product, with any associated costs being recouped through the sale of the green power to participating customers. Nova Scotia Power's program is discussed briefly, but in 2006 NS Power dissolved its green power program in favour of simply increasing the proportion of green power in Nova Scotia's overall supply mix.

Third party programs are characterized by independent entities that source green power and sell it to retail customers. Bullfrog Power, OPG and Energy Ottawa are the only continually active third party renewable electricity retailers.

Each program is briefly described in the following sections with additional information provided in Appendix C. A summary table is provided at the end of this section for comparison across all programs.

2.1.1.1 ENMAX Greenmax

Through its Greenmax program, ENMAX sold 549 GWh of green power generated at wind farms in Alberta in 2007. Greenmax is an EcoLogo-certified product for residential and

[21] Bird, L.A. et al., "Implications of carbon cap-and-trade for US voluntary renewable energy markets," *Energy Policy* 36 (2008): 2063-2073

[22] Susan Herbert, Vice-President of Science and Programs, TerraChoice Environmental Marketing. July 2009

commercial electricity customers[23]. ENMAX owns 50% of the 75 MW McBride Lake Wind Farm, commissioned in 2003, and purchases 100% of the electricity generated from the McBride Lake turbines (approximately 235,000 MWh / year) through an agreement with Vision Quest Windelectric (now Transalta Wind).[24] ENMAX fully owns the 80 MW capacity Taber Wind Power Project, which was officially commissioned in 2007. ENMAX cites the City of Calgary's 20-year supply agreement as a key driver of the Taber project.[25] However, it does not appear that the City of Calgary's supply agreement with ENMAX occurs within the Greenmax program, as the Taber project is not EcoLogo certified.

Throughout 2007, ENMAX offered 50% or 100% renewable electricity packages to residential customers, for $6.25 per month and $12.50 per month respectively. ENMAX also offered green power to commercial customers. Greenmax no longer offers the option for residential customers to purchase green power directly; instead, customers are able to redeem their EasyMax Rewards dollars[26] for green power. Greenmax then adds 5,000 kWh of EcoLogo-certified renewable electricity to the Alberta grid ear year for each EasyMax customer who opts to use their reward dollars for green power.

2.1.1.2 SaskPower GreenPower

SaskPower's GreenPower was launched in March 2002 to business customers and on Earth Day, April 2002, to residential and farm customers. Customer demand has been the main driver for this program, with demand increasing in recent years particularly from customers seeking points for potential LEED (Leadership in Energy and Environmental Design) buildings.[27] GreenPower is sold in 100 kWh blocks at $2.50 per block. SaskPower's green power is provided by its two wind power facilities in southern Saskatchewan. These facilities totalling approximately 6.5 MW in capacity, were built in 2002 and 2003 near Gull Lake, Saskatchewan. SaskPower claims that its GreenPower is EcoLogo-certified[28], although SaskPower is not listed as a renewable energy marketer on the EcoLogo website. Key customers include the Governments of Canada and Saskatchewan, SaskTel, SaskEnergy, University of Regina and Hitachi Canada. SaskPower also purchases GreenPower to operate its own offices.[29]

At the end of 2007, the GreenPower product received support from about 1,100 customers and GreenPower customers have supported about 69 million kWh going into the electrical system and investment in approximately 22 MW.

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[23] EcoLogo^{M} Program *Enmax Corporation* (cited June 25, 2009); available from http://www.terrachoice-certified.com/en/participatingcompanies/details.asp?client_id=215

[24] Enmax. *McBride Lake Wind Farm* (cited September 16, 2008); available from http://www.enmax.com/Corporation/Clean+Power/Wind+Power/McBride+Lake+Wind+Farm.htm

[25] ENMAX. *Renewable Energy Solutions* (cited September 16, 2008); available from http://www.enmax.com/Energy/Renewable+Energy+Solutions.htm

[26] ENMAX customers who have signed up for the EasyMax program earn bonus reward dollars for bundling their utility bills.

[27] Darryl Reinson, Corporate Planning, SaskPower. March 5, 2008.

[28] Darryl Reinson, Corporate Planning, SaskPower. April 2009.

[29] Note that SaskPower also operate other wind farms whose cost is recovered through the general customer rate base.

2.1.1.3 Oakville Hydro Energy Services Inc. Green Light Pact

The Oakville Hydro Green Light Pact program was launched in March 2003, providing residential, commercial and institutional customers with the ability to purchase "Green Light Pacts." A full pact, costing $60.00, purchases the equivalent of 1,000 kWh of green electricity over the course of a year, while a $30.00 half pact purchases 500 kWh. Oakville Hydro is not listed as a licensed EcoLogo marketer and, therefore, the Green Light Pact is not EcoLogo-certified.[30] Oakville Hydro claims to procure electricity from EcoLogo-certified facilities "or equivalent electricity generators"[31], although there is no readily available evidence on Oakville Hydro's webpage, which may confuse customers. [32]

The electricity is provided by the OPG Evergreen program (see section 2.1.1.9 below). For the purposes of this report, generation under the Oakville Hydro Green Light Pact is accounted for under the Ontario Power Generation Evergreen program to avoid double-counting from the same green power sources.

Oakville Hydro reported the program's participant base as relatively stable with a high retention rate, comprised of 90% residents, businesses and institutions local to the Oakville area. The program serves about four major business and three institutional customers, with the remainder being residential customers. Oakville Hydro indicated that the program is mainly for branding purposes and is not currently being marketed aggressively. Branding was identified as the major driver behind the program.

In the first 10 months of the program, customers purchased 62,700 kWh of green electricity. By the end of 2007, 422,040 kWh of green power had been purchased through the program since its inception, of which residential purchases accounted for approximately 120,000 kWh. For the 2007 program year, beginning January 1, 2007 and ending December 31, 2007, 216,900 kWh were purchased, a slight increase over previous years.

Key customers include the Town of Oakville, which purchased 170,000 kWh in 2006 and 175,000 kWh in 2007.

2.1.1.4 Maritime Electric Green Power

Maritime Electric's Green Power Program was initiated after the first 5 MW (Phase 1) North Cape wind farm was commissioned by the Prince Edward Island Energy Corporation Fall 2001. The Green Power Program is one of several sources of funding intended to fund the expected higher cost of electricity produced by the wind farm relative to electricity generated by conventional sources. Blocks of 50 kWh of uncertified electricity are sold for $1.25, which represents a premium of $0.025/kWh. In 2007, the program sold 570 MWh, mostly to residential customers. Customers were encouraged to participate in the program as a way of demonstrating support for developing renewable power sources. All proceeds collected from the Green Power

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[30] The EcoLogo website does not identify Oakville Hydro as a provider of an EcoLogo-certified product. TerraChoice Environmental Marketing, *EcoLogo Program - Product Type: electricity - marketer, commercial power* (2007b [cited April 24 2008]); available from http://www.ecologo.org/en/certifiedgreenproducts/details.asp?product_type_id=13.

[31] http://www.oakvillehydro.com/greenpower_business_faqs.asp [cited Oct 1, 2009]

[32] In 2003, the Pembina Institute reported Oakville Hydro's Green Light Pact as an EcoLogo-certified product. Either Oakville Hydro chose to not renew its license through TerraChoice or the authors had assessed the certification status in error. This error may illustrate the difficulty of assessing whether a product is certified.

Program are forwarded to the Prince Edward Island Energy Corporation, which owns North Cape wind farm.

The original motive behind the program was to recoup the additional cost of wind power relative to electricity generated from fossil sources. However, wind power has since become a less expensive fuel than fossil fuels for generating power on the Island. Consequently, Maritime Electric does not need to sell green power at a premium to recover costs and has decided not to expand the program, although Green Power customers may continue to pay a premium for wind power.

A Ventus Energy subsidiary, West Cape Wind Energy, exported wind power from Canada to the New England Power Pool in 2007.[33] Suez Energy took over Ventus Energy in 2007 and appears to have continued this practice[34]. Maritime Electric did not comment on whether it was involved with this transaction.

2.1.1.5 Selectpower's Selectwind (residual customers)

Selectpower was formed in 2000 as an electricity retailer for Guelph Hydro and in July 2003 launched the Selectwind program for customers to choose wind power blocks at $6.53 per 75 kWh. The program was closed in September 2006 along with the program operator, Selectpower. The reason given for Selectpower's closure was a "[Guelph Hydro's] decision to concentrate on core business of safe and reliable delivery of electricity." Representatives added that "Selectpower has developed an excellent reputation and track record in Ontario's energy sector, but it no longer fits with our current and future business models."[35]

The source of the power for the Selectwind program was Sky Generation's 1.8 MW wind turbine in Ferndale, Ontario, commissioned in November 2002. The turbine produces approximately 4,500,000 kWh in a typical year. Both the source facility and the product were EcoLogo certified. It is important to note that the Ferndale wind turbine was also supported by the now defunct federal Market Incentive Program. Also note that Selectwind and Green Tags Ontario both used power from the Ferndale turbine, although they used different blocks of generated electricity to ensure double-counting did not occur, according to the Sky Generation. The program marketed a power product to residential, business and institutional customers through 3- or 5-year purchase options. Selectpower charged $6.53 to produce 75 kWh/month of green electricity for the Ontario electricity grid.

In 2005, students at the University of Guelph elected through a student association referendum to purchase 100% wind power for the campus's Bullring building, equivalent to 86,400 kWh per year. Also in 2005, the Guelph Jazz Festival purchased over 8,000 kWh of Selectwind power. After the closing of Selectpower, many residual customers switched to Bullfrog Power's green power marketing program (refer to sections 2.1.1.7 and 2.1.2.5 for more information about Bullfrog Power). Nearly half of the energy purchased from Sky Generation by Selectpower was purchased in 2006.

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[33] Canadian Wind Energy Association, "PEI wind farm exports power to US" *WindLink* June 5, 2007.

[34] Wayne Thibodeau, "New Brunswick not keeping P.E.I. from selling wind power" *The Charlottetown Guardian*, September 16, 2009, page A1

[35] Guelph Hydro Electric Systems Inc., *Guelph Hydro Inc. Withdraws from Energy Services Market* (2006 [cited April 30 2008]); available from http://www.guelphhydro.com/GuelphHydroWeb/NewsOct052006.htm.

2.1.1.6 Nova Scotia Power Green Power

Between late 2002 and the end of 2003, 350 of Nova Scotia Power's 350,000 residential customers were participating in the Green Power Program. Nova Scotia Power ceased offering the program in September 2006 citing that the program had lost popularity among customers. The authors did not find evidence to verify this claim, which runs counter to the national trend of green power gaining popularity. Nova Scotia Power has supply contracts with other generators for its green power.

During its operation, the program offered 125-kWh blocks of power at a premium of $5 ($40/MWh) above the standard electricity price.[36] EcoLogo-certified sources owned by Nova Scotia Power include Grand Etang Wind Generator and Little Brook Wind Generator.[37] However, since Nova Scotia Power is not listed on the EcoLogo website as a licensed marketer of EcoLogo-certified electricity, the consumer cannot distinguish whether Nova Scotia Power Green Power is EcoLogo-certified. The authors presume this power is not EcoLogo-certified, although Pembina's 2003 report states that the product was EcoLogo-certified.[38]

2.1.1.7 Bullfrog Power Green Power

Bullfrog Power was founded in 2005 in Ontario and moved into the Alberta market in 2007. Bullfrog Power's customers include residential and commercial customers who voluntarily purchase green power. Customers vary in size from households to major corporations. For Ontario commercial customers and all customers in Alberta, Bullfrog markets only the environmental attributes of green power, whereas one of Bullfrog Power's Ontario residential products includes both the electricity and the environmental attributes (see 2.1.2.5 below).

At the end of the fiscal year 2007 (ending December 31, 2007) Bullfrog Power had approximately 5,000 residential customers and 500 commercial customers (including institutional and industrial customers), which represents a 267% increase over 2006.[39]

Ontario residential Bullfrog Power retails for $0.089/kWh and includes the cost of the electricity itself.

Bullfrog Power electricity products are EcoLogo certified, both for residential and commercial products. In Alberta in 2007, all of Bullfrog Power's electricity was purchased from wind farms in southern Alberta. In Ontario in 2007, power sources included wind farms and run-of-river hydro facilities.

2.1.1.8 Energy Ottawa Green Power

Energy Ottawa's green power facilities include the EcoLogo-certified Chaudière Falls Generating Stations and two 8 MW capacity hydro generators that produce approximately a total

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[36] Pollution Probe, *How to Buy Green Power: Nova Scotia* (Date unknown [cited March 13 2008]); available from http://www.pollutionprobe.org/whatwedo/greenpower/consumerguide/novascotia.htm.

[37] TerraChoice Environmental Marketing, *EcoLogo Program EcoBuyer Green Products Database* (2007c [cited April 30 2008]); available from http://www.ecologo.org/en/certifiedgreenproducts/?category_id=24#24.

[38] This discrepancy may illustrate the general difficulty in assessing whether a product is certified.

[39] Bullfrog Power's residential customers in Alberta and commercial customers in Ontario buy RECs rather than green power. However, Bullfrog did not distinguish the two programs in its reporting.

of 110 GWh per year. The stations were built in 1891 and 1900, and both underwent a major refurbishment in 2001.

Energy Ottawa sells green power to the federal department of Public Works and Government Services Canada but has indicated that publicly marketing their green power in the future may be a possibility. Energy Ottawa's green power product is not EcoLogo-certified[40].

In 2007, Energy Ottawa generated approximately 110 GWh, of which it sold 90 GWh to the federal government.[41] Also in 2007, Energy Ottawa applied for 56 t NO and 186 t SO_2 as set-aside reductions under Ontario's Emissions Trading Registry.[42] Energy Otttawa was awarded 11 t NO and 35 t SO_2 in set-aside reductions. The authors infer that the Government of Ontario determined that approximately 20% of Energy Ottawa's claimed incremental generation was eligible under the Trading Registry. Therefore, the authors consider 20% of Energy Ottawa's total generation as incremental green power to be consistent with the Government of Ontario's decision.

2.1.1.9 Ontario Power Generation Evergreen Green Power

The Ontario Power Generation (OPG) Evergreen Green Power fleet is comprised of 32 EcoLogo-certified generators, 29 of which are small hydroelectric and three of which are wind, as well as the non-EcoLogo-certified 6.1 MW capacity Eugenia Falls hydroelectric station. The EcoLogo-certified capacity is equivalent to 146 MW, while the total including the Eugenia Falls station is 152 MW.[43] The wind projects are the 9 MW Huron Wind Project, commissioned in 2002, the 1.8 MW Pickering Wind Generating station, commissioned in 2001, with a full list of hydro facilities available online.[44] OPG describes its Evergreen energy as originating from 100% EcoLogo-certified sources. However, in their most recent publicly available sustainability report, OPG categorizes its non-EcoLogo-certified 6.1 MW Eugenia Falls hydro plant as "Other Evergreen Energy Capacity," specifying that it is not EcoLogo-certified. This generation capacity is listed separately from the "Evergreen Energy" category.[45]

Approximately 2% of the electricity generated under the program comes from wind power, 6% from biomass and 92% from small hydro. All of this green generation is currently purchased by customers through the Evergreen program, although OPG does not claim the product to be EcoLogo-certified.

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[40] Chris Whitehead, Director of Generation, Energy Ottawa. April 2009.

[41] During earlier conversations, Energy Ottawa had indicated that all of Energy Ottawa's green power is sold to PWGSC. However, the difference between PWGSC's green power purchase and Energy Ottawa's generation was approximately 20 GWh in 2007.

[42] Ontario Emissions Trading Registry, *Notice of Emission Reduction* (Date unknown [cited September 11, 2008]); available from http://www.oetr.on.ca/oetr/search/noer_details.jsp?iNERID=7

[43] Pembina Institute, *Life Cycle Value Assessment (LCVA) of Pipeline and Roadway Routing Options for Firebag* (1998)

[44] Ontario Power Generation, *Evergreen Energy Plant Group* (2008 [cited April 30 2008]); available from http://www.opg.com/power/hydro/evergreen_energy/.

[45] Ontario Power Generation, *Sustainable Development 2006 Report* (2006) http://www.opg.com/pdf/Sustainable%20Development%20Reports/Sustainable%20Development%20Report%202006.pdf (last accessed April 30, 2008).

OPG used to offer three classes of green power: Evergreen Friendly, from older facilities not EcoLogo-certified; Evergreen Clean Green, comprising half old and half new EcoLogo-certified facilities; and Evergreen Pure Green, comprising electricity from only EcoLogo-certified facilities commissioned after 1990. Presently, OPG only offers one class of Evergreen power.

While the electricity sources for the remaining class of Evergreen program are all EcoLogo-certified, the products are not EcoLogo-certified. Because most of the Evergreen facilities were commissioned before 1991, they are only eligible for EcoLogo Type I electricity certification. If Evergreen were to EcoLogo-certify their green power products, they would have to ensure that each product comprises at least 50% Type II, III or IV electricity certification.[46]

Power from the Evergreen program is marketed only to businesses and green power resellers such as Oakville Hydro. Key customers include Oakville Hydro and Toronto and Region Conservation. OPG has indicated in their program brochures and information that customer demand was a major driver of the program, along with a desire within OPG to become a more sustainable company.[47]

2.1.1.10 Direct Energy Green Plan

Direct Energy sells green power to residential and commercial customers in Alberta and Ontario. The product is not EcoLogo-certified but all of the power is generated at EcoLogo-certified facilities. In Ontario, residential customers pay a premium that floats around $3.10/MWh for the equivalent of 100% of an average customer's electricity consumption. In Alberta, residential customers pay a premium that floats around $2.60/MWh for the equivalent of 15% of an average customer's electricity consumption (1,080 kWh). Prices for commercial customers are negotiated on an individual basis.

2.1.1.11 Alberta Energy Savings Green Energy Option (GEO)

Alberta Energy Savings declined to participate in the survey. According to the Alberta Energy Savings website[48], customers can purchase units of green power equal to 20% of an average household's electricity consumption. No reference to product certification is made explicit on the website.

2.1.1.12 Ontario Energy Savings Green Energy Option (GEO)

Ontario Energy Savings declined to participate in the survey. According to the Ontario Energy Savings website[49], customers can purchase units of green power equal to 20% of an average household's electricity consumption. No reference to product certification is made explicit on the website.

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[46] In the 2003 version of this report, Pembina stated, "OPG implies that all facilities and products are EcoLogo-certified, but this cannot be the case for "Evergreen Friendly Power" as the certification criteria require green power products to incorporate a minimum of 50% of power from facilities that began operations in 1991 or later (see Section 4.2.1)." OPG's website no longer implies EcoLogo certification.

[47] Ontario Power Generation, *Energy Solutions* (2003 [cited April 30 2008]); available from http://www.ontla.on.ca/library/repository/mon/7000/10316881.pdf.

[48] Alberta Energy Savings L.P., *How does GEO work?* (2008 [cited August 30 2008]); available from http://www.aeslp.ca/index.taf?t=2&n=312&lg=&_UserReference=F06C936AE57F5DB44914EB61.

[49] Ontario Energy Savings L.P., *How does GEO work* (2008 [cited August 30 2008]); available from http://www.oesc.ca/index.taf?t=1&n=300&lg=&_UserReference=4110BA944AAD53CA4914EB95.

2.1.2 Stand-alone Environmental Attributes Programs

Stand-alone environmental attributes programs are those programs whereby a utility or third party vendor sells the environmental and social attributes of green power separately from the electricity itself. The environmental attributes may incur an additional cost over and above the cost of the electricity; therefore, customers purchasing third party green power attributes actively and willingly pay a premium for the positive environmental and social attributes of the electricity.

There were five vendors in Canada that sold stand-alone environmental attributes in Canada in 2007: BC Hydro, Canadian Hydro Developers, EPCOR, the Pembina Institute and Bullfrog Power.

2.1.2.1 BC Hydro Green Power Certificates

BC Hydro is currently reviewing its green power certificates program, and certificates are not available for sale at this time.

From 2005 to 2007, BC Hydro offered green power certificates to its institutional, commercial and industrial customers, expanding on a program that was available since 2001 for large industrial and commercial customers). From the start of the program through 2001, the green power for these certificates was supplied by sources that met BC Hydro's green power certification. The technologies included the following:

- Low-impact biogas
- Low-impact biomass
- Low-impact hydroelectric
- Low-impact wave
- Low-impact wind

Additionally, any technology also needed to comply with BC Hydro's Green Criteria list (June 5, 2003).[50]

In 2002, BC Hydro switched to using EcoLogo as the certification criteria for the sources of the power that they sell through their Green Power certificates. The certificates, however, are not EcoLogo certified as an electricity product. Only a portion of BC Hydro's green power is EcoLogo certified. As reported in section 2.2.2.7 below, in 2008 44% of the electricity purchased by BC Hydro under its green power agreements was also EcoLogo certified.

Companies like CIBC, TransLink and Wal-Mart have made significant commitments toward GPC purchases. In fiscal year 2007 (ending March 31), 80 customers purchased over 67,000 MWh of Green Power through this program, a 50% increase from fiscal year 2006.

2.1.2.2 Canadian Hydro Developers Renewable Energy Certificates

Canadian Hydro Developers (CHD) sells environmental attributes of its electricity as Renewable Energy Certificates (REC) separately from the electricity they sell into the grid from their generating facilities. The RECs are generated at wind, run-of-river hydro and biomass facilities that are owned and operated by CHD in British Columbia, Alberta and Ontario. According to

[50] BC Hydro, *Green Criteria* (2003) http://www.bchydro.com/rx_files/info/info4793.pdf (last accessed April 30, 2008).

CHD, 20 facilities totalling 364 MW that it owns and operates are EcoLogo certified but the RECs themselves are not EcoLogo certified. CHD's RECs prominently display the EcoLogo, which may confuse the customer.

On a wholesale basis, utilities and institutions can purchase RECs at a negotiated price. During 2007, CHD sold approximately 600,000 MWh of RECs to a variety of customers in Alberta, British Columbia and Ontario. Most contracts are long-term contracts, meaning customer retention is near 100% from one year to the next. CHD wishes to keep the identity and number of its customers confidential.

2.1.2.3 EPCOR Green Power

EPCOR no longer provides a green power option for its customers. Since 2001, Alberta has moved from regulated electricity distribution to a competitive system, which resulted in EPCOR being unable to provide Green Power. EPCOR is a regulated rate provider and requires approval from the regulator for its rates and products. In 2004, EPCOR applied for and received approval to continue to provide service to the Green Power customers it had when retail competition started. EPCOR did not receive approval to offer the product to other customers. EPCOR has not pursued approval for new Green Power customers since "the sentiment in Alberta was that this should be a competitive product offered by competitive retailers only."[51]

EPCOR still provides Green Power to customers that purchased the service before the switch to competitive markets, but the number of customers has been steadily declining to a few hundred or less in 2007.[52] In 2007, Green Power sales were approximately 3,000 MWh.

2.1.2.4 Pembina Institute Green Power for Computers

Through summer of 2008, the Pembina Institute sold Bullfrog Power generated RECs derived from EcoLogo-certified facilities in denominations appropriate for computers. While Bullfrog's green power products are EcoLogo certified and provide the source of RECs for the Pembina Institute's Green Power for computers, the Pembina Institute's products sourced from TransAlta were not EcoLogo certified. The program began as a means of expanding renewable energy deployment in Canada with the overall objective of reducing greenhouse gas emissions. The Pembina Institute is in the process of transitioning its green power customers to Bullfrog Power.

Beginning in 2003, until the first half of 2007, Pembina retailed RECs in varying denominations (i.e., broader than only computers). However, a shortage of returns made justifying the administrative expense difficult. Pembina retailed RECs for $27/MWh and desktop computer-only RECs for $39/3yrs for 1.44 MWh (approximately $27.08/MWh) and laptop computer-only RECs for $18/3yrs for 1.44 MWh (approximately $12.50/MWh). The RECs were purchased from VisionQuest.

Residential customers constitute the majority (90% or 322 of 359 customers) of Pembina's customer base. Residential customers accounted for 9% of all MWh sold in 2007, while commercial customers accounted for 80%, industrial for 9% and institutional for 1% of sales. A total of 8,411 MWh was sold through the program in 2007.

[51] Don Gerke, Energy Services, EPCOR. May 1, 2008.

[52] Amanda Rosychuk, Energy Services, EPCOR. March, 2008.

Pembina recognizes the importance of EcoLogo certification for green power and Green Leaf certification for stand-alone environmental attributes. As a result of the lack of clarity around certification, combined with confusion between an EcoLogo-certified product and an EcoLogo-certified facility, the product that Pembina formerly sold was not EcoLogo-certified. This was not a deliberate decision; rather, Pembina did not sufficiently understand the certification and licensing process.

Pembina now encourages all marketers of green power products to participate in the certification process. Participating in such programs would be easier if the programs themselves were clearer. For example, most marketers appear to be confused by the difference between a certified facility and a certified product. TerraChoice's assertion that facilities themselves cannot be certified would be quite surprising to several of the marketers identified herein.

2.1.2.5 Bullfrog Power Renewable Energy Certificates

In addition to its green power sales directly to customers (see 2.1.1.7), Bullfrog Power sells stand-alone environmental attributes of green power as EcoLogo-certified green power certificates derived from other wind power or run-of-river hydropower to residential and commercial customers in Alberta and Ontario under its program, Bullfrogpowered.

Ontario commercial Bullfrog Power certificates retail at $0.03/kWh. In Alberta Bullfrog Power certificates (residential and commercial) retail at $0.02/kWh. More information about Bullfrog Power is included in section 2.1.1.7.

2.1.2.6 Green Tags Ontario

Green Tags Ontario began in 2002. According to one of the operators of the program who was a member of the Grey-Bruce Renewable Energy Co-op, the objective of the Green Tags Ontario program was to demonstrate the viability of a green power market in Ontario and to demonstrate that consumer interest in green power purchasing existed in the province. Once other groups offering green power and certificates started to appear, Green Tags Ontario felt that it had served its purpose and was no longer needed. It stopped operations in 2005.

The source of the attributes for the Green Tags Ontario program was the same 1.8 MW Ferndale, Ontario EcoLogo-certified wind turbine (commissioned in November 2002) used by the Selectpower Selectwind program. However, the actual Green Tags Ontario green power products were not EcoLogo certified.

The operator of the 1.8 MW wind turbine, Sky Generation's Glen Estil, indicated that from December of 2002 through 2005, Green Tags Ontario sold approximately 775,000 kWh of attributes in total, and that many residual customers became customers of Bullfrog Power after the closure of Green Tags Ontario (see sections 2.1.1.7 and 2.1.2.5 above).

2.1.2.7 Constellation New Energy NewMix Super

In early 2008, Constellation New Energy began selling stand-alone environmental attributes of green power to Canadian commercial and industrial customers. The product is GreenLeaf- and EcoLogo-certified. Constellation New Energy did not disclose the number of customers or the amount of stand-alone environmental attributes sold in 2008 (the program was not in operation in 2007). Constellation has offered its product in the US for several years and entered the Canadian market because of the business opportunity it recognized in Alberta and Ontario.

2.1.2.8 TransAlta Utilities

TransAlta sells green power (Green Energy®) and stand-alone attributes to approximately 10 customers in Canada and the US. Most of TransAlta's customers are wholesale customers, such as ENMAX (City of Calgary) and other non-disclosed customers.

TransAlta's Green Energy is EcoLogo-certified and Green-e-certified. However, TransAlta may reconsider the value of EcoLogo certification in a merchant market, such as now exists in Alberta. Some displeasure with the EcoLogo program also contributes to TransAlta's hesitation in renewing its EcoLogo certification.

In 2007, TransAlta generated approximately 550 GWh but did not offer any new contracts during that calendar year. Of the 550 GWh, 26 GWh were for the City of Calgary's Ride the Wind program.

2.1.3 Summary

Table 1: Summary of green power marketing programs

Program	Price	Sales in 2007 (MWh)	EcoLogo-certified product
Bundled Electricity and Environmental Attributes Programs			
ENMAX Greenmax	Did not disclose	549,000	Yes
SaskPower GreenPower	$25/MWh	30,000	Yes
Oakville Hydro Green Light Pact	$60/MWh	217	No
Maritime Electric Green Power	$2.5/MWh above market price	570	No
Select Power's Selectwind	$87/MWh	Not operational in 2007	No
Nova Scotia Power Green Power	$40/MWh	Not operational in 2007	No
Bullfrog Power	ON Res: $89/MWh	30,000[53]	Yes
Energy Ottawa	‡	90,000[Δ]	No
Ontario Power Generation Evergreen Green Power	‡	153,196	No

[53] Estimated by the Pembina Institute based on the average price premium, the number of customers and the average monthly fee that customers pay.

[Δ] Energy Ottawa generated 110,000 MWh and sold 90,000 MWh under its Green Energy program in 2007.

Program	Price	Sales in 2007 (MWh)	EcoLogo-certified product
Direct Energy Green Plan	‡	‡	Yes
Alberta Energy Savings Green Energy Option	‡	‡	No
Ontario Energy Savings Green Energy Option	‡	‡	No
TransAlta Green Energy and RECs	Varies	550,000	Yes
Stand-alone Environmental Attributes Programs			
BC Hydro Green Power Certificates	Varies	67,084	No
Canadian Hydro Developers Renewable Energy Certificates	Varies	600,000	No
EPCOR Green Power	‡	3,000	No
Pembina Institute Green Power for Computers	$27/MWh (desktops) $12.50/MWh (laptops)	8,411	No
Bullfrog Power Renewable Energy Certificates	ON: $30/MWh AB: $20/MWh	176,750[54]	Yes
Green Tags Ontario	‡	Not operating in 2007	No
Constellation New Energy	‡	Not operating in 2007	Yes
Total		~1,427,000	

‡ Data not available

* See Section 3 for estimates of Bullfrog Power sales, based on number of customers.

2.2 Green Power Acquisition Programs

This section covers the voluntary, target driven and regulated procurement and acquisition of green power by governments, utilities, and private sector entities. In these cases, the green power is not available for resale as a differentiated product.

[54] Estimated by the Pembina Institute based on the average price premium, the number of customers and the average monthly fee that customers pay.

2.2.1 Voluntary Green Power Procurement

Voluntary green power procurement is the purchase of significant amounts of green power to meet voluntary commitments made by organizations, utilities or governments.

For utilities and businesses, the motivation and objectives of this procurement vary, ranging from wanting to avoid future regulated constraints on greenhouse gas emissions while also gaining experience with innovative technologies to wanting to meet a corporation's sustainability objectives.

For governments, the motivation is usually to kick-start investment in renewable power sources and establish interest and experience in specific regions, or to meet sustainability objectives for their operations.

With utilities that are crown corporations, it can be difficult to distinguish utility green power procurement initiatives from government green power policies (section 5), as provincial governments often use their wholly owned electric utilities as instruments of policy.

Major government, utility and other green power acquisition programs are briefly described in the following sections with additional information provided in Appendix C. A summary table is provided at the end of this section for comparison across all programs. A list of companies that acquire green power though some of the green power marketing programs described in section 2.1 is provided in Appendix A.

2.2.1.1 Federal Government Power Purchase Agreements in Alberta, Saskatchewan, Ontario and Prince Edward Island

The federal government started purchasing green power for its own operations through a series of pilot programs that began in 1997 and continued through 2001. From 2001 through 2006, the federal government continued to purchase green power through its Purchases of Electricity from Renewable Resources (PERR) program. The Government of Canada's *Action Plan 2000 on Climate Change* and 2002 *Climate Change Plan for Canada* included a commitment to purchase 20% of the electricity used in Government of Canada operations as green power by 2010. In August 2005, the commitment was affirmed, but the timeline for achieving the 2010 goal was moved in implementation plans to 2008.

An audit completed in 2006 of the federal government's green power purchases concluded that the government has set up power agreements in Alberta, Saskatchewan, Ontario and Prince Edward Island under PERR. However, no federal green power purchases had been made in British Columbia, Nova Scotia, Newfoundland and New Brunswick, even though the program was intended to include those provinces. The audit also noted that by 2005/06 the program had achieved purchase agreements for 147.4 GWh, less than 35% of its 2010 green power target and that only $30 million of the $75 million allocated budget had been spent or committed in signed agreements.[55]

Table 2 indicates the main green power purchase agreements made under PERR and also by some departments acting on their own.

[55] Office of the Auditor General of Canada, *2006 September Report of the Commissioner of the Environment and Sustainable Development* (Ottawa, Canada: 2006) http://www.oag-bvg.gc.ca/internet/English/aud_parl_cesd_200609_e_936.html (last accessed March 27, 2008).

Table 2: Federal government green power purchase agreements (may be incomplete)

Federal government department	Green power provider	Timeframe for agreement	Purchases (MWh /year)
Environment Canada	ENMAX	November 8, 1997 – November 7, 2007	~2,200
Natural Resources Canada	ENMAX	January 9, 1998 – January 8, 2008	10,000
Natural Resources Canada	Sask Power Corporation	February 01, 2002 – January 31, 2012	25,000
Natural Resources Canada	Maritime Electric Company Limited	September 29, 2001 – September 28, 2011	13,000
Public Works and Government Services Canada	Energy Ottawa	May 4, 2004 – March 31, 2009	90,000
Public Works and Government Services Canada (on behalf of three departments)	ENMAX	January 1, 2007 – December 31, 2016	34,000
Totals (for 2007)			~174,000

(Source: Leslie Welsh, Environment Canada)

2.2.1.2 City of Calgary Ride the Wind and Other Acquisitions

Calgary Transit, owned and operated by The City of Calgary, purchases green electricity delivered by ENMAX, which has an agreement with TransAlta Wind (formerly VisionQuest WindElectric) to develop a program that provides enough green power to supply electricity for Calgary's light rail transit "CTrain" system. Calgary Transit has contracted with ENMAX to furnish 26,000 MWh/yr, which is sufficient electricity for the entire estimated demand of the CTrain system. The term of the contract is 10 years, ending in 2011.

In addition to the Ride the Wind program, the City of Calgary annually purchases 236,000 MWh for its operations.

2.2.1.3 Government of Alberta Green Power Purchase

In 2003, the Government of Alberta announced its intention to purchase 90% of its total electricity consumption from renewable sources as of January 1, 2005.[56] In 2005, the Government of Alberta purchased approximately 215,000 MWh of green power from wind and biomass sources through long-term contracts with ENMAX and Canadian Hydro Developers; these contracts were for 10 and 20 years respectively.

ENMAX' 76-MW McBride Lake wind project and Canadian Hydro Developers' 25-MW biomass cogeneration facility in Grande Prairie provide the majority of the power. [57, 58]

[56] Government of Alberta, *Alberta leads country in purchase of green power* (March 12 2003 [cited September 15 2008]); available from http://www.gov.ab.ca/acn/200303/14035.html.

[57] Alberta Infrastructure, *Environmental Initiatives* (2007 [cited September 15 2008]); available from http://www.infrastructure.alberta.ca/501.htm.

2.2.1.4 Alberta Municipal Services Corporation Electricity Aggregation

The Alberta Municipal Services Corporation procures electricity in bulk order for municipalities across Alberta. From 2004 through 2008, the municipalities set a minimum of 20% renewable energy content in the contracts. In 2009, the minimum renewable content will no longer apply and municipalities will choose individually how much renewable electricity they wish to purchase.

2.2.1.5 Government of Ontario Green Power Purchase

In 2003, the Government of Ontario announced its intention to procure at least 20% of its own electricity consumption from renewable sources.[59]

2.2.1.6 Yukon Wind Feasibility Pilot Program

The Yukon government invested a total of $3,000,000 in a wind feasibility pilot program, which includes a 150-kW wind turbine and a 660-kW wind turbine. In 2007, the pilot program generated 371 MWh, which were fed directly into the grid and not sold as green power at a premium. Since the construction of the first turbine, a total of 7,300 MWh have been generated.

Table 3: Summary of voluntary green power procurement initiatives active in 2007

Program	Purchases in 2007 (MWh)
Federal government, Alberta, Saskatchewan, Ontario and Prince Edward Island green power purchase agreements	174,000
City of Calgary – green power acquisitions	262,500 (26,000 are for the Ride the Wind program.)
Government of Alberta green power purchase	~215,000
Alberta Municipal Services Corporation Electricity Aggregation	70,000
Government of Ontario green power purchase	20% of electricity use (actual amount unknown)
Yukon wind feasibility pilot program	400 (pilot)
Total (estimate)	~721,000 + 20% of Government of Ontario electricity use

2.2.2 Target-driven Procurement of Green Power

Several large Canadian electric utilities including SaskPower, Hydro Quebec, Manitoba Hydro and New Brunswick Power have established green power generation facilities and/or purchases of green power from independent producers in response to government policies or targets. The

[58] CBC News, *Alberta government increasing green power stake* (2003 [cited May 22 2008]); available from http://origin.www.cbc.ca/news/story/2003/03/13/altagree_030313.html.

[59] Ontario Ministry of Energy, *Ontario's Progress on Clean Energy, Conservation and Alternative Fuels* (2007 [cited May 22 2008]); available from www.energy.gov.on.ca/index.cfm?fuseaction=archives.news2&back=yes&news_id=16&backgrounder_id=21.

green power is blended with conventional power in the electricity product offered to all consumers, with any cost premiums being recovered from the entire consumer base.

While not a legally binding requirement like a Renewable Portfolio Standard (see section 2.2.3 below), the impact is similar.

2.2.2.1 Alberta 2001 Climate Change Plan

In 2001, the Government of Alberta unveiled a climate change plan that included a goal for "increasing the renewable and alternative energy portion of total provincial energy capacity by 3.5% by 2008." This is equivalent to approximately 560 MW of new capacity.

Since 2001, a total of 439 MW of wind, 6 MW of biogas and 30 MW of wood-waste fired biomass cogeneration capacity have been installed in Alberta.[60] Sufficient information to determine whether these sources meet the criteria suggested for the program is not available. In 2007, 139 MW of wind capacity were installed. According to the Clean Air Strategic Alliance (CASA), Alberta was expected to exceed the 2008 target. CASA attributes the success in meeting the target in part to the "federal government's tax and production incentives".[61]

CASA recommended criteria for projects to be included under the umbrella of the 560 MW goal. The Alliance recommended that qualifying facilities greater than 5 MW should be EcoLogo "compatible" (not necessarily EcoLogo "certified"), with a GHG intensity below 418 kg / MWh.[62] CASA also recommended that the target be based on energy rather than installed capacity because an energy-based target would lead to more renewable energy than a capacity-based target.

Alberta's 2008 climate change plan does not mention this target of 3.5% or 560 MW mentioned in the 2001 plan.[63]

2.2.2.2 Manitoba Hydro RFPs

Manitoba Hydro sources the majority of its electricity from large (>200 MW) hydro projects. Large hydro is not considered a green power source in this report and Manitoba Hydro has not attempted to market green power to its customers for this reason.

Nonetheless, wind power does meet Manitoba Hydro's objective of increasing reliance on renewable energy sources. In 2005, the Province of Manitoba and Manitoba Hydro announced an intention to develop 1,000 MW of wind power by 2015.[64] Manitoba Hydro states that "since

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[60] Alberta Energy, *Electricity Statistics* (April 17 2008 [cited May 22 2008]); available from http://www.energy.gov.ab.ca/Electricity/682.asp.

[61] Clean Air Strategic Alliance Renewable and Alternative Energy Project Team, *Recommendations for a Renewable and Alternative Electrical Energy Framework for Alberta* (March 2007); available from http://www.casahome.org/wp-content/uploads/2007/05/RAreport29May2007_FINAL_incl-BoardRevisions.pdf (last accessed April 3, 2009).

[62] Clean Air Strategic Alliance *Electricity* Project Team, *An Emissions Management Framework for the Alberta Electricity Sector Report to Stakeholders* (2003) http://www.casahome.org/wp-content/uploads/2006/10/Emissions_Mgmt_Framework.pdf (last accessed May 22, 2008).

[63] Government of Alberta, *Alberta's 2008 Climate Change Strategy - Responsibility / Leadership / Action* (2008a) http://environment.gov.ab.ca/info/library/7894.pdf (last accessed May 22, 2008).

[64] Government of Manitoba, "Energy Minister Announces Next Step in Plan to Further Harvest Manitoba's Wind-Power Potential," (2005).

1990, to increase our reliance on renewable generation and to reduce our own GHG emissions we have committed to purchase output from a 100 MW wind farm."[65] Also in 2005, Manitoba Hydro entered a contract with St. Leon wind farm based on its general power procurement process. During 2007, the St. Leon wind farm's 63 turbines contributed a total of 374 GWh to the Manitoba grid.

In March 2008, Manitoba Hydro announced that it has completed a review of 10 shortlisted proponents that submitted bids in response to Manitoba Hydro's RFP for 300 MW of new wind power.[66]

2.2.2.3 Hydro Quebec RFPs

In 2003, Hydro-Quebec issued its first RFP calling for 1,000 MW of wind power specifically to be developed in the Gaspésie region. Hydro-Quebec signed contracts for 990 MW of wind power capacity as a result of those tenders, to be developed between 2006 and 2012. The RFPs were mandated by the provincial government and required successful bids to contain minimum levels of local content. The process was perceived as an effort to help diversify the economy in the Gaspésie as well as establish wind turbine manufacturing in the province of Quebec.

Hydro-Quebec released its second RFP on October 31, 2005, calling for 2,000 MW of wind-generated capacity. It received 66 bids from 25 developers for a total of 7,724 MW. This RFP resulted in contracts awarded to 15 bidders in May of 2008 for an additional 2,004 MW of wind power capacity, to be commissioned from 2011 to 2015.

In May 2006, the Government of Quebec announced its goal of 4,000 MW of new wind power by 2015, 500 MW of which would come through a tender process from independent power producers.[67] Hydro-Quebec also purchases biomass electricity from Tembec, Boralex, Bowater and Kruger.[68]

2.2.2.4 New Brunswick Power Embedded Generation Program

New Brunswick Power is still considering options before launching the program and was not able to provide information about the program.

2.2.2.5 SaskPower Procurement of Green Power Not Sold under GreenPower Program

In the spring of 2003, SaskPower announced its Green Power Portfolio strategy, which ensures that Saskatchewan's electricity needs through 2010 will be met by environmentally responsible sources that avoid any increase in SaskPower's total greenhouse gas emissions. Currently the Green Power Portfolio consists of SaskPower's 150-MW Centennial Wind Power facility

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[65]Manitoba Hydro, *Performance Report* (2006) http://www.hydro.mb.ca/environment/greenhouse_gas/performance.shtml (last accessed March 11, 2006).

[66] Manitoba Hydro, *Manitoba Hydro Progresses in Evaluation of Wind Energy Proposals* (March 31, 2008 [cited April 24 2008]); available from http://www.hydro.mb.ca/news/releases/news_08_03_31.shtml.

67 Government of Quebec. *Le gouvernement dévoile la stratégie énergétique du Québec 2006-2015* (May 4, 2006 [cited September 22, 2008); available from http://www.premier-ministre.gouv.qc.ca/salle-de-presse/communiques/2006/mai/com20060504_en.shtml

http://www.premier-ministre.gouv.qc.ca/salle-de-presse/communiques/2006/mai/com20060504_en.shtml

[68] Félix Paré. Email, April 24, 2008.

(commissioned in March 2006), a series of solicitations over three years to obtain up to 45 MW of Environmentally Preferred Power (EPP) through competitive bids, and customer-based energy efficiency and conservation initiatives.[69]

In 2003, SaskPower's first solicitation for 15 MW of EPPs received a very encouraging response with 52 project proposals representing 169.9 MW of capacity. SaskPower evaluated the proposals and, through consistency with the original call for up to 15 MW, it selected two wind projects (8 MW) and a heat recovery project (5.1 MW)[70] totalling 13.1 MW of capacity. One of the wind projects (5.4 MW) subsequently withdrew. A second solicitation in 2005/2006 was intended to procure up to 32 MW of additional EPP.[71] Four projects were selected from that solicitation – three heat recovery projects (5.1 MW each) and one wind power project (24.75MW).

Environmentally preferred technologies include wind, low impact hydro, biomass, biogas, flare gas, heat recovery from an existing heat source and solar. Criteria are based on SaskPower definition.[72]

2.2.2.6 Ontario Power Authority RFPs

Another acquisition program intended to help Ontario meet its renewable energy supply targets, the Ontario Power Authority Renewable Energy Supply procurement process, has occurred in two phases to date: the RES I RFP, issued April 2004, with winners announced November 2004, and RES II, issued June 2005 with winners announced November 2005. A third phase, RES III, is planned for the first quarter of 2008 as part of the Ontario Ministry of Energy's directive to the Ontario Power Authority to procure 2,000 MW of renewable energy for projects greater than 10 MW in size.

The RES I RFP, intended to procure 395 MW of renewable energy capacity, included wind, solar photovoltaic, small hydro, biomass and landfill gas generators between 0.5 and 100 MW in size. The RES II RFP sought to procure 975 MW in capacity from the same sources, for projects between 20 MW and 200 MW in size.

The total capacity installed under the program by the end of 2007 included 471.1 MW of wind capacity, 1.6 MW of biogas capacity (anaerobic digester), 8 MW of small hydroelectric capacity and 7.5 MW of landfill gas capacity.

2.2.2.7 BC Hydro RFPs

In February 2007, the Government of British Columbia released its *BC Energy Plan: A Vision for Clean Energy Leadership*, which indicated that at least 90% of all electricity generated in the province must continue to come from clean or renewable sources. The *BC Energy Plan* also

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[69] SaskPower, *Strategies for Closing the Gap* (2007 [cited May 22 2008]); available from http://www.saskpower.com/poweringyourfuture/tomorrow/strategies.shtml.

[70] Heat recovery projects are not considered "green power" as defined herein. Some jurisdictions may define "green power" less stringently than herein.

[71] SaskPower, *Environmentally Preferred Power Program - Second Phase Public Overview* (Date unknown-a [cited May 8 2008]); available from http://www.saskpower.com/poweringyourfuture/tomorrow/pubs/eppoverviewp2.pdf.

[72] Ibid.

requires self-sufficiency to meet electricity needs by 2016, prohibits nuclear generation and establishes a zero emission standard for greenhouse gas emissions from coal-fired plants.[73]

As part of meeting these requirements, BC Hydro issued a Clean Power Call on June 11, 2008. BC Hydro has indicated that it expects to acquire about 5,000 GWh per year of seasonal and hourly firm energy from the Clean Power Call.[74] The criteria to meet the province's "clean or renewable energy" requirements are being reviewed in draft form by stakeholders. These draft definitions indicate that qualification can be met through Environmental Choice certification, meeting the definitions developed by the government (these draft definitions include Energy Recovery Generation, hydrocarbon generation with zero greenhouse gas emissions, as well as more typical renewable definitions), or recognized by the Minister of Energy, Mines and Petroleum Resources as meeting the definition for clean or renewable.[75] The final version of the clean energy criteria were included in the Clean Power Call.

BC Hydro is also developing a call for bioenergy power. This will be a two-phase approach. The request for proposal (RFP) for Phase I, issued in February 2008, is for projects that are immediately viable and do not need new tenure from the Ministry of Forests and Range. BC Hydro plans to release the RFP for Phase II in July 2008, pending completion of an ongoing biomass inventory and forest tenure analysis currently being undertaken by the Ministry of Forests and Range.

BC Hydro developed Electricity Purchase Agreements with renewable facilities in two of its earlier requests for power. In 2006, the utility issued an Open Call for Power. This call did not specify criteria for facilities, but at the time the utility was operating under the provincial government's direction for electricity distributors to pursue a voluntary goal to acquire 50% of new supply from BC Clean Electricity.[76] The 2006 call resulted in 38 contracts being awarded, including 29 hydro, three wind, two biomass, two waste heat and two coal/biomass projects.[77] The coal/biomass projects were subsequently cancelled following the 2007 BC Energy Plan, which establishes a zero emission standard for greenhouse gas emissions from coal-fired plants.

In 2002/03, BC Hydro issued a green power generation request for generation (RFG). Key requirements included the following:

- **Renewable:** The energy source must be replenishable by natural processes within a reasonable length of time: within about one average human life span. For example,

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[73] Government of British Columbia, *The BC Energy Plan* (Date unknown [cited April 1 2008]); available from http://www.energyplan.gov.bc.ca/bcep/default.html#7.

[74]BC Hydro, *Clean Power Call* (2007 [cited March 20 2008]); available from http://www.bchydro.com/info/ipp/ipp48319.html.

[75]BC Ministry of Energy Mines and Petroleum Resources, *British Columbia's Clean or Renewable Electricity Guidelines* (2008) http://www.em.gov.bc.ca/AlternativeEnergy/cre_defs.pdf (last accessed April 23, 2008).

[76] The government direction was from the 2002 Energy Plan, *Energy for our Future: A plan for BC.* http://www.gov.bc.ca/empr/popt/energyplan.htm.

The B.C. Clean Electricity Guidelines can be found at www.em.gov.bc.ca/AlternativeEnergy/Clean_Energy_2005.pdf (last accessed April 2008).

[77] BC Hydro, *BC Hydro Awards Energy Contracts* (2006) http://www.bchydro.com/news/2006/jul/release47609.html (last accessed April 4, 2008).

hydroelectric generation relies on water, which is a renewable resource. Natural gas electrical generation relies on a fossil fuel, a resource that does not meet this renewable criterion.

- **Licensable:** The project must meet all relevant regulations and standards.
- **Socially responsible:** The project must be developed in a socially responsible manner. This criterion must be judged on a site-specific basis. Every project within BC Hydro's green acquisition process is reviewed according to specific social responsibility criteria.
- **Low environmental impact:** The project must avoid unacceptably high environmental impacts such as damage to fish populations, endangered species or air quality. This criterion is evaluated on a site- and technology-specific basis. Every green project within BC Hydro's acquisition process is reviewed according to the criteria that correspond to the project's technology.[78]

More detailed description of the criteria used is included in 2002/03 Green Power Generation Green Criteria.[79]

The 2002/03 procurement process resulted in the approval of 16 projects 14 hydro, one landfill gas and one wind energy — representing 1,764 GWh of new generation, to be purchased by BC Hydro under 10- to 20-year contracts. As of 2007, these approvals have lead to the installation of 120.2 MW of storage hydro capacity, 1.85 MW of biogas capacity, 14.8 MW of non-storage hydro capacity, and 20.4 MW of biomass capacity.

Table 4 reports the generation from green power procured from BC Hydro's calls for power in 2001, 2002, and 2003.[80]

Table 4: BC Hydro Green Power Acquisitions (MWh)

	F2006			F2007			F2008		
Call	Total Green	With Eco-Logo	Eco-Logo Share	Total Green	With Eco-Logo	Eco-Logo Share	Total Green	With Eco-Logo	Eco-Logo Share
2001	516,268	150,097	29%	612,211	207,365	34%	664,907	229,591	35%
2002	131,976	131,976	100%	115,969	115,969	100%	129,028	129,028	100%
2003	5,649	0	0%	25,193	5,077	20%	46,058	14,319	31%

Source: Lui (2008)

[78] BC Hydro, *2002/03 Green Power Generation Green Criteria* (2004 [cited April 30 2008]); available from http://www.bchydro.com/info/ipp/ipp959.html..

[79] BC Hydro, *Green Criteria*

[80] For more discussion about the 2001 Call for Power, refer to Johanne Whitmore and Matthew Bramley, *Green Power Programs in Canada - 2003* (The Pembina Institute, 2004) http://www.pembina.org/pub/173 (last accessed March 27, 2008).

2.2.2.8 BC Hydro Standing Offer Program

While not active in 2007, BC Hydro's Standing Offer Program indicates the support for this type of initiative for encouraging renewable energy. BC Hydro was directed to develop a standing offer program for clean electricity projects under 10 megawatts (MW) in the provincial government's 2007 *BC Energy Plan: A Vision for Clean Energy Leadership*. One of the goals of the program is to reduce the administrative burden of participation for small developers. Draft rules have been developed for this program and include the following key eligibility criteria:

1. The Project must have a Nameplate Capacity of greater than 0.05 MW but not more than 10 MW.
2. The Project, and any Common Generation Facility that the Project is a part of, if applicable, and all energy generated from the Project and the Common Generation Facility must be Clean, Renewable or High Efficiency Cogeneration. The definitions for clean, renewable and high efficiency cogeneration will be defined by British Columbia Ministry of Energy, Mines and Petroleum Resources or any successor Ministry thereto.
3. Projects must be located in British Columbia, which includes Canadian and British Columbia territorial waters.[81]

This program was launched in the spring of 2008.

Table 5: Summary of target-driven green power procurement initiatives active in 2007[82]

Program	Cost recovery mechanism	Facility certification	Resources installed by the end of 2007 under the Program
Alberta 2001 Climate Change Plan	Rate-recovery	None	139 MW
Manitoba Hydro RFPs	Rate-recovery	None	99 MW
Hydro Quebec RFPs	Rate-recovery	None	None
New Brunswick Power Embedded Generation Program	To be determined	To be determined	None
SaskPower	Rate-recovery	None	175 MW[83]

[81] BC Hydro, *Standing Offer Draft Program Rules* (2008b) http://www.bchydro.com/rx_files/info/info54864.pdf (last accessed April 30, 2008).

[82] In its 2001 climate change plan, Alberta committed to increasing the renewable and alternative energy portion of electricity capacity by 560 MW by 2008.(Government of Alberta, *Albertans & Climate Change - Taking Action* (2002) http://environment.gov.ab.ca/info/library/6123.pdf (last accessed May 22, 2008).) However, there are no specific programs arising from this target to discuss herein.

The province further stated that 12.5% of all electricity would be derived from renewable and alternative sources. However, in 2006, only 880 GWh were derived from hydro and 920 GWh were derived from other renewables out of 64,170 GWh of total generation in the province (Environment Canada, *National Inventory Report 1990-2006* (2008a)). Thus, in 2006, only approximately 3% of electricity was generated from renewables, even include large hydro, which is not considered to be low impact.

Ontario Power Authority Renewable Energy Supply procurement process	Rate-recovery		471.1 MW of wind capacity, 1.6 MW of biogas capacity (anaerobic digester), 8 MW of small hydroelectric capacity and 7.5 MW of landfill gas capacity.
BC Hydro Calls for Renewable Energy 2007	Rate-recovery	Environmental Choice, or MEMPR recognized	Not active in 2007
BC Hydro Calls for Renewable Energy F2006	Rate-recovery	Environmental Choice, or MEMPR recognized	No capacity built as of 2007
BC Hydro Calls for Renewable Energy 2002/03	Rate-recovery	EcoLogo	120.2 MW of storage hydro capacity, 1.85 MW of biogas capacity, 14.8 MW of non-storage hydro capacity, 20.4 MW of biomass capacity
BC Hydro Standing Offer Program	Rate-recovery	Must meet MEMPR definition	Not active in 2007
Total (estimate)			~1,130 MW

2.2.3 Regulated Green Power Procurement (Utility Rate Base)

This section covers green power that is procured by utilities as part of their mix of generation sources to meet a government directive or regulation, Renewable Portfolio Standard or a requirement to guarantee access to green power at premium prices (feed-in tariff or standard offer). The motivations for and objectives of regulated procurement vary but include establishing a green power industry, accelerating the deployment of renewable power, avoiding future greenhouse gas emissions and gaining experience with innovative technologies.

The acquired green power is blended with conventional power in the electricity product offered to all consumers, with any cost premiums being recovered from the entire consumer base.

Each program is briefly described in the following sections with additional information provided in Appendix C. A summary table is provided at the end of this section for comparison across all programs.

2.2.3.1 Ontario Renewable Energy Standard Offer Program

The Renewable Energy Standard Offer Program (RESOP) is a program operated by the Ontario Power Authority (OPA) that allows generators of grid-connected renewable electricity in the province of Ontario (and some non-grid connected micro-generation) to sell the electricity that they generate.

[83] SaskPower's heat recovery projects are not included in this total.

The program became active in November 2006 as a result of a ministerial directive to the Ontario Power Authority to implement a Standard Offer Program. The objective of the program is to help the province meet its renewable energy supply targets by procuring more renewable electricity and providing small electricity generators standard and stable pricing, as well as a streamlined process for connecting to the grid. The ministerial directive was issued in support of the Ontario government's two renewable energy targets announced in 2004. These targets are for the province to produce five per cent of its electricity from renewable sources by 2007 and ten per cent by 2010.[84] The program is also intended to help the OPA meet its longer-term objectives for renewable capacity outlined in the OPA Integrated Power System Plan.

The RESOP allows generators of qualifying renewable energy with a nameplate capacity equal to or less than 10 MW and connected to the electricity distribution grid (50 kV or less) to enter into a 20-year contract with the Ontario Power Authority. Eligible technologies include solar photovoltaic, solar thermal electric, wind power, renewable biomass and biogas, and hydroelectric power. Generators can include residential participants, corporations and institutions, excluding Ontario Power Generation.

The program pays generators $0.42/kWh for solar photovoltaic electricity and $0.11/kWh for all other eligible electricity, as well as a $0.0352/kWh on-peak performance incentive for qualifying generators (excludes wind and solar). Any and all environmental benefits that may arise through the project's electricity production are transferred to the OPA, but the participating generators are not eligible to obtain allowances from the Ontario Emissions Trading System's Renewable and Conservation NO_x and SO_2 Allowance Set-Asides.

Energy Ottawa has a contract with the Ontario Power Authority to purchase 100% of the output electricity and environmental attributes from their new Trail Road landfill gas generation station over the next 20 years (until 2027).

For a complete list of all operating contracted sources and all contracted sources under development, as well as a list of those resources installed during 2007, please see the information in Appendix C.

2.2.3.2 Nova Scotia Power Renewable Energy Solicitation

Nova Scotia's 2001 Energy Policy established a Renewable Energy Standard, which led to a 2004 Renewable Energy Solicitation. By 2007, Nova Scotia Power had 87 MW of renewable energy sourced from independent power producers. The bulk of the 87 MW was wind power.[85]

In February 2007, Nova Scotia's new Renewable Energy Standards were enacted. These standards call for renewable energy increases of five per cent to the total supply by 2010, and 10 per cent by 2013, on top of renewables already in the system as of 2001. The province estimates that by 2013, "almost 20 per cent of Nova Scotia's electricity will be generated by renewable energy — wind, tidal, biomass, solar and hydro.[86]

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[84] Ontario Ministry of Energy, *Targets and Progress* (2006 [cited Apirl 30 2008]); available from http://www.energy.gov.on.ca/index.cfm?fuseaction=renewable.targets.

[85] Emera Inc, *Generating Results: Annual Financial Report 2007* [cited October 1, 2009]; available from http://www.snl.com/Cache/5892166.PDF?D=&O=PDF&IID=4072693&OSID=9&Y=&T=&FID=5892166

[86] Government of Nova Scotia, *Province Commits to Green Energy Market Reform* (2007 [cited April 30 2008]); available from http://gov.ns.ca/news/details.asp?id=20070125002.

In March 2007, Nova Scotia Power issued an RFP that is intended to add 130 MW of renewable energy capacity to its mix.[87] Nova Scotia Power currently has about 400 MW of renewable capacity, including wind, tidal, biomass, biogas and hydropower. The RFP includes two size categories for development:

- Category A Transmission connected developments (100 –130 MW)
- Category B Distribution connected developments (i.e., 12, 25kv) – (15 – 30 MW)

The renewable criteria are based on the federal government's ecoEnergy for Renewable Energy program. Specifically, the RFP states:

> For category A and category B proposals that meet the qualifying criteria for the new ecoEnergy for Renewable Power program, and to the extent that the new ecoEnergy for Renewable Power program is available for project registration, the developer must show evidence that they have done everything necessary to have their projects in queue for this incentive.[88]

To date, Nova Scotia Power has signed power purchase agreements with several wind power projects: one with 60 MW capacity, another with 51 MW capacity, another with 6 MW capacity, another with 45 MW capacity and a 22 MW capacity project. The total capacity of power purchase agreements signed so far as a result of the RFP is 184 MW.

2.2.3.3 Prince Edward Island Renewable Portfolio Standard

In 2004, the government of Prince Edward Island passed the Renewable Energy Act. This act required that utilities acquire at least 15% of electrical energy from renewable sources. In the April 2008 Speech from the Throne, the PEI government committed to developing 500 MW of wind power[89], which exceeds the previous RPS of 100% or approximately 250 MW.

In December 2005, the government approved the minimum Purchase Price regulations as a means to achieve the RPS.[90] The main objectives of the program are to reduce the greenhouse gas emission intensity of electricity generation, increase Prince Edward Island's autonomy over electricity supply and increase economic development.

This program mandates that utilities pay a minimum of 7.75 cents/kWh for electricity generated by renewable sources. The minimum purchase price applies to both new and existing generation. The Province owns 40.56 MW of installed wind generation capacity, while the private sector owns 29 MW of installed wind generation capacity with plans for an additional 80 MW. All of the generation from public facilities and most of the generation from private sector facilities is sold under the minimum purchase price to Maritime Electric and then to its customers. The City of Summerside's utility also purchases some generation from private sector.

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[87] Nova Scotia Power, *Renewable RFP* (2005 [cited April 30 2008]); available from http://www.nspower.ca/environment/green_power/renewable_energy_solicitation/renewableRFP.shtml.

[88] Nova Scotia Power, *Request for Proposal for 130 MW of Renewable Energy* (2007) http://www.nspower.ca/documents/NSPI%20Renewable%202007%20RFP.pdf (last accessed April 30, 2008).

[89] Hagerman, Barbara, *One Island Community One Island Future* (April 4, 2008) http://www.assembly.pe.ca/speech/2007/speech07.pdf (last accessed April 3, 2009)

[90] PEI Ministry of Environment Energy & Forestry, *Renewable Energy Act Proclaimed and Regulations Passed* (2005 [cited April 30 2008]); available from http://www.princeedwardisland.com/news/getrelease.php3?number=4419..

PEI's Renewable Energy Act mandates that the provincial government automatically retains the rights to the environmental attributes of green power generated within the province. However, the Province has the right to sell the environmental attributes at its discretion. For example, a green power marketer would have to purchase environmental attributes from the province to resell the attributes to green power customers. For such a situation to maintain its legitimacy, the attributes must not be retired until they reach the final customer. Without certification, proving that the attributes have not been retired until they reach the final customer may be difficult, or worse they may be double counted. It is not clear if this applies to sales of green power by Maritime Electric to various customers, but without certification cannot be proven one way or the other.

2.2.3.4 New Brunswick Power – Commitment to Purchase up to 300 MW of Wind Energy

In 2005, New Brunswick Power announced its intention to purchase as much as 400 MW of wind power capacity across New Brunswick by 2016. The purchase plan sought EcoLogo-certified wind power capacity in geographically dispersed high-wind areas to mitigate the impacts of wind variability on overall instantaneous power production. This plan was developed primarily to help meet New Brunswick's Renewable Portfolio Standard of 10% of electricity from renewable sources by 2016.[91]

Since the original announcement, an RFP for the procurement of 300 MW of wind power by 2010 has been launched to accelerate the acquisition of the original 400 MW.

The RPS begins at 1% in 2007 and increases linearly to 10% in 2016. However, none of the electricity sold in 2007 was eligible under the RPS. Therefore, the Renewable Electricity Act appears to have been contravened.

Table 6: Summary of regulated green power procurement initiatives active in 2007

Program	Cost recovery mechanism	Facility certification	Resources installed by the end of 2007 under the program
Ontario Renewable Energy Standard Offer Program	Rate-recovery	Unknown	2.775 MW wind 16.64 MW landfill gas 0.32 MW solar 5.08 MW small hydro 0.23 MW biogas
Nova Scotia Power Renewable Energy Solicitation	Rate-recovery	Must be able to qualify for ecoEnergy for Renewables	Data not available
Prince Edward Island Minimum Purchase Price	Rate-recovery	Unknown	69.56 MW wind
New Brunswick Power Commitment - 300 MW of	Rate-recovery	Must comply with Type III EcoLogo	None in 2007 300 MW by 2010

[91] New Brunswick Electricity Act (O.C. 2006-274), Regulation 2006-58, (filed July 27, 2006) http://www.gnb.ca/0062/regs/2006-58.htm (last accessed April 3, 2009)

wind energy by 2010		certification	
Total (estimate)			~95 MW

3. Environmental Benefits of Green Power Marketing Programs

3.1 Context

3.1.1 Greenhouse Gases

Climate change caused by anthropogenic sources of greenhouse gases is among the biggest challenges humankind currently faces. National and international efforts to reduce GHG emissions have, to date, been insufficient to meet targets set under the Kyoto Protocol. While some countries aggressively pursue ambitious targets to reduce emissions, other countries' emissions increase at alarming rates.

Canada's federal and provincial attempts to reduce emissions have not been sufficient to meet its commitments under the Kyoto Protocol. Emissions in the energy sector continue to rise. In 2006, Canada's electricity and heat generation sector was responsible for 117 Mt CO_2e or 16% of the country's GHG emissions.[92] Therefore, reducing the GHG-intensity of electricity generation is of utmost importance.

3.1.2 Criteria Air Contaminants

The air quality contaminants of concern are acid deposition precursors (SO_2 and NO_x), ground level ozone precursors (NO_x and VOCs) and particulate matter (total suspended particulate, PM_{10} and $PM_{2.5}$).

Acid deposition occurs following a reaction involving NO_x and SO_2 and is responsible for impacts on lakes, forests, crops, and buildings.[93]

Sulphur dioxide (SO_2) is among the most significant pollutants in Canada and is emitted by burning fuels containing sulphur (such as diesel) or in the process of removing sulphur from fuel itself. Major contributing sources include diesel-powered vehicles,[94] metal smelters and refineries. Emissions of SO_2 from non-diesel motor vehicles are considered negligible.

Health effects of high concentrations of SO_2 include discomfort while breathing, respiratory illness (exacerbating existing respiratory and cardiovascular diseases) and irritation of the "lungs' normal defences".[95] Sulphur dioxide also reacts with NO_x to form acid deposition (acid rain).

Nitrogen dioxide (NO_2) forms when nitrogen oxide (NO) emitted during combustion processes reacts naturally with the air. Nitrogen oxide and NO_2 are collectively referred to as nitrogen oxides (NO_x) in this report to reflect general usage.

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[92] Environment Canada, *National Inventory Report 1990-2006* Table S-3

[93] Pembina Institute, *Life Cycle Value Assessment (LCVA) of Pipeline and Roadway Routing Options for Firebag*

[94] Vehicles powered by low-sulphur diesel have reduced sulphur emissions.

[95] New Brunswick Department of Environment, "Air Quality Monitoring Results in New Brunswick for the year 2004," in *Environmental Reporting Series* (Fredericton, NB: 2006).

Nitrogen oxides are addressed under "acid deposition precursors" as well as "ground-level ozone precursors" in this report to increase readability and to allow the reader to quickly search for emissions by type and associated health impact.

Nitrogen dioxide can irritate the lungs, compromise resistance to respiratory infection, provoke cardiac arrhythmias and cause other respiratory symptoms. NO_2 may adversely affect various materials (e.g., metal corrosion, rubber degradation, etc.) and vegetation. It is a precursor to acid deposition (upon reaction with SO_2) and ground-level ozone (upon reaction with volatile organic compounds and ultraviolet light).

Volatile Organic Compounds (VOCs) are generated by organic chemicals, such as hydrocarbons, that have a tendency to evaporate (volatilize) when exposed to atmospheric conditions during activities such as pumping and transferring hydrocarbon fuels. VOCs are also emitted during a variety of industrial processes and in vehicle exhaust.

Some VOCs are known or suspected carcinogens while others may be toxic. Through non-linear photo-oxidation processes, VOCs react with NO_x and ultraviolet light to form ground-level ozone.

Particulate matter (TSP, PM_{10}, and $PM_{2.5}$) refers to microscopic particles (PM_{10} particles are 10 micrometres or less in diameter; $PM_{2.5}$ are 2.5 micrometres or less in diameter) that become airborne (including dust). Typical sources of particulate matter include construction works, combustion of diesel fuels and biomass (wood), and windstorms. Particulate matter also forms through chemical reactions between compounds such as SO_2 and NO_x.

Adverse effects of particulate matter include exacerbation of asthma and other respiratory conditions and reduced visibility. Particulate matter less than 10 micrometres in diameter (PM_{10}) are considered "inhalable" and can irritate the lungs and adversely affect the membranes and air sacs that absorb oxygen (alveoli). $PM_{2.5}$ may enter pathways through which PM_{10} could not pass. Particulate matter may also act as a substrate for other pathogens (bacteria and viruses) and contaminants.

Odour and noise are considered components of the atmospheric environment but are beyond the scope of this analysis.

3.1.3 Quantitative Approach

The following section presents a quantitative analysis of the green power programs described in Section 1, in terms of their contribution in 2007 to (i) each province or territory's electricity production, and (ii) estimated reductions of emissions of GHGs and regional air pollutants. The analysis presented here is subject to the following assumptions, approaches and caveats:

1. While the numbers in Table 9 through Table 12 represent an attempt to quantify the environmental attributes of green power produced, they do not, in any way, represent a claim of ownership over those attributes on behalf of the program proponents. This is an important caveat, since green power and certificate certification (see Section 4) requires attributes to be transferred or retired by producers.
2. Electricity production attributed to a particular green power program is the total production during 2007 from the green power generation facilities installed or significantly retrofitted since 1990 as a result of the program, under the program, or that contribute to the program, regardless of whether all power (or its environmental attributes) produced by those facilities was actually sold as green power (or as green power certificates).

3. The baseline year is 1990. Therefore, generation from facilities constructed before 1990 are not included herein.
4. Care has been taken to avoid any double counting of electricity production or, in consequence, emission reductions. These decisions have an inevitable degree of arbitrariness. Therefore, while Table 9 through Table 12 give a good sense of emission reductions achieved in different jurisdictions, they cannot be used to draw reliable conclusions about the relative additional contributions of individual programs.
5. As a further measure to avoid double-counting, acquisition programs, such as provincial and federal government programs, have been excluded from total sums. Excluding acquisition programs is considered conservative because there may not be complete overlap with marketing programs.
6. The contribution of green power programs to each province/territory's total electricity production (Table 17) was calculated using total electricity production data for 2007 taken from Statistics Canada's Energy Statistics Handbook.

3.2 Avoided Emissions

Table 9, Table 10, Table 11 and Table 12 show the green power generation in 2007 and the corresponding estimated net reductions of emissions of GHGs and regional air pollutants attributable to each of the green power programs described in Section 2. In each case, net emission reductions have been calculated as the difference between (i) the estimated emissions from green power generation and (ii) the estimated emissions from a "business-as-usual" scenario of generation of the same quantity of electricity. Generation of the green power is considered to avoid or displace generation of the electricity in the business-as-usual scenario.

As business-as-usual scenarios are "counterfactual,"[96] there can be no single correct one. In addition, business-as-usual scenarios that might be considered highly realistic will in general be very complex. Two simple but commonly used business-as-usual scenarios have therefore been used, with the aim of obtaining two sets of reasonable estimates for net emission reductions. In Table 9 and Table 11, net emission reductions have been calculated assuming that green power production is causing the avoidance of *grid-average electricity generation* in each province or territory. This is a reasonable assumption if green power production is displacing output from existing facilities, as opposed to preventing the building of new facilities.

If, however, green power production is preventing the building of new conventional power generation facilities, it is causing the avoidance of "*build-marginal" electricity generation* (i.e., the conventional electricity capacity that would normally be built in response to increased demand). Natural gas-fired combined cycle gas turbine (CCGT) systems are widely regarded as the current build-marginal power supply throughout Canada.[97] In Table 10 and Table 12, net emission reductions have been calculated assuming that green power production is causing the avoidance of *natural gas-fired CCGT electricity generation* in all jurisdictions.

Table 7 provides emissions factors for each of the above pollutants for each province based on avoiding grid-average electricity generation.

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[96] By definition, it does not exist in reality.

[97] This assumption is uncertain, depending on future energy prices and other factors, but considered a reasonable assumption for this report.

Table 7: Grid average GHG and criteria air contaminant emissions intensities by province (Source: Environment Canada (2007) for GHG emissions, Environment Canada (2005) for criteria air contaminant emissions, execptions noted below)

Province	GHG intensity (g CO_2e/kWh)	NO_x intensity (g/kWh)	SO_2 intensity (g/kWh)	PM intensity (g/kWh)	VOC intensity (g/kWh)
Yukon	84.34	0.16	0.07	0.00	0.000
British Columbia	16.91	0.11	0.01	0.00	0.002
Alberta	650*	1.48†	2.28†	0.05	0.010
Saskatchewan	821.79	1.83	5.04	0.02	0.001
Manitoba	13.64	0.05	0.03	0.00	0.000
Ontario	220.05	0.31†	0.74†	0.01	0.005
Quebec	9.07	0.04	0.01	0.00	0.001
New Brunswick	393.79	0.89	2.70	0.08	0.007
Prince Edward Island	89.29	0.38	0.60	0.04	0.000
Nova Scotia	770.74	0.35	1.12	0.03	0.006
Newfoundland	30.76	0.11	0.34	0.01	0.001

† Estimates for emissions reductions in Ontario and Alberta are based on regulated limits rather than grid averages provided here.

The authors have assumed that each kWh of green power production reduces power produced from other sources by 1 kWh and reduces air emissions by an amount equal to the provincial emissions factor. Exceptions are Ontario and Alberta, where emissions factors used to estimate reductions are based on applicable regulations.

In Ontario, NO_x and SO_x emissions are regulated under a cap and trade system.[98] Green power producers may qualify for "set aside" allowances that reduce the allowances available for other generators. However, if green power producers do not apply for a set aside, these allocations are distributed among all other emitting generators. In this case, the green power produced by the generator results in no net emissions reductions of NO_x and SO_2. For those Ontario green power marketers where the source of green power generation is not stated on the Ontario Emissions Trading Registry website, or where a generator has not applied for set asides, we have assigned zero NO_x and SO_2 emissions reductions.

In Alberta, new coal-fired plants must not emit more than 0.8 g SO_2/kWh and 0.69 g NO_x/kWh and gas-fired plants greater than 60 MW must not emit more than 0.3 g NO_x/kWh.[99, 100]

[98] Ontario Emissions Trading Registry, *About the Registry* (2003 [cited April 30 2008]); available from http://www.oetr.on.ca/oetr/about_registry.jsp.

[99] Alberta Environment - Environmental Policy Branch, *Alberta Air Emission Standards for Electricity Generation and Alberta Air Emission Guidelines for Electricity Generation* (2005) http://environment.alberta.ca/documents/Air_Emissions_Standards_and_Guidelines.pdf (last accessed May 20, 2008). Table A.

Assuming 50% of displaced generation would be from coal facilities and 50% would be from gas facilities, the emissions factors used were 0.4 g SO_2/kWh and 0.5 g NO_x/kWh. Alberta's GHG intensity was established legislatively as 650 g CO_2e/kWh.

Nova Scotia's annual sulphur dioxide emission cap is 141,750 t SO_2, effective since March 2005. Nova Scotia Power Incorporated has been allocated 108,750 t SO_2 under the provincial cap.[101]

Under the New England Governors' and Eastern Canadian Premiers' *Acid Rain Action Plan 1998*, New Brunswick committed to a staged reduction of 50% in SO_2 emissions and 30% in NO_x emissions. For New Brunswick Power, these commitments translate to an SO_2 cap of 86.1 kt by 2005 and 61.5 kt by 2010 and a NO_x cap of 18 kt in 2007.

Table 8 provides the emissions intensities for reporting avoided emissions based on natural gas combined cycle factors.

Table 8: Build marginal GHG and criteria air contaminant emissions intensities based on natural gas combined cycle plant (Source: Spath and Mann (2000))

Province	GHG intensity (g CO_2e/kWh)	NO_x intensity (g/kWh)	SO_2 intensity (g/kWh)	PM intensity (g/kWh)	VOC intensity (g/kWh)
All Provinces	372.2	0.095	0.00194	0.0617	0.0

3.3 Quantitative Results

Table 9, Table 10, Table 11 and Table 12 summarize the emissions that did not occur as a result of the green power programs referenced herein displacing *business-as-usual* electricity generation. The values indicated in these tables do not reflect ownership of the emissions reductions.

Table 9: Environmental benefits of green power programs by program type (2007) — based on grid average or mandated factors

Note: The following table does not reflect ownership of environmental attributes in any way. In many cases, the program or organization listed has sold the environmental attributes and, therefore, the customer owns the environmental attributes. In some cases, the generator has retained ownership of the environmental attributes. For the Province of Prince Edward Island, environmental attributes are retained by the Crown. Where data were not provided via the survey, the authors reviewed annual reports and websites to acquire the relevant information. Tables do not include totals because the degree of overlap between programs is high, although unknown.

[100] Ibid. Table B.

[101] Province of Nova Scotia, "Air Quality Regulations made under Section 112 of the Environment Act," in *S.N.S. 1994-95, c.1* (1994).

Program	Electricity generation in 2007 (MWh)	Emissions reductions (kg)				
		GHG (CO_2e)	NO_x	SO_2	PM	VOC
Renewable Power Programs						
ENMAX Greenmax	548,506	356,528,900	271,510	219,402	260,540	934
SaskPower GreenPower	69,000	56,017,553	129,241	370,961	28,158	61
EPCOR Green Power	3,000	1,950,000	1,485	1,200	1,425	5
Oakville Hydro Green Light Pact	217	Included under OPG Evergreen				
Maritime Electric*	570	109,615	466	738	48	0
Selectpower's Selectwind	Not operational in 2007					
Nova Scotia Power Green Power	Not operational in 2007					
Bullfrog Power	30,000	24,377,400	32,100	102,493	12,254	140
Energy Ottawa Green Power[102]	110,000	17,876,760	0	0	8,986	103
Ontario Power Generation Evergreen[103]	153,196	0	0	0	0	0
Direct Energy Green Plan	Data not provided					
Alberta Energy Savings Green Energy Option	Data not provided					
Ontario Energy Savings Green Energy Option	Data not provided					
TransAlta Green Energy and RECs	550,000	357,500,000	272,250	220,000	261,250	937

[102] Energy Ottawa has not received set-aside allowances under the Ontario Emissions Trading Registry; therefore, no NO_x or SO_2 reductions have been allocated. Furthermore, the OETR awarded approximately 20% of the set-aside reductions for which Energy Ottawa applied. For consistency, the authors have allocated 20% of the CO_2e, PM and VOC reductions that would otherwise be associated with the amount of green power generated. The authors understand that the basis of the OETR's decision was the fact that the facilities are retrofits and, therefore, do not represent incremental generation.

[103] None of the OPG Evergreen facilities was constructed after 1991. Therefore, no emissions reductions have been allocated herein.

Stand-alone Environmental Attributes Programs						
BC Hydro Green Power Certificates	67,084	1,141,446	5,015	201	251	114
Canadian Hydro Developers	921,675	487,366,308	166,597	137,258	305,622	-61,368
Pembina Institute Green Power for Computers	8,411	5,467,150	629	25	3,995	0
Bullfrog Power Renewable Energy Certificates	176,750	139,919,943	176,024	535,141	73,710	758
Green Tags Ontario	Not operational in 2007					
Constellation New Energy NewMix Super	Not operational in 2007					
Voluntary Green Power Procurement						
Federal Government, Alberta, Saskatchewan, Ontario and Prince Edward Island green power purchase agreements	173,700	125,633,415	176,373	476,991	69,770	520
City of Calgary Ride the Wind and Other Acquisitions	262,000	170,300,000	19,586	785	980	446
Government of Alberta Green Power Purchase	215,000	139,750,000	-35,420	-26,661	407	366
Government of Ontario Green Power Purchase	20% of total purchase (exact amount unknown)					
Alberta Municipal Services Corporation Electricity Aggregation	70,000	45,500,000	5,233	210	262	119
Yukon Wind Feasibility Pilot Program	371	31,289	61	25	1	0
Target-driven Green Power Procurement						
Manitoba Hydro RFPs	374,000	4,172,637	14,771	10,158	749	15
Hydro Quebec RFPs	731,300	4,361,538	54,669	2,192	2,736	1,246
New Brunswick Power Embedded Generation Program	Not operational in 2007					

SaskPower Procurement of Green Power Not Sold under Green Power Program	560,000	454,635,217	1,048,914	3,010,696	228,528	498
Ontario Power Authority RFPs	1,174,431	954,319,142	0†	0†	479,700	5,484
BC Hydro RFPs	762,373	12,971,906	56,992	2,285	2,852	1,299
BC Hydro Standing Offer Program	Not operational in 2007					
Regulated Green Power Procurement						
Ontario Renewable Energy Standard Offer Program	74,146	60,249,298	79,336	253,314	277	126
Nova Scotia Power Renewable Energy Solicitation	No data to report for 2007					
Prince Edward Island Minimum Purchase Price*	110,000	9,821,429	41,741	66,098	4,321	0
New Brunswick Power Commitment to purchase up to 300 MW of wind energy	No data to report for 2007					

† For those Ontario green power marketers that have not received set-aside allowances under the Ontario Emissions Trading Registry, we have assigned no NO_x and SO_2 emissions reductions (refer to section 3.1.2)

‡ Data not available

* Environmental attributes earned by a large-capacity renewable energy generator or public electricity utility are the property of the Province of Prince Edward Island unless they are purchased back from the Province.[104]

Table 10: Environmental benefits of green power programs by program type (2007) — based on displacing electricity generated from natural gas combined cycle or mandated factors

Note: The following table does not reflect ownership of environmental attributes in any way. In many cases, the program or organization listed has sold the environmental attributes and, therefore, the customer owns the environmental attributes. In some cases, the generator has retained ownership of the environmental attributes. For the Province of Prince Edward Island, environmental attributes are retained by the Crown. Where data were not provided via the survey, the authors reviewed annual reports and websites to acquire the relevant information. Tables do not include totals because the degree of overlap between programs is high, although unknown.

[104] Government of Prince Edward Island. *Renewable Energy Act*. Also available at http://www.irac.pe.ca/document.aspx?content=legislation/RenewableEnergyAct.asp (accessed May 22, 2008)

Program	Electricity generation in 2007 (MWh)	Emissions reductions (kg)				
		GHG (CO_2e)	NO_x	SO_2	PM	VOC
Renewable Electricity Programs						
ENMAX Greenmax	548,506	356,528,900	52,212	1,066	33,849	0
SaskPower GreenPower	69,000	25,681,800	6,568	134	4,258	0
EPCOR Green Power	3,000	1,116,600	286	6	185	0
Oakville Hydro Green Light Pact	216.9	Included under OPG Evergreen				
Maritime Electric	570	212,154	54	1	35	0
Selectpower's Selectwind	Not operational in 2007					
Nova Scotia Power Green Power	Not operational in 2007					
Bullfrog Power	30,000	24,377,400	32,100	102,493	480	138
Energy Ottawa Green Power[105]	110,000	8,188,400	0	0	1,358	0
Ontario Power Generation Evergreen[106]	153,196	0	0†	0†	0	0
Direct Energy Green Plan	Data not provided					
Alberta Energy Savings Green Energy Option	Data not provided					
Ontario Energy Savings Green Energy Option	Data not provided					
TransAlta Green Energy and RECs	550,000	204,710,000	52,355	1,069	33,942	0
Stand-alone Environmental Attributes Programs						
BC Hydro Green Power Certificates	67,084	24,968,665	6,386	130	4,140	0
Canadian Hydro Developers	921,675	343,047,435	63,086	1,288	40,899	0
Pembina Institute Green Power for Computers	8,411	3,130,574	12,466	19,156	519	0
Bullfrog Power Renewable Energy Certificates	176,750	139,919,943	176,024	535,141	73,710	758
Green Tags Ontario	Not operating in 2007					
Constellation New Energy	Not operating in 2007					

[105] Energy Ottawa has not received set-aside allowances under the Ontario Emissions Trading Registry; therefore, no NO_x or SO_2 reductions have been allocated. Furthermore, the OETR awarded approximately 20% of the set-aside reductions for which Energy Ottawa applied. For consistency, the authors have allocated 20% of the CO_2e, PM and VOC reductions that would otherwise be associated with the amount of green power generated. The authors understand that the basis of the OETR's decision was the fact that the facilities are retrofits and, therefore, do not represent incremental generation.

[106] None of the OPG Evergreen facilities was constructed after 1991. Therefore, no emissions reductions have been allocated herein.

Program	Electricity generation in 2007 (MWh)	Emissions reductions (kg)				
		GHG (CO_2e)	NO_x	SO_2	PM	VOC
NewMix Super						
Voluntary Green Power Procurement						
Federal Government, Alberta, Saskatchewan, Ontario and Prince Edward Island green power purchase agreements	173,700	64,651,140	16,535	338	10,719	0
City of Calgary Ride the Wind and Other Acquisitions	262,000	97,516,400	24,940	509	16,169	0
Government of Alberta Green Power Purchases	215,000	80,023,000	-31,027	-26,887	12,870	-55,363
Government of Ontario Green Power Purchases	20% of total purchase (exact amount unknown)					
Alberta Municipal Services Corporation Electricity Aggregation	70,000	26,054,000	6,663	136	4,320	0
Yukon Wind Feasibility Pilot Program	371	138,086	35	1	23	0
Target-driven Green Power Procurement						
Manitoba Hydro RFPs	374,000	139,202,800	35,601	727	23,080	0
Hydro Quebec RFPs	731,300	272,189,860	69,612	1,422	45,130	0
New Brunswick Power Embedded Generation Program	Not operating in 2007					
SaskPower Procurement of Green Power Not Sold under Green Power Program	560,000	208,432,000	53,306	1,089	34,559	0
Ontario Power Authority RFPs	1,174,431	437,123,218	0†	0†	72,476	0
BC Hydro RFPs	762,373	283,755,231	72,570	1,482	47,048	0
BC Hydro Standing Offer Program	Data not provided					
Regulated Green Power Procurement						
Ontario Renewable Energy Standard Offer Program	74,145	27,597,023	7,058	144	4,576	0
Nova Scotia Power Renewable Energy Solicitation	Not operating in 2007					
Prince Edward Island Minimum Purchase Price*	110,000	40,942,000	10,471	214	6,788	0
New Brunswick Power Commitment to purchase up to 300 MW of wind energy	No data to report for 2007					

† For those Ontario green power marketers that have not received set-aside allowances under the Ontario Emissions Trading Registry, we have assigned zero NO_x and SO_2 emissions reductions (refer to section 3.1.2)

* Environmental attributes earned by a large-capacity renewable energy generator or public electricity utility are the property of the Province of Prince Edward Island unless they are purchased back from the Province.[107]

Table 11: Environmental benefits of green power programs by province/territory (2007) — based on grid average or mandated factors

Note: The following table does not reflect ownership of environmental attributes in any way. In many cases, the program or organization listed has sold the environmental attributes and, therefore, the customer owns the environmental attributes. In some cases, the generator has retained ownership of the environmental attributes. For the Province of Prince Edward Island, environmental attributes are retained by the Crown. Where data were not provided via the survey, the authors reviewed annual reports and websites to acquire the relevant information. Tables do not include totals because the degree of overlap between programs is high, although unknown.

Program	Electricity generation in 2007 (MWh)	Emissions reductions (kg)				
		GHG (CO_2e)	NO_x	SO_2	PM	VOC
Yukon, Northwest Territories and Nunavut						
Yukon Wind Feasibility Pilot Program	371	31,289	61	25	1	0
British Columbia						
BC Hydro Green Power Certificates	67,084	1,141,446	5,015	201	251	114
BC Hydro RFPs	762,373	12,971,906	56,992	2,285	2,852	1,299
BC Hydro Standing Offer Program	Data not provided					
Canadian Hydro Developers	238,007	4,049,730	17,792	713	890	405
Alberta						
ENMAX Greenmax	548,506	356,528,900	271,510	219,402	260,540	934
EPCOR Green Power	3,000	1,950,000	1,485	1,200	1,425	5
Canadian Hydro Developers	419,812	272,877,800	148,557	136,506	198,953	-62,988

[107] Government of Prince Edward Island. *Renewable Energy Act*. Also available at http://www.irac.pe.ca/document.aspx?content=legislation/RenewableEnergyAct.asp (accessed May 22, 2008)

Program	Electricity generation in 2007 (MWh)	Emissions reductions (kg)				
		GHG (CO_2e)	NO_x	SO_2	PM	VOC
Pembina Institute Green Power for Computers	8,411	5,467,150	629	25	3,995	0
City of Calgary Ride the Wind and Other Acquisitions	262,000	170,300,000	19,586	785	980	446
Government of Alberta Green Power Purchase	215,000	139,750,000	-35,420	-26,661	407	366
Alberta Municipal Services Corporation Electricity Aggregation	70,000	26,054,000	6,663	136	4,320	0
Bullfrog Power RECs (Alberta share)	22,780	14,807,000	11,276	9,112	10,821	39
Direct Energy Green Plan (Alberta)	Data not provided					
Alberta Energy Savings Green Energy Option	Data not provided					
Constellation New Energy NewMix Super	Not operational in 2007					
TransAlta Green Energy and RECs	550,000	357,500,000	272,250	220,000	261,250	937
Saskatchewan						
SaskPower GreenPower	69,000	56,017,553	129,241	370,961	28,158	61
SaskPower Procurement of Green Power Not Sold under Green Power Program	560,000	454,635,217	1,048,914	3,010,696	228,528	498
Manitoba						
Manitoba Hydro RFPs	374,000	4,172,637	14,771	10,158	749	15
Ontario						
Bullfrog Power Green Power	30,000	24,377,400	32,100	102,493	12,254	140
Bullfrog Power RECs (Ontario share)	153,970	125,112,943	164,748	526,029	62,890	719

Program	Electricity generation in 2007 (MWh)	Emissions reductions (kg)				
		GHG (CO_2e)	NO_x	SO_2	PM	VOC
Oakville Hydro Green Light Pact	217	Included under OPG Evergreen				
Selectpower's Selectwind	Not operational in 2007					
Energy Ottawa Green Power[108]	110,000	17,876,760	0	0	8,986	103
Ontario Power Generation Evergreen[109]	153,196	0	0	0	0	0
Green Tags Ontario	Not operational in 2007					
Ontario Energy Savings Green Energy Option	Data not provided					
Constellation New Energy NewMix Super	Data not provided					
Canadian Hydro Developer	258,940	210,409,465	0†	0†	105,765	1,209
Ontario Power Authority RFPs	1,174,431	954,319,142	0†	0†	479,700	5,484
Ontario Renewable Energy Standard Offer Program	74,146	60,249,298	79,336	253,314	277	126
Government of Ontario Green Power Purchase	20% of total purchase (exact amount unknown)					
Québec						
Hydro Quebec RFPs	731,300	4,361,538	54,669	2,192	2,736	1,246
Canadian Hydro Developers	4,915	29,313	247	39	14	5
New Brunswick						

[108] Energy Ottawa has not received set-aside allowances under the Ontario Emissions Trading Registry; therefore, no NO_x or SO_2 reductions have been allocated. Furthermore, the OETR awarded approximately 20% of the set-aside reductions for which Energy Ottawa applied. For consistency, the authors have allocated 20% of the CO_2e, PM and VOC reductions that would otherwise be associated with the amount of green power generated. The authors understand that the basis of the OETR's decision was the fact that the facilities are retrofits and, therefore, do not represent incremental generation.

[109] None of the OPG Evergreen facilities was constructed after 1991. Therefore, no emissions reductions have been allocated herein.

Program	Electricity generation in 2007 (MWh)	Emissions reductions (kg)				
		GHG (CO_2e)	NO_x	SO_2	PM	VOC
New Brunswick Power Embedded Generation Program	Not operational in 2007					
New Brunswick Power Commitment to purchase up to 300 MW of wind energy	No data to report for 2007					
Prince Edward Island*						
Maritime Electric	570	50,893	216	343	22	0
Prince Edward Island Minimum Purchase Price	110,000	9,821,429	41,741	66,098	4,321	0
Nova Scotia						
Nova Scotia Power Green Power	Not operational in 2007					
Nova Scotia Power Renewable Energy Solicitation	Not operational in 2007					
Newfoundland and Labrador						
No programs to report						
Federal government						
Federal Government, Alberta, Saskatchewan, Ontario and Prince Edward Island green power purchase agreements	173,700	125,633,415	176,373	476,991	69,770	520

† For those Ontario green power marketers that have not received set-aside allowances under the Ontario Emissions Trading Registry, we have assigned zero NO_x and SO_2 emissions reductions (refer to section 3.1.2)

* Environmental attributes earned by a large-capacity renewable energy generator or public electricity utility are the property of the Province of Prince Edward Island unless they are purchased back from the Province.[110]

* These values represent set-aside reductions under the Ontario Emissions Trading Registry.

[110] Government of Prince Edward Island. *Renewable Energy Act*. Also available at http://www.irac.pe.ca/document.aspx?content=legislation/RenewableEnergyAct.asp (accessed May 22, 2008)

Table 12: Environmental benefits of green power programs by province/territory (2007) — based on displacing electricity generated from natural gas combined cycle or mandated factors

Note: The following table does not reflect ownership of environmental attributes in any way. In many cases, the program or organization listed has sold the environmental attributes and, therefore, the customer owns the environmental attributes. In some cases, the generator has retained ownership of the environmental attributes. For the Province of Prince Edward Island, environmental attributes are retained by the Crown. Where data were not provided via the survey, the authors reviewed annual reports and websites to acquire the relevant information. Tables do not include totals because the degree of overlap between programs is high, although unknown.

Program	Electricity generation in 2007 (MWh)	Emissions reductions (kg)				
		GHG (CO_2e)	NO_x	SO_2	PM	VOC
Yukon, Northwest Territories and Nunavut						
Yukon Wind Feasibility Pilot Program	371	138,086	35	1	23	0
British Columbia						
BC Hydro Green Power Certificates	67,084	24,968,665	6,386	130	4,140	0
BC Hydro RFPs	762,373	283,755,231	72,570	1,482	47,048	0
BC Hydro Standing Offer Program	Data not provided					
Canadian Hydro Developers	238,007	88,586,205	16,291	333	10,561	0
Alberta						
ENMAX Greenmax	548,506	356,528,900	52,212	1,066	33,849	0
EPCOR Green Power	3,000	1,116,600	286	6	185	0
Canadian Hydro Developers	419,813	156,254,399	28,735	587	18,629	0
Pembina Institute Green Power for Computers	8,411	3,130,574	12,466	19,156	519	0
City of Calgary Ride the Wind and Other Acquisitions	262,000	97,516,400	24,940	509	16,169	0
Government of Alberta Green Power Purchase	215,000	80,023,000	-31,027	-26,887	12,870	-55,363
Alberta Municipal Services Corporation Electricity Aggregation	70,000	26,054,000	6,663	136	4,320	0
Bullfrog Power RECs (Alberta share)	22,780	14,807,000	11,276	9,112	10,821	229
Direct Energy Green Plan (Alberta)	Data not provided					
Alberta Energy Savings Green Energy Option	Data not provided					
Constellation New Energy NewMix Super	Not operational in 2007					

Program	Electricity generation in 2007 (MWh)	Emissions reductions (kg)				
		GHG (CO_2e)	NO_x	SO_2	PM	VOC
TransAlta Green Energy and RECs	550,000	204,710,000	52,355	1,069	33,942	0
Saskatchewan						
SaskPower GreenPower	69,000	25,681,800	6,568	134	4,258	0
SaskPower Procurement of Green Power Not Sold under Green Power Program	560,000	208,432,000	53,306	1,089	34,559	0
Manitoba						
Manitoba Hydro RFPs	374,000	139,202,800	35,601	727	23,080	0
Ontario						
Bullfrog Power	30,000	24,377,400	32,100	102,493	12,254	140
Bullfrog Power RECs (Ontario share)	153,970	125,112,943	164,748	526,029	62,890	719
Oakville Hydro Green Light Pact	216.9	Included under OPG Evergreen				
Selectpower's Selectwind	Not operational in 2007					
Energy Ottawa Green Power[111]	110,000	8,188,400	0	0	1,358	0
Direct Energy Green Plan	Data not provided					
Ontario Power Generation Evergreen[112]	153,196	0	0	0	0	0
Green Tags Ontario	Not operational in 2007					
Constellation New Energy NewMix Super	Data not provided					
Canadian Hydro Developers	258,940	96,377,468	0†	0†	11,490	0
Ontario Energy Savings Green Energy Option	Data not provided					
Ontario Power Authority RFPs	1,174,431	437,123,218	0†	0†	72,476	0
Ontario Renewable Energy Standard Offer Program	74,145	27,597,023	7,058	144	4,576	0
Government of Ontario Green	20% of total purchase (exact amount unknown)					

[111] Energy Ottawa has not received set-aside allowances under the Ontario Emissions Trading Registry; therefore, no NO_x or SO_2 reductions have been allocated. Furthermore, the OETR awarded approximately 20% of the set-aside reductions for which Energy Ottawa applied. For consistency, the authors have allocated 20% of the CO_2e reductions that would otherwise be associated with the amount of green power generated. The authors understand that the basis of the OETR's decision was the fact that the facilities are retrofits and, therefore, do not represent incremental generation.

[112] None of the OPG Evergreen facilities was constructed after 1991. Therefore, no emissions reductions have been allocated herein.

Program	Electricity generation in 2007 (MWh)	Emissions reductions (kg)				
		GHG (CO_2e)	NO_x	SO_2	PM	VOC
Power Purchase						
Quebec						
Hydro Quebec RFPs	731,300	272,189,860	69,612	1,422	45,130	0
Canadian Hydro Developers	4,915	1,829,363	336	7	218	0
New Brunswick						
New Brunswick Power embedded generation program	Not operating in 2007					
New Brunswick Power – Commitment to purchase up to 300 MW of wind energy	No data to report for 2007					
Prince Edward Island*						
Maritime Electric	570	212,154	54	1	35	0
Prince Edward Island Minimum Purchase Price	110,000	40,942,000	10,471	214	6,788	0
Nova Scotia						
Nova Scotia Power Green Power	Not operating in 2007					
Nova Scotia Power Renewable Energy Solicitation	Not operating in 2007					
Newfoundland and Labrador						
No programs to report						
Federal government						
Federal Government Alberta, Saskatchewan, Ontario and Prince Edward Island green power purchase agreements	173,700	64,651,140	16,535	338	10,719	0

† For those Ontario green power marketers that have not received set-aside allowances under the Ontario Emissions Trading Registry, we have assigned zero NO_x and SO_2 emissions reductions (refer to section 3.1.2)

* Environmental attributes earned by a large-capacity renewable energy generator or public electricity utility are the property of the Province of Prince Edward Island unless they are purchased back from the Province.[113]

[113] Government of Prince Edward Island. *Renewable Energy Act*. Also available at http://www.irac.pe.ca/document.aspx?content=legislation/RenewableEnergyAct.asp (accessed May 22, 2008)

3.4 Significance

The green power programs for which generation data are reported herein reduced Canada's electricity sector emissions of criteria air contaminants by approximately 1%. This reduction is relative to the assumed business-as-usual scenario whereby new generation would match the existing portfolio in each province. Since Bullfrog Power's did not provide information, the actual emissions reductions will be greater than the total reported herein.

Table 13 provides the amount of emissions that did not occur because the green power programs were in place in 2007. For most provinces, the "Total reduced" is estimated by multiplying the total generation by the emissions factors reported in Environment Canada's *National Inventory Report*. For Ontario, New Brunswick, Nova Scotia and Alberta, the emissions factors are based on regulated limits. The "NPRI for province" is the National Pollutants Release Inventory's (NPRI) 2006 data for electricity generation from all sources. The "% reduction" is the total reduced expressed relative to the NPRI electricity generation data.

Table 13: Emissions reductions resulting from green power programs

Note: The following table compares emissions reductions that occurred in 2007 to NPRI data from 2007. The amount of green power generated in each jurisdiction is provided in parentheses.

	NO_x (t)	SO_2 (t)	PM (t)	VOC (t)
Yukon, Northwest Territories and Nunavut (371 MWh)				
Total reduced	0.1	0.0	0.0	0.1
NPRI for province	5,225.1	355.7	367.4	175.5
% reduction	0.0%	0.0%	0.0%	0.0%
British Columbia (1,067,464 MWh)				
Total reduced	80	3	4	2
NPRI for province	3,646.6	146.2	182.5	83.1
% reduction	2.2%	2.2%	2.2%	2.2%
Alberta (1,241,730 MWh)				
Total reduced	422	357	461	-62
NPRI for province	88,053.7	130,791.8	8,389.6	678.9
% reduction	0.5%	0.3%	5.5%	-9.1%
Saskatchewan (629,000 MWh)				
Total reduced	1,178	3,382	257	1
NPRI for province	34,145.9	98,008.9	7,439.4	16.2
% reduction	3.5%	3.5%	3.5%	3.5%
Manitoba				

	NO_x (t)	SO_2 (t)	PM (t)	VOC (t)
(374,000 MWh)				
Total reduced	15	10	1	0
NPRI for province	1,345.2	925.1	68.2	1.4
% reduction	1.1%	1.1%	1.1%	1.1%
Ontario[†] (178,521,000 MWh)				
Total reduced	79	253	595	7
NPRI for province	40,783.3	88,178.0	8,692.5	722.9
% reduction	0.2%	0.3%	7.2%	1.0%
Quebec (736,000 MWh)				
Total reduced	55	2	3	1
NPRI for province	7,926.1	1,237.3	447.1	150.9
% reduction	0.7%	0.2%	0.6%	0.8%
New Brunswick (0 MWh)				
Total reduced	No programs in operation in 2007			
NPRI for province	13,283.1	27,927.6	504.6	121.1
% reduction	NA	NA	NA	NA
Prince Edward Island (110,570 MWh)				
Total reduced	42	66	4	0
NPRI for province	42.5	67.3	4.4	0.0
% reduction	98.7%	98.7%	98.7%	NA
Nova Scotia (0 MWh)				
Total reduced	No programs in operation in 2007			
NPRI for province	28,550.2	106,822.9	1,638.4	51.7
% reduction	NA	NA	NA	NA
Newfoundland and Labrador (0 MWh)				
Total reduced	No programs			
NPRI for province	3,338.3	5,425.9	617.9	46.2
% reduction	NA	NA	NA	NA
Canada				

	NO_x (t)	SO_2 (t)	PM (t)	VOC (t)
(5,581,617 MWh)				
Total reduced†	921.1	1,257.4	1,749.6	-43.8
NPRI for province	226,340.0	459,886.8	28,352.0	2,047.8
% reduction	0.4%	0.3%	6.2%	-2.1%

† For those Ontario green power marketers where the source of green power generation is not known, or where a generator has not applied for set asides, we have assigned no NO_x and SO_2 emissions reductions (refer to section 3.1.2)

The vast majority of Prince Edward Island's electricity 2007 generation is from wind power. Therefore, Prince Edward Island had the greatest reduction in SO_2 and NO_x emissions relative to NPRI data. Outside of Prince Edward Island, the greatest reductions in SO_2 emissions relative to NPRI data for the province occurred in British Columbia. Similarly, Manitoba had the greatest relative reductions in NO_x, Alberta had the greatest relative reduction in particulate matter, and Ontario had the greatest relative reductions in VOCs.

While reductions on the order of 1% are significant, the values in Table 13 illustrate the magnitude of the emissions occurring from electricity generation across Canada and how much potential exists for emissions reductions.

3.5 Other Environmental Impacts

Several other environmental benefits often accompany the use of green power to displace fossil sources of electricity. For many renewable, low-impact fuels the land footprint is smaller than fossil fuels. Green power does not generate measurable quantities of radioactive waste. Renewable, low-impact fuels do post risks of spills or hazardous release. Generally, only small amounts of water are consumed[114] during the life-cycle of green power.

Conversely, green power fuels can create impacts that other fuels might not create. For example, wind turbines may impact bat populations, and run-of-river hydro facilities may interfere with fish populations or fish habitat.

3.6 Other Benefits of Green Power

The following bullets summarize other benefits of green power.

- Wind and biomass can support multiple uses of land (i.e., energy *and* agriculture).
- Generally, some form of green power fuel is available worldwide (unlike fossil fuels that are mostly controlled by a handful of states). Energy security improves as power production becomes less vulnerable to supply chain interruption.
- As critical power infrastructure, distributed and modular green power sources tend to be less vulnerable to terrorism, natural disaster or other major disruption than larger, centralized power generation facilities.
- Complementary to large-hydro systems that exist in Canada by reducing draw down on reservoirs, that in turn can act as a storage system for green power.

[114] "Consumed" is defined as being effectively removed from the watershed.

4. Green Power Certification Standards and Criteria

There are three primary green power product certification standards and criteria in Canada: EcoLogo, Green-e Renewable Energy Certificates and Green Leaf Tradeable Renewable Electricity Certificates. EcoLogo applies to bundled electricity and environmental attributes sold in Canada. Green Leaf applies to stand-alone environmental attributes sold in Canada. Green-e applies to stand-alone environmental attributes sold in the US. Some marketers, such as TransAlta, seek all three types of certification for their products to accommodate customers in Canada and the US.

Green power certification is critical for assuring a customer of the validity of the product that the customer purchases. Without certification, marketers are not held to account for claims they make about a product and environmental benefits cannot be guaranteed.

A confusing certification protocol may be as harmful as an absent certification protocol. For example, some marketers claim to purchase power from EcoLogo-certified facilities. However, TerraChoice does not even certify facilities. Similarly, determining which products are EcoLogo-certified is extremely difficult because the consumer must know whether the original power is EcoLogo certified and whether each marketer along the marketing chain is licensed. The TerraChoice website does not appear to list all licensed green power marketers. Rather, the website lists some facilities under "Electricity – Marketer, Commercial/Residential Power" and some products under "Electricity: [fuel]". If a consumer is sold a green power product by an unlicensed marketer, that power is no longer EcoLogo-certified. Many marketers do not appear to understand the certification process either. The Pembina Institute itself did not recognize that it had to be licensed before it could sell an EcoLogo product.

Green power product certification applies to green power or green power certificates and ensures that marketing rules have been followed, that customers receive the actual product for which they pay, that a particular product is not sold twice and so on. The EcoLogo program specifically creates unnecessary confusion that could ultimately harm the success of green power programs in Canada.

4.1 Environment Canada EcoLogo

EcoLogo[115] was launched by the Canadian Federal Government in 1988 and is North America's oldest, and the world's second oldest, environmental standard and certification program. EcoLogo is managed by TerraChoice Environmental Marketing Inc. and accredited by the Global Labeling Network as meeting the ISO 14024 standard for Type 1 environmental labels.[116]

[115] The EcoLogo is a registered mark of Environment Canada

[116] ISO 14024 requires third party certification and multi-attribute.

EcoLogo uses Certification Criteria Documents (CCDs) as the basis of evaluation for certification of electricity generators. CCD-003 is the relevant document related to certification of renewable low-impact energy sources. CCD-003 contains the following technology groups:

- Alternative-use electricity;
- Biogas-fuelled electricity;
- Biomass-fuelled electricity;
- Solar-powered electricity;
- Water-powered electricity; and
- Wind-powered electricity.

CCD-003 details the eligibility criteria for renewable energy projects and products to qualify for certification. The certification document is publicly available, and details are available in Appendix C.

Direct Energy, Epcor Utilities, Bullfrog Power, Vision Quest Windelectric/ENMAX Green Power and Constellation NewEnergy sell EcoLogo-certified products, provided in Appendix B.

EcoLogo does distinguish between the vintage of generation using the following guideline:

- **Type I Electricity** is EcoLogo-certified electricity from a generation facility that began operations before January 1, 1991.
- **Type II Electricity** is EcoLogo-certified electricity from a generation facility that began generating electricity from January 1, 1991 to March 31, 2001.
- **Type III Electricity** is EcoLogo-certified electricity from a generation facility that began generating electricity on or after April 1, 2001.
- **Type IV Electricity** is EcoLogo-certified electricity from a generation facility that began generating electricity on or after April 1, 2001. It is a designation given only in situations where the Government of Canada is purchasing green power and specifically requesting this designation.

In order to meet certification requirements, the product must incorporate a minimum of 50% of the second, third or fourth vintages, and a maximum of 50% of the first type.[117]

EcoLogo considers a number of impacts, including environmental, social, economic and technical when certifying renewable energy products. Of note is the requirement to consult communities and stakeholders in the certification process. Specifically, the criteria

- require that there be consultation with communities and stakeholders
- require that land use, cultural values and biodiversity loss issues be addressed
- exclude pilot-scale demonstration projects
- prohibit any adverse impacts on endangered or threatened species
- limit, for biogas- and biomass-fired facilities, the total of "load points" corresponding to emissions of CO, PM, NO_x and SO_x

[117] Marketing green power from facilities that are not new does not produce any new reductions in adverse environmental impacts.

- require that, for facilities fuelled by wood waste, agricultural waste or energy crops, fuel be sourced from operations that ensure the rate of harvest "does not exceed levels that can be sustained"
- include, for hydro facilities, a series of requirements addressing habitat alteration or destruction, water flows and temperature and their effect on indigenous species, water quality and fish passage
- require that, for wind facilities, facility structures do not harm birds and are not located in areas protected for endangered or threatened bird species.

To verify that a product meets the certification criteria, EcoLogo auditors can review quality control and production records and may perform unannounced on-site audits. Electricity sources, accounting of environmental attributes and product compliance with the criteria are all subject to verification. However, the certification criteria do not explicitly require that products be reviewed or audited on an annual or other regular basis.

The certification criteria also contain provisions (articles 13–18) for avoiding double counting of the environmental attributes of green power, requiring that all such attributes be transferred to the end-use party or retired.[118] However, these provisions do not quite provide complete assurance that all forms of double counting are prohibited, since the word "retired" (article 15 paragraph (b)) is not accompanied by the words "without use." For example, double counting would occur if GHG emission reductions associated with green power generation were used toward meeting the generating company's voluntary or mandatory corporate GHG target, while at the same time the power was sold in a manner that implied that its full environmental attributes were being transferred to the customer (which is the justification for the customer paying a premium). A company might claim it was conforming to the EcoLogo criteria in "retiring" the reductions by using them to meet its GHG target.

When TerraChoice reviews the EcoLogo program, it should clarify the entire certification process such that customers that are new to the green power market can understand the difference between a certified product and an uncertified product, particularly the difference between a renewable energy facility and the renewable product itself.

All marketers should be able to understand when they are marketing a certified product and when they are marketing an uncertified product. Similarly, marketers should understand that TerraChoice does not certify facilities, as TerraChoice itself now claims. The responsibility to clarify what is certifiable rests with TerraChoice. The authors suggest that TerraChoice clarify what is certifiable.

4.2 SaskPower Green Criteria

SaskPower's short term strategy to ensure all its electricity needs to 2010 are met with environmentally friendly sources is called the Green Power Portfolio (GPP). SaskPower's GPP

[118] In Prince Edward Island's case, Suez North America pays the Province a royalty to effectively buy the environmental attributes from the Province in order to sell the attributes bundled with the electricity to the buyer(s) in the US. Under PEI's *Renewable Energy Act,* the Province retains ownership of the environmental attributes from power generated at EcoLogo certified facilities. The *Act* does not require the product itself to be EcoLogo certified. Without certification and the requisite verification of claims, however, enforcing the *Act* may be impossible.

also contains power generation that is sold as Green Power to their customers. SaskPower's GreenPower is not listed on the EcoLogo website as a certified product[119].

SaskPower retains ownership of the environmental attributes of the portion of the GPP that is not sold to third-party customers. The attributes of the portion that is sold to customers belongs with the customers.

4.3 Green-e Renewable Energy Certification

Green-e is the United States' "leading independent certification and verification program for renewable energy and greenhouse gas emission reduction in the retail market." It has three primary certification programs: Green-e Climate, Green-e Energy and Green-e Marketplace. This report focuses on the Green-e Energy certification criteria.

The objectives of Green-e Renewable Energy Certification are the following:

- Bolster customer confidence in the reliability of retail electricity products reflecting renewable energy generation.
- Expand the retail market for electricity products incorporating renewable energy, including expanding the demand for new renewable energy generation.
- Provide customers clear information about retail "green" electricity products to enable them to make informed purchasing decisions.
- Encourage the deployment of electricity products that minimize air pollution and reduce greenhouse gas emissions.

To achieve these objectives Green-e provides three certification types: Renewable Energy Certificate Certification, for single and multiple mix products and broker certification; Green Pricing Program Certification, for utilities selling green power to their customers; and Competitive Electricity Product Certification, for single-mix and multiple-mix contracts. Certification details are available on Green-e's website.[120]

Green-e standard contains a very specific list of eligible technologies with detailed eligibility criteria. Without going into specific detail, eligible technologies are the following:

- Solar electric
- Wind
- Geothermal
- Hydropower
- Green-e will consider adopting ocean-based resources and will review these technologies as they mature and as practical application reaches near term.
- Solid, liquid, and gaseous forms of biomass from the following fuels:
    - All woody waste

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[119] TerraChoice Environmental Marketing, "Product Type – Marketer, Residential Power" EcoLog Program (date unknown [cited October 16, 2009]) available from http://www.terrachoice-certified.com/en/certifiedgreenproducts/details.asp?product_type_id=14

[120] Green-e, *Energy - National Standard Version 1.5* (2007) http://www.green-e.org/docs/energy/Appendix%20D_Green-e%20Energy%20National%20Standard.pdf (last accessed April 30, 2008).

- All agricultural crops or waste
- All animal and other organic waste
- All energy crops
- Landfill gas and wastewater methane
- Municipal solid waste
- Biodisel
- Fuel cells

Specific requirements per technology type are contained in the Green-e Standard and are summarized in Appendix C. Green-e's determination of green energy is based on several criteria, including but not limited to, air emissions (NO_x, SO_2, ozone, particulate matter, carbon monoxide and mercury). In addition, for facilities to be eligible they must be new as of January 1, 1997.

Green power or environmental attributes generated at facilities located in Canada are eligible under Green-e if the facilities are EcoLogo-certified. Green-e certifies green power or stand-alone environmental attributes generated at facilities located in the U.S. for sale in Canada if they meet the Green-e renewable definition and the facility is EcoLogo-certified.[121]

In 2007, sales of Green-e Energy Certified renewable energy in Canada and the US reached 10,000 commercial customers and 260,000 residential customers and totalled 15,700,000 MWh. The proportion of these sales that were in Canada is not disclosed.[122]

4.4 Green Leaf Tradeable Renewable Electricity Certificates

TerraChoice Environmental Services Inc. managed the Green Leaf Tradeable Renewable Certificates (TRC) Program Standard. The "Green Leaf" now belongs to Audubon International for their lodging facilities program[123], as TerraChoice is moving to address TRC within the CCD-003[124]. The objectives of the program were to:

- generate real environmental benefits;
- reduce dependence on depleting energy sources and on foreign energy supplies;
- support the growth of the domestic renewable market;
- create opportunities for rural communities where renewable low-impact electricity generation facilities can be and often are already located; and
- create the opportunity for anyone to support renewable energy development, regardless of whether they pay an electric bill (renters, for instance) or whether their utility offers a green power option.[125]

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[121] Ibid.

[122] Center for Resource Solutions, *2007 Green-e Energy Verification Report* (2008 [cited November 2008]); available from http://www.green-e.org/docs/energy/07Green-e_Verification_Report.pdf.

[123] http://greenleaf.audubooninternational.org/ [cited September 21, 2009]

[124] http://www.ecologo.org/common/assets//Background%20Notes%20TRCs%20May%2014%202009%20.pdf [cited October 1, 2009]

[125] TerraChoice Environmental Services, *Green Leaf Tradeable Renewable Electricity Certificates (TRCs) Program Standard* (2002)

To achieve these objectives TerraChoice uses the Green Leaf TRCPS to certify electricity produced by green generating stations, which must meet the requirements specified in the Green Leaf™ TRCs Technical Requirements for Electricity Generation Facilities.[126] In addition, each Tradeable Renewable Certificate (TRC) must have a minimum block size of 100 kWh in order to be eligible.

The electricity generated must "impose relatively low impacts on the environment and produce potential benefits including low net greenhouse gas emissions, limited or no depletion of non-renewable resources, reduced emissions of other pollutants and reduced impacts on aquatic, riparian and terrestrial ecosystems and species."[127]

The technologies specifically addressed are as follows:

- Alternative-use electricity
- Biogas-fuelled electricity
- Biomass-fuelled electricity
- Solar-powered electricity
- Water-powered electricity
- Wind-powered electricity

The Technical Requirements for Electricity Generation Facilities document contains specific requirements for each of the technologies listed above and is available in Appendix C.

Green Leaf used two categories to distinguish between facility vintage. Type A electricity includes facilities that began generating electricity on or after April 1, 2001. Type B electricity includes facilities that began generating electricity between January 1, 1991 and March 31, 2001. Although Green Leaf does distinguish between vintage, there is only one level of certification, i.e., the electricity product is either certified or not.

Once the product is certified the environmental attributes and claims can be sold. Only the final end-use party (or owner) can make claims about the TRCs including marketing. The Program Standard details how the TRC may be used and retirement criteria that must be followed. More detailed information is available in Appendix C.

TransAlta used the Green Leaf standard for its renewable energy certificates. The Green Leaf standard appears to have been seldom used by retailers in Canada. In 2007, most Canadian RECs claimed some type of EcoLogo certification, despite tradable renewable energy certificates not being covered under the EcoLogo program. This contradiction may confuse customers.

[126] TerraChoice Environmental Services, "Technical Requirements for Electricity Generation Facilities," (2003).

[127] Ibid.

5. Other Green Power Support and Promotion Programs

5.1 Federal Support Programs

Programs in this section provide financial support to renewable power projects through federal government programs. These are all voluntary programs that provide financial benefits and incentives to encourage the production and deployment of renewable power. Research and development programs are excluded as they do not directly support green power marketing or acquisition.

Each program is described briefly in the sections that follow with more information provided in Appendix C.

5.1.1 ecoENERGY for Renewable Power

The ecoENERGY for Renewable Power (EERP) program, beginning April 1, 2007, superseded the Wind Power Production Incentive program, for which the commitment of funds ended March 31, 2007. The EERP program is a federal program intended to provide a total of $1.48 billion through a production incentive to encourage more renewable electricity generation. The program aims to incent the production of 1.43 billion kWh of renewable electricity over a period of up to 14 years.

The incentive comes in the form of a 1¢/kWh production incentive for up to 10 years for low-impact renewable electricity projects constructed between April 1, 2007 and March 31, 2011.

Eligible recipients include businesses, municipalities, institutions and organizations. Eligible technologies include those described as low-impact renewable technologies under Environment Canada's Environmental Choice Program.[128] Biomass and hydro projects must be EcoLogo certified to qualify. Project must be at least 1 MW in nameplate capacity, excepting wind energy projects commissioned between March 31, 2006 and April 1, 2007, which must have a capacity of at least 500 kW. Maximum capacity factors have been established for each technology to determine how much production from a project is eligible for the incentive.

In 2007, 458.4 MW of green power capacity has been installed under the EERP. This new capacity includes 299.5 MW of wind capacity and 158.9 MW of small hydro capacity. For more details on participating projects, see the information in Appendix C.

5.1.2 Class 43.1 and 43.2 Accelerated Capital Cost Allowance

Class 43.1 is a tax provision in Schedule II of the Income Tax Act that provides taxpayers with an accelerated capital cost allowance for certain renewable energy equipment. Class 43.1 allows taxpayers to deduct the cost of eligible equipment at up to 30% per year, on a declining balance basis.

[128] Environmental Choice Program, *Certification Criteria Document CCD-003* (2006) http://www.ecologo.org/common/assets/criterias/CCD-003.pdf (last accessed April 24, 2008).

Eligible green power systems include small-scale hydroelectric installations (15 MW average annual capacity or lower), wind power systems, solar photovoltaic systems, geothermal electrical systems and biogas systems. The same technology eligibility requirements that apply to the Class 43.1 Accelerated Capital Cost Allowance also apply to the Canadian Renewable and Conservation Expenses incentive below.

Eligible costs under Class 43.1 Accelerated Capital Cost Allowance include machinery and equipment, and related design and engineering costs as well as other services required to make the system operational.

Class 43.2 is similar to Class 43.1 and is also in Schedule II of the *Income Tax Act.* Class 43.1 is available for eligible equipment acquired on or after February 23, 2005 and before 2020. An accelerated capital cost allowance of 50% per year is provided under Class 43.2, while it is 30% under Class 43.1. Class 43.2 also has different technology eligibility than Class 43.1 with the inclusion of wave and tidal energy in Class 43.2 in the 2007 federal budget.

5.1.3 Canadian Renewable and Conservation Expenses

Canadian Renewable and Conservation Expenses (CRCE) allows for expenses associated with starting a renewable energy project to be deducted in full in the year incurred, carried forward indefinitely or transferred to investors using flow-through shares, provided at least 50 % of the capital costs of the property are described in Class 43.1 (see Class 43.1 and 43.2 above).

For technology eligibility requirements for the CRCE program, see the identical requirements under Class 43.1 Accelerated Capital Cost Allowance above.

Eligible costs under CRCE include pre-feasibility and feasibility studies, site resource analysis, negotiation and site approval costs, service connection costs (i.e., grid connection costs) and test wind turbines.

Table 14: Summary of federal support programs

Program	Program type	Facility certification	Resources installed by the end of 2007 under the program
ecoENERGY for Renewable Power	Production incentive	Must meet the definition of low-impact renewable energy per Environmental Choice / EcoLogo	299.5 MW wind 158.9 MW small hydro
Class 43.1 and 43.2 Accelerated Capital Cost Allowance	Favourable tax treatment	Small scale hydro (<50 MW), wind systems, photovoltaic systems, geothermal electrical systems, biogas systems and wave and tidal energy systems	unknown
Canadian Renewable and Conservation Expenses	Favourable tax treatment for start up expenses	As above	unknown

5.2 Renewable Portfolio Standards and Provincial Renewable Electricity Targets

In Canada and across North America, a number of jurisdictions have adopted targets as a way of mandating an increase in renewable energy capacity and generation. Some of these targets are in the form of Renewable Portfolio Standards (RPS). An RPS sets a set of green power objectives and requires electricity retailers to meet those targets, with penalties issued for non-compliance. Other jurisdictions have established policy directives or set targets for renewable generation.

Such targets and policies are significant in their influence of green power acquisition among electricity retailers. These policies can also have implications for green power marketing: certain RPS programs in North America also allow utilities to purchase green electricity from other generators in order to fulfill quotas mandated by the policy.

A summary of targets and standards in each province is shown in Table 15. Green power acquisition programs put in place to meet targets and regulations in most provinces were described in sections 2.2.1.3 and 2.2.3 respectively

Table 15: Summary of green power targets in Canadian jurisdictions (Source: Environment Canada (2008b) unless otherwise noted)

Province	Policy tool	Renewable energy as a per cent of total generation
British Columbia	Target	90% of generation, 100% net zero GHG emissions by 2016[129]
Alberta	Target	12.5% by 2008[130, 131]
Saskatchewan	Target	Expansion of wind by another 100 MW by 2012, waste heat recovery by 50 MW by 2010, biomass by 20 MW by 2010[132]
Manitoba	Target	1,000 MW wind power by 2014; Conserve 842 MW by 2017
Ontario	Directive	Increase renewable generation by 2,700 MW by 2010 to a total of 15,700 MW by 2025 Conserve 6,300 MW by2025[133]

[129] British Columbia Ministry of Environment, *B.C. Introduces More Measures to Fight Climate Change* (2008 [cited May 20 2008]); available from http://www2.news.gov.bc.ca/news_releases_2005-2009/2008ENV0041-000560.htm.

[130] Alberta Ministry of the Environment, *Accomplishments to date* (Date unknown [cited April 30 2008]); available from http://environment.alberta.ca/643.html.

[131] Alberta's 2008 Climate Change Plan does not include an updated target. Government of Alberta, *Alberta's 2008 Climate Change Strategy - Responsibility / Leadership / Action*

[132] Government of Saskatchewan, *Sustainable And Renewable Electricity Sources Will Power Saskatchewan's Future – News Release* (September 6, 2007 [cited October 15, 2009]); available from http://www.gov.sk.ca/news?newsId=4b28f4d5-a6ba-4c6f-81c9-94058f3990e7

[133] Ontario Ministry of Energy and Infrastructure, *Nuclear Energy, Electricity Supply* (September 17, 2009 [cited October 16, 2009]) available from http://www.mei.gov.on.ca.wsd6.korax.net/en/energy/electricity/?page=nuclear-electricity-supply

Province	Policy tool	Renewable energy as a per cent of total generation
Quebec	Target	4,000 MW wind power by 2015
Prince Edward Island	Renewable Portfolio Standard	15% by 2010 (already met and exceeded); 100% by 2015[134] 500 MW of wind energy by 2013[135]
New Brunswick	Renewable Portfolio Standard	Additional 10% by 2016
Nova Scotia	Renewable Portfolio Standard	25% by 2015[136]
Newfoundland	Target	50 MW of wind power; 98% from renewables by 2016

5.3 Provincial Support Programs

Programs in this section provide financial support to renewable power projects through provincial government agencies. These are all voluntary programs that provide financial benefits, either directly through net metering or through tax exemptions, to individuals and companies that install renewables. Many of these programs are designed to help provincial governments meet over-arching objectives in their energy plans or strategies. These objectives are discussed in section 2.2.2.

Table 16 summarizes the programs, which are described in Appendix C.

Table 16: Provincial government support programs

Program	Customers by end of 2007	Resources installed by the end of 2007 under the program
Yukon, Northwest Territories and Nunavut		
Community Renewable Energy Fund		No power projects have been installed yet
Small Renewable Energy Fund		0.00732 MW of solar photovoltaic and 0.0012 MW of wind capacity
Small Green Energy		Information not currently available

[134] Hassan Masum, *Prince Edward Island to go 100% renewable* (World Changing, 2005 [cited May 20 2008]); available from http://www.worldchanging.com/archives/003914.html.

[135] Government of Prince Edward Island, *Island Wind Energy - Securing our Future: The 10 Point Plan* (Unknown [cited November 2008]); available from http://www.gov.pe.ca/photos/original/wind_energy.pdf.

[136] Government of Nova Scotia, *Province Ups Renewable Target; Wheeler to Consult with Public* (July 28, 2009 [cited September 2009]); available from http://www.gov.ns.ca/news/details.asp?id=20090728002

Sales Tax Exemption		
Net Metering Program	Fewer than 12 customers	Approximately 0.3 to 0.4 MW
British Columbia		
Net Metering Program	38 participants + 15 applicants	0.423 MW (participants + applicants) (113.7 kW hydro, 170 kW fuel cell, 129 kW photovoltaic and 10.7 kW wind)
Land Use Operational Policy: Wind Power Projects		No wind project operating in 2007. Significant capacity in various stages of development
Alberta		
Net Metering Program		Program was not operational in 2007
Saskatchewan		
Net Metering Program		Information not provided by utility
Small Power Producers		Information not provided by utility
Alternative Farm Energy Program		Information not provided by utility
Manitoba		
Net Metering Program		Program was no longer operational in 2007
Ontario		
Net Metering Program		
Biogas Systems Financial Assistance Program		Program was not operational in 2007
Retail Sales Tax Rebates for Alternative Energy Systems		Information not currently available
Green Fund		Funding was not available in 2007
Pilot Financing for Renewable Energy		Program was not operational in 2007
New Brunswick		
Climate Action Fund		One project funded but not operating in 2007
Net Metering Program	3 customers, many inquiries	Information not currently available
Prince Edward Island		
Net Metering	Fewer than 12	0.3 to 0.4 MW of capacity

Nova Scotia		
Net Metering	31 applicants	Information not currently available
Newfoundland and Labrador		
No programs to report		

5.3.1 Yukon, Northwest Territories and Nunavut

5.3.1.1 Community Renewable Energy Fund

Aimed at supporting alternative energy projects by community and aboriginal governments, Government of Northwest Territories departments, boards and agencies, and non-profit organizations, the Northwest Territories Community Renewable Energy Fund (NWTCREF) provides up to $50,000 per year for a project. The fund is part of the Alternative Energy Technologies Program carried out by the Department of Environment and Natural Resources, Government of the Northwest Territories. Part of the impetus for the NWTCREF is to address increases in energy costs, concern over climate change and the need to reduce greenhouse gas emissions, and the program is tied to the Government of Northwest Territories Energy Plan and Greenhouse Gas Strategy. The stated objective of the fund is to "promote projects that advance the knowledge and effectiveness of new clean energy technologies in northern environments" and to demonstrate the effectiveness of alternative energy technologies in the Northwest Territories.[137]

Eligible green power technologies include solar photovoltaic systems, wind turbines, and some biofuel/synthetic gas technologies. Other eligible non-electricity technologies include solar walls, solar hot water heating systems and ground-source heat pumps. Notable are the eligible costs included under the program: materials, installation, shipping and certain training costs are eligible for funding, as are batteries for off-grid applications.

The program's first operational year was 2007. During 2007, no green power systems were installed. Two solar hot water heating systems were installed on seniors' centres in Hay River and Fort Providence, and other non-electricity technologies were also installed.

5.3.1.2 Small Renewable Energy Fund

Aimed at supporting alternative energy projects by private residential homeowners and businesses, the Small Renewable Energy Fund (NWTSREF) provides up to $5,000 per year for eligible alternative energy projects, covering up to one third of project costs. The fund is part of the Alternative Energy Technologies Program carried out by the Department of Environment and Natural Resources, Government of the Northwest Territories. The NWTSREF shares many of the same drivers as the NWTCREF, with the exception being that technologies funded under the NWTSREF "were selected because they have been previously demonstrated successful for small-scale applications in the NWT."[138]

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[137] Northwest Territories Department of Environment and Natural Resources, *Application Guidelines for the Alternative Energy Technologies Program - Community Renewable Energy Fund Small Renewable Energy Fund* (2007) http://www.enr.gov.nt.ca/eps/pdf/AETP_Guidelines_final2.pdf (last accessed April 30, 2008).

[138] Ibid.

Eligible green power technologies include solar photovoltaic and wind power. Eligible non-electricity technologies include ground-source heat pumps. Solar hot water systems and wood stoves, pellet stoves and pellet boilers are specifically excluded because they are addressed under the NWT Energy Efficiency Incentive Program or the federal ecoENERGY program.

Eligible costs include balance of system costs, batteries for off-grid applications, grid-tie packages and shipping/installation costs.

The program's first operational year was 2007. During 2007, 7.32 kW of solar photovoltaic and 1.2 kW of wind capacity were installed under the program. Many participants to date have been for off-grid residential applications. Environment and Natural Resources indicated an expectation of a 15% increase in program uptake in 2008. There are plans to launch an education and marketing campaign to accompany the program in order to increase awareness of the fund.

5.3.2 British Columbia

5.3.2.1 Net Metering Program

BC Hydro has been offering net metering since 2004 to residential and commercial customers who connect a "BC Clean"[139] (as defined by the BC government) generation source to the BC Hydro distribution system. Sources must be 50 kW or less and located on the customer's premises. Customers who generate less electricity than they use will pay BC Hydro for the net electricity at their usual rate. Customers who generate more electricity than they use will receive a credit from BC Hydro that goes to their account and can be applied against future consumption charges. On an annual basis, the customer will be credited for any excess generation at a rate of 5.4 cents/kWh. Customers must first sign an interconnection agreement with BC Hydro and comply with its terms.

According to BC Hydro staff, "There are currently 38 active participants representing an installed generation capacity of 246.6 kW, and 15 additional applications in process representing 176.8 kW. The total resource (active plus applications) of 423.4 kW consists of 113.7 kW of hydro, 170 kW of fuel cell, 129 kW of photovoltaic and 10.7 kW of wind."[140]

5.3.2.2 Participation rent policy for wind energy projects

This policy, announced in October 2005 is intended to encourage capital investment in wind projects by offering flexible incentives for wind power producers. In particular, wind power producers will pay no rent on crown land for the first ten years of commercial operations. After ten years, participation rent will be charged ranging from one to three per cent of gross annual revenues; the sliding scale formula will be based on annual electricity production.[141, 142]

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[139] The Government of British Columbia's definition of BC Clean is: "BC Clean electricity refers to alternative energy technologies that result in a net environmental improvement relative to existing energy production. Examples may include small/micro hydro, wind, solar, photovoltaic, geothermal, tidal, wave and *biomass energy, as well as cogeneration of heat and power, energy from landfill gas and municipal solid waste, fuel cells and efficiency improvements at existing facilities."*

[140].C. Vershoor. Personal Communication, April 11, 2008.

[141] BC Ministry of Energy Mines nad Petroleum Resources, *Wind Power* (2007 [cited March 2008]); available from http://www.em.gov.bc.ca/alternativeenergy/windpower/default.htm.

[142] Peter Ostergaard and Warren Mitchell, "Land Use Operational Policy - Wind Power Projects," (2005), http://www.em.gov.bc.ca/alternativeenergy/windpower/windpolicy_07.pdf (accessed April 30, 2008).

All wind power projects in British Columbia will qualify for this program. As of 2007, there were no wind power projects in operation. However, three wind power projects have electricity purchase agreements with BC Hydro though its procurement process (see section 2.2.2.7 and 2.2.2.8). Many additional wind projects are in various stages of development and would, if they are all completed, have a cumulative capacity in excess of 3.500 MW.[143]

5.3.3 Alberta

5.3.3.1 Net Metering Program

In February 2008, the Government of Alberta announced its micro-generation regulation, which allows small generators who generate environmentally-friendly electricity, to connect to the grid and receive credit for any power that they do not use.

This program will be available for projects that are less than one megawatt. The Government of Alberta requires that the micro-generation units use electricity generated by a renewable, environmentally friendly fuel source such as solar panels, small-scale hydro, wind, biomass, micro-cogeneration and fuel cells.

Quantitative data are not yet available since this program has just started (connection services for small (less than 150 kW) systems are not yet available — but expected by January 1, 2009).[144]

5.3.4 Saskatchewan

5.3.4.1 Net Metering Program

SaskPower implemented its net metering program in response to customer demand. According to the utility, "the intent of the net metering policy is to provide for the safe installation of generation by customers for the purpose of netting off energy that is produced by the customer against the energy, which that customer consumes over a specific time period."[145]

Only environmentally responsible electricity sources are eligible for the net metering program. These technologies include wind, low impact hydro, biomass, flare gas, solar and heat recovery systems.

SaskPower will not be paying for any excess electricity through the net metering program. If a net metering customer generates more power than they actually use, that excess electricity is fed back to SaskPower's electricity system, which is then "banked" for a defined period of time and used to offset that customer's future electricity use.

The Saskatchewan Research Council's net metering program will pay a one-time fee equivalent to 25% of eligible costs up to a maximum of $100,000 (i.e., maximum $25,000).

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[143] Geoff Turner. BC Ministry of Energy Mines and Petroleum Resources. Personal communication with Pembina Institute. April 15, 2008.

[144] Government of Alberta, *Province gives Albertans a green choice in managing electricity needs* (2008b) http://www.alberta.ca/home/NewsFrame.cfm?ReleaseID=/acn/200802/23047D5C4CD60-B044-88EA-6CF4C1F8C46D7974.html (last accessed April 11, 2008).

[145] SaskPower, "Net Metering Policy," (2006), http://www.saskpower.com/poweringyourfuture/pdfs/SaskPowerNetMeteringPolicy.pdf (accessed April 30, 2008).

5.3.4.2 Small Power Producers Policy

SaskPower's Small Power Producers Policy is designed to accommodate customers who wish to generate up to 100 kilowatts (kW) of electricity for the purpose of offsetting power that would otherwise be purchased from SaskPower. This applies to wind and solar-powered facilities, as well as other viable generating sources.

SaskPower will purchase any excess energy provided to the grid at a firm price of 6.26¢/kWh. Energy banking services are not provided under this policy (i.e., the meter does not turn backward when the generator is feeding power to the electric system).

5.3.4.3 Alternative Farm Energy Program

SaskPower offers grants for farmers toward the purchase and installation of a complete solar or wind-powered water pumping system for farm livestock watering facilities. The grants cover 50% of costs above $500, to a maximum of $500. Solar or wind-powered water pump systems must be purchased from a Saskatchewan-based supplier to qualify for the grant.

5.3.5 Manitoba

5.3.5.1 Net Metering Program

Between 1989 and 2003, Manitoba Hydro customers could participate in net metering. Because of low participation, Manitoba Hydro discontinued the program in 2003.[146]

5.3.6 Ontario

5.3.6.1 Net Metering Program

In 2007, Hydro One Networks offered net metering for its customers with facilities that are any combination of wind, water, solar radiation or agricultural biomass with a total nameplate rating of 500 kW or less. Hydro One calculates the electricity bills for customers on this program as the electricity consumed minus electricity generated. While Hydro One allows a customer to reduce his or her bill to zero, the utility will not pay for any excess generation. However, credit for excess generation can be used for a period of up to one year.

5.3.6.2 Biogas Systems Financial Assistance Program

Announced in June of 2007, the Ontario Biogas Systems Financial Assistance Program provides financial assistance for Ontario-based biogas projects for up to 70% of funding, to a maximum of $35,000, for pre-construction activities. Biogas projects can also receive up to 40% of eligible construction costs for a total of as much as $400,000 toward the project. One of the program's primary drivers is greenhouse gas reduction, with the second being support for rural economic development.

The first phase of applications will be considered beginning in September 2008, with the second phase applications being considered beginning in September 2009. The program officially ends March 31, 2010. Because the program was not yet active in 2007, there are no results to report at this time.

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[146] Richard Stout, "Net Metering Tariff - Rate Schedule 1289 (RS 1289): Monitoring and Evaluation Report," (2005), http://www.bchydro.com/rx_files/info/info24287.pdf (accessed April 30, 2008).

5.3.6.3 Retail Sales Tax Rebates for Alternative Energy Systems

The Retail Sales Tax Rebates for Alternative Energy Systems program originally operated from March 28, 2003 to November 25, 2007 and was renewed in the 2007 Ontario Budget and now applies to qualifying systems purchased and installed on residential premises before January 1, 2010.[147]

The rebate applies to solar energy systems, including solar photovoltaic and solar thermal systems (including non-power hot water and space heating systems). Eligible costs include components required to operate a solar energy system, as well as the first battery purchased to store the energy it produces.

5.3.6.4 Green Fund

Announced in August of 2007, funding through the Community Go Green Fund (CGGF) will not distribute funds until 2008. The CGGF is a four-year, $6.6 million program aimed at funding local projects that help reduce greenhouse gas emissions.

According to former Ontario Minister of the Environment Laurel Broten, "[t]he Community Go Green Fund will provide funding for not-for-profit groups at the local and grassroots level to educate on global warming, and to run programs in Ontario communities that reduce greenhouse gases."[148]

5.3.6.5 Pilot Financing for Renewable Energy

The PowerHouse/Ontario Pilot Financing for Renewable Energy program is a pilot financing program for residential renewable energy projects. Hydro One Networks and Enersource (Mississauga) will offer zero-interest loans to selected qualifying customers who install renewable energy technologies in their homes.

The PowerHouse Loan Program is intended to include solar, geothermal, photovoltaic and wind technologies that generate electricity. The program is being launched "in support of the Government of Ontario's climate change strategy."[149]

As of the end of 2007, the program was not yet operational. It is expected that the program will be operation by March 2008 and that the initial pilot phase of the program will run until March 2009. Hydro One Networks and Enersource may extend the program to all customers depending on the results of the pilot program.

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[147] Ontario Ministry of Revenue, *Solar Energy Systems Rebate Program* (2007 [cited April 30 2008]); available from http://www.rev.gov.on.ca/english/refund/sesr/.

[148] Ontario Ministry of the Environment, *MCGUINTY GOVERNMENT INVESTING IN LOCAL CLIMATE CHANGE PROJECTS - Community Go Green Promotes Public Education And Community Action* (2007 [cited April 30 2008]); available from http://www.ene.gov.on.ca/en/news/2007/081001.php.

[149] HydroOne, *Hydro One Networks launches PowerHouse Loan Pilot Program in support of Ontario's Climate Change Strategy* (2007 [cited April 30 2008]); available from http://www.hydroone.com/en/media_centre/news_releases/archives/2007/2007_06_20.asp.

5.3.7 New Brunswick

5.3.7.1 Climate Action Fund

New Brunswick's climate action fund is an extension of the federal government's program by the same name. The fund targets six sources of greenhouse gas emissions reductions, green power generation is among them. To date, the fund has contributed to one landfill gas collection project, the construction of which is scheduled for completion in 2009.

5.3.7.2 Net Metering Program

New Brunswick Power developed its net metering program over the period 2003 to 2005 and has been growing slowly since then. The program applies to generation units that use renewable fuels, have a nameplate rating of up to 100 kW and are connected the New Brunswick Power Distribution and Customer Service Corporation (Disco) grid. According to New Brunswick Power, "the output of the generation unit may be used to offset the customer's own consumption. Monthly credits not used within any month may be carried forward and used to reduce future consumption until March 31 of each year."[150]

While only three customers were participating in the program as of 2007, New Brunswick Power has been receiving many inquiries on net metering.

5.3.8 Prince Edward Island

5.3.8.1 Small Green Energy Sales Tax Exemption

As part of its objectives to reduce greenhouse gas emission and strengthen the local economy, the Prince Edward Island government provides a sales tax exemption for renewable energy generating units (wind, biogas, ground-source or geothermal, solar thermal, solar PV, drain water heat recovery) that are 100 kW. This exemption has been available since April 8, 2005, but estimates on the number of units that have taken advantage of the exemption.

5.3.8.2 Net Metering Program

Since December 31, 2005, the Prince Edward Island government has required that utilities provide net metering for their customers. Generators smaller than 100kW receive credit for any excess energy they supply to the grid at the same price as they pay for that power from the utility.[151]

This program has received limited customer interest so far. As of 2007, there were fewer than 12 customers, accounting for about 300 or 400 kW of capacity.

5.3.9 Nova Scotia

5.3.9.1 Net Metering

Nova Scotia Power recently started a net metering program for residential and commercial customers to connect renewable energy generating units that are 100 kW or less to the electrical

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[150] Unknown author, *New Brunswick Power Distribution and Customer Service Corporation: Non Utility Generation - Net Metering* (Date Unknown [cited March 24 2008]); available from http://conservationcouncil.ca/energy/files/Information%20on%20Net%20Metering.pdf.

[151] PEI Ministry of Environment Energy & Forestry, *Renewable Energy Act Proclaimed and Regulations Passed*.

grid. Eligible systems include wind, solar, small hydro, biomass and tidal. If the renewable energy system produces more power than the customer consumes, the customer receives an energy credit that can be applied against any future usage. Surplus kilowatt-hours can be carried over for twelve months.

There have been 31 applications for the net metering program since it started in July 2006.

5.4 Other Support Programs

The Ontario Community Power Fund is an example of the new types of support program that are also emerging; they are neither a provincial nor federal agency nor program, although the fund has received an endowment from the Government of Ontario.

5.4.1 Ontario Community Power Fund

The Community Power Fund began operating in August 2007 and is intended to run until the end of 2010 with its current funding.

The fund has a $3 million endowment from the Government of Ontario to support project development activities for local renewable energy projects. Although the fund's initial endowment is from the Government of Ontario, it is an independent, cooperative non-profit corporation. Ontario-based community organizations developing renewable energy projects are eligible to receive grants for operations, capacity building and management of Ontario-based community organizations pursuing local renewable energy projects. Eligible groups include not-for-profits, co-operatives, co-operatively structured corporations, unincorporated groups and First Nations organizations pursuing Community Power projects

The fund is currently operating two grant programs. The first is a Small Grant Program, which provides up to $25,000 to fund feasibility studies and "strategic opportunity exploration." The second program, the Large Grant Program, supports project development, providing as much as $300,000 in funding to a single project.

Eligible projects include solar photovoltaic and solar thermal, wind, biogas, small hydroelectric and geothermal. One notable feature of the fund is that eligible recipients must be pursuing a community power project as defined by the Ontario Sustainable Energy Association.

The program aims to directly stimulate 75 MW of community power capacity in Ontario in the short term, with 500 MW by 2010. The fund aims to provide grants to up to 15 projects, mitigating approximately 50,000 tonnes of greenhouse gas emissions. In January 2008, $1.1 million was disbursed, affecting projects that could total 170 MW of capacity if constructed. The fund expects to disburse a total of $2.5 million of the initial endowment, with the remaining $500,000 used for administration costs.

The fund is actively seeking additional $10 million in seed money to become a longer-term loan and investment organization supporting community-based renewable energy projects.

6. Trends in Green Power Marketing and Acquisition: 2003 through 2007

6.1 General Observations

Over the last five years, green power has experienced a tremendous growth throughout the world. Globally, investments in clean energy have grown from $28 billion US in 2004 to $95 billion US in 2007.[152]

Canadians are also placing increasing value on environmental concerns and on climate change in particular. A snapshot of recent polling results shows strong support for renewable energy as part of the solution to those environmental concerns. Some polling highlights include the following:

- When asked their preferences on how revenue from a proposed federal carbon tax should be spent, almost half of Canadians surveyed in May 2008 supported increased spending on "renewable energy like wind and solar power." Other choices were energy efficiency technologies (16%), cutting income taxes (11%) and public transit (8%).[153]
- More than 85% of Canadians support the use of green power as a source of electricity in Canada, and roughly 50% of Canadians would be willing to pay between $5 and $20 more per month for green power. Almost 90% of Canadians believed that it is important or very important for federal and provincial governments to work together to develop green power sources in Canada over the next 20 years.[154]
- More than 95% of Canadians support the continued development of wind energy, while 92% support the construction of a project for their community and more than 70% would like to invest in such a project.[155]
- Focus group sessions in Toronto, Montreal, and Calgary revealed a sense of urgency for government action on environmental issues and a sense that consumers are more willing to embrace "green technologies" if they are provided incentives.[156]

Many governments in Canada and elsewhere have implemented policies to encourage green power, acknowledging the benefits of green power to limit environmental harm from energy production, act as a buffer from high prices of fossil fuels and contribute to local jobs.

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[152] Michael Liebrach, "New Energy Finance" (presented at the ACORE National Policy Conference, November 29 2007).

[153] Mike DeSouza, "Carbon tax gaining support across Canada: poll," *Canwest Newservice*, May 26 2008.

[154] Oraclepoll Research, *National Survey Report on Green Power* (prepared for Pollution Probe, 2004)

[155] Ipsos Reid, "Public Attitudes Towards Wind Power" (presented at the Canadian Wind Energy Association, 2005a).

[156] Ipsos Reid, *Qualitative Research on Broad Approaches to Addressing Climate Change* (2005b) Report prepared for Environment Canada.

6.2 Share of Electricity Market

The green power programs reported herein accounted for over 5,657 GWh in 2007. That is approximately 1% of Canada's 2007 electricity generation of 603,182 GWh[157]. Table 17 provides estimates of total generation from green power programs in 2007.

Table 17: Total generation from green power programs in 2007 by province

Program	Generation in 2007 (MWh)
Yukon, Northwest Territories and Nunavut	
Yukon Wind Feasibility Pilot Program	371
Total green power (2007)	371
Total generation (2007)	1,157,210
Green power as % of 2007 total	0.03%
British Columbia	
BC Hydro Green Power Certificates	67,084
BC Hydro RFPs	762,373
BC Hydro Standing Offer Program	Not operational in 2007
Canadian Hydro Developers	238,007
Total green power (2007)	1,067,464
Total generation (2007)	72,211,656
Green power as % of 2007 total	1.48%
Alberta	
ENMAX Greenmax	548,506
EPCOR Green Power	3,000
Canadian Hydro Developers	419,812
Pembina Institute Green Power for Computers	8,411*
City of Calgary Ride the Wind and Other Acquisitions	262,500*
Government of Alberta Green Power Purchase[158]	215,000*
Alberta Municipal Services Corporation Electricity Aggregation	70,000*
Bullfrog Power RECs (Alberta share)	22,780
Direct Energy Green Plan (Alberta)	Data not provided
Alberta Energy Savings Green Energy Option	Data not provided

[157] Environment Canada, *National Inventory Report 1990-2006* , Statistics Canada, *Energy Statistics Handbook Fourth Quarter 2007* (2007) http://www.statcan.ca/english/freepub/57-601-XIE/57-601-XIE2007004.pdf (last accessed August 2008). Table 8.4

[158] Not included in total to avoid double-counting

Program	Generation in 2007 (MWh)
Constellation New Energy NewMix Super	Not operational in 2007
Total green power (2007)	994,098
Total generation (2007)	60,504,171
Green power as % of 2007 total	1.6%
Saskatchewan	
SaskPower GreenPower	69,000
SaskPower (procurement of green power not sold under green power program)	560,000
Total green power (2007)	629,000
Total generation (2007)	20,008,845
Green power as % of 2007 total	3.14%
Manitoba	
Manitoba Hydro RFPs	374,000
Total green power (2007)	374,000
Total generation (2007)	34,142,111
Green power as % of 2007 total	1.1%
Ontario	
Bullfrog Power Green Power	30,000
Bullfrog Power RECs (Ontario share)	153,970
Oakville Hydro Green Light Pact	216.9
Selectpower's Selectwind	Not operating in 2007
Energy Ottawa Green Power	110,000
Ontario Power Generation Evergreen	153,196
Green Tags Ontario	Not operating in 2007
Constellation New Energy NewMix Super	Not operating in 2007
Canadian Hydro Developers	258,940
Ontario Energy Savings Green Energy Option	Data not provided
Ontario Power Authority RFPs	1,174,431
Ontario Renewable Energy Standard Offer Program	74,1456
Government of Ontario Green Power Purchase[159]	20% of total purchase (exact amount unknown)
Total green power (2007)	1,954,899
Total generation (2007)	157,947,499

[159] Not include in total to avoid double-counting

Program	Generation in 2007 (MWh)
Green power as % of 2007 total	1.24%
Québec	
Hydro Quebec RFPs	731,300
Canadian Hydro Developers	4,915
Total green power (2007)	736,215
Total generation (2007)	186,045,674
Green power as % of 2007 total	0.40%
New Brunswick	
New Brunswick Power Embedded Generation Program	Not operating in 2007
New Brunswick Power – Commitment to purchase up to 300 MW of wind energy	0
Total green power (2007)	0
Total generation (2007)	16,897,065
Green power as % of 2007 total	0.00%
Prince Edward Island	
Maritime Electric	570
Prince Edward Island Minimum Purchase Price	185,000
Total green power (2007)	185,570
Total generation (2007)	112,682
Green power as % of 2007 total	165%[160]
Nova Scotia	
Nova Scotia Power Green Power	Not operating in 2007
Nova Scotia Power Renewable Energy Solicitation	Not operating in 2007
Total green power (2007)	NA
Total generation (2007)	12,513,869
Green power as % of 2007 total	NA
Newfoundland and Labrador	
No programs to report	
Total green power (2007)	0
Total generation (2007)	41,608,329
Green power as % of 2007 total	0.00%

[160] The Prince Edward Island Department of Environment, Energy and Forestry reported green power generation that exceeded total generation estimates within the province as reported by Statistics Canada. Survey methods and respondents may account for this discrepancy.

Program	Generation in 2007 (MWh)
Federal government	
Federal Government Alberta, Saskatchewan, Ontario and PEI green power purchase agreements	173,700*
Total green power (2007)	173,700
Total generation (2007)	NA
Green power as % of 2007 total	NA
Total[161]	
Total green power (2007)	5,656,617
Total generation (2007)	603,181,896
Green power as % of 2007 total	0.94%

* Excluded from totals to avoid double-counting

Green Power Programs in Canada – 2003 reported 3,102,000 MWh of electricity generated through green power programs. The 5,657,000 MWh reported herein represents a 82% increase over the four-year period.

6.3 Evolution of the Canadian Green Power Market

This report has covered several aspects of the green power market. The main categories that contribute to green power market are

- marketing,
- acquisition, and
- support.

Marketing programs focus on sales of the various attributes of green power to a voluntary market. Acquisition programs refer to power purchase programs generally resulting from a government directive (on behalf of the public) or private sector initiative. Support programs either directly or indirectly help purchasers meet goals or fulfill their own objectives, such as BC Hydro's Standing Offer Program, which is designed to help meet a provincial government target for clean and renewable energy.

All three categories can lead to increased electricity generation from renewable, low-impact sources and typically appear in various stages as markets have grown and matured across Canada. A common evolution of green power in Canadian jurisdictions begins with consumers, including retail-level consumers and wholesale consumers such as governments, who were willing and wanting to see renewable power develop. These customers have been served by green power market programs. Other government policies have followed these early adopters. Once various combinations of public support (through voluntary green power purchases or other means of showing support), technology maturity and economic competitiveness were demonstrated, governments have been motivated to become more directly involved by introducing more sector wide policies to accelerate use of renewable power such as RPS (or

[161] Government purchases are excluded from this total to avoid double-counting

other types of minimum standards) and production incentives.[162] Government-scale policies have the potential to dramatically increase green power generation through legislation or through increased cost sharing across the rate base. By spreading the additional cost of renewable energy across all consumers rather than only those who are willing to purchase green power as a premium product, small cost increments can lead to significant increases in renewable generation.

At this stage in the market evolution, the voluntary green power market serves consumers who want to pay a premium to purchase green power. This voluntary procurement of green power stimulates the market and promotes developing new sources of green power. Broad government policies to increase the supply of green power would stimulate the green power market much more quickly than the voluntary market.

6.4 Trends in Green Power Programs in Canada

The total number of utilities offering a Green Power Product or Certificates has declined since 2003. Six programs that were active in 2003, Green Tags Ontario, Select Wind, Nova Scotia Power Green Power, EPCOR Green Power and BC Hydro Green power certificates were no longer being offered in 2007. Bullfrog Power has assumed much of the green power market in Alberta and Ontario and has shown considerable growth since its inception in 2005. Bullfrog's 5,000 residential and 500 commercial customers in 2007 represent over 200% growth relative to 2006. Relative to Canada's over 12 million households, however, the green power market does not appear to have grown significantly over the past few years.

There appears to be several reasons for the decline in utilities offering green power options. Provincial governments have been more active since 2003 in implementing policies such as renewable portfolio standards, issuing renewable RFPs and implementing standard offer contracts, which have led in part to the decline in voluntary programs. Several utilities have moved from providing green power to a small group of consumers to focusing on meeting the provincial requirements, following the evolution pattern described in the previous section. In Ontario, certain groups could access financing through the Ontario Community Power Fund, making it less necessary for green power producers to use the voluntary green power market.

The green power market is still playing a role in meeting customer demand for a specialized product and in some cases still growing. Bullfrog Power is a good example of a green power marketer who has tapped into the demand for green power. Bullfrog Power entered the market in 2005 and has shown increases in its customer base and sales. Companies that are trying to achieve "Carbon Neutral" status and developers that are creating LEED (Leadership in Energy and Environmental Design) certified or net zero-energy or emissions buildings want to obtain green power that exceeds the levels provided by provincial targets and may turn to certified green power to meet these requirements.

Acquisition and support programs grew between 2003 and 2007. All ten provinces now have targets for renewable power generation – three provinces use Renewable Portfolio Standards (mandatory requirements for utilities) while the other provinces use directives with support programs and other additional initiatives to attain the targets, compared to zero provincial RPS in effect in 2003. In 2007, Ontario introduced a standard offer program, similar to feed in tariffs

[162] Some policies, such as the Wind Power Producer's Incentive, served to stimulate green power generation before retail-level green power purchases provided stimulation.

used in Europe. British Columbia followed suit in 2008. SaskPower undertook a Green Power Portfolio strategy that ensures that all new generation will not add to their greenhouse gas emissions. This strategy led to the installation of Centennial Wind Power Facility, which generated about 560 GWh in 2007. These large scale government and utility policies are a major change from 2003, when the governments of British Columbia and Nova Scotia had negotiated voluntary renewable energy targets with their main public utilities, but none of the provinces had requirements for green power.

An important evolution of the renewable energy market in Canada is the almost standard use of EcoLogo certification. As the green power market has grown, consumers and providers have recognized the benefits of a common standard to understand what they are buying and selling. However, generators and retailers seldom distinguish power generated at EcoLogo-certified facilities from power that is EcoLogo-certified itself. The frequency with which this distinction is omitted may represent one weakness of the EcoLogo program, as it is difficult to expect the average consumer to understand the subtle nuanced difference.

6.5 Green Power Generation in Canada

Renewable power in Canada has grown considerably in the last few years. Figure 2 indicates the strong growth in wind power. In 2007, Canada's installed wind capacity grew by 20% from 1,460 MW to 1,846 MW.[163]

Statistics Canada reports a 32% increase in the supply of green power from 5,120 MW in 2003 to 6,771 MW in 2007. However, this represents only approximately 4% of total electricity generation in Canada.

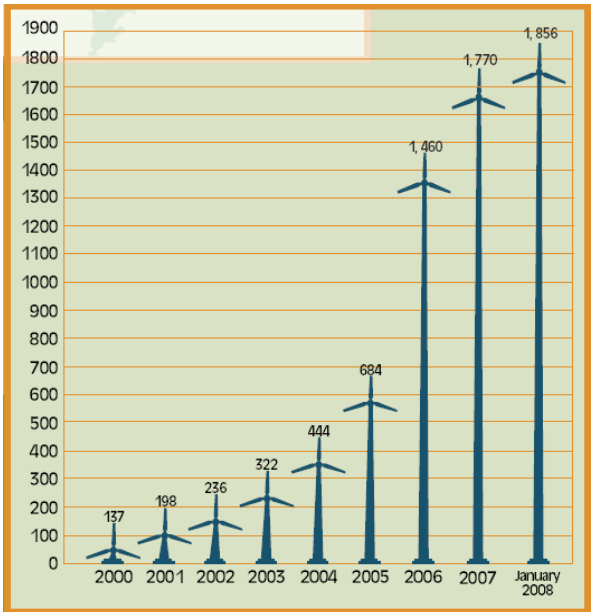

Figure 2: Installed Wind Capacity in Canada (Source Canadian Wind Energy Association (2008))

[163] CanWEA, *Wind Energy Sets Global Growth Record in 2007; Canada Expects a Record Year for New Installations in 2008* (2008 [cited November 3 2008]); available from http://www.canwea.ca/media/release/release_e.php?newsId=4.

6.6 Future Directions for Green Power

Between 2003 and 2007, the green power trend in Canada was towards more provincial regulation and policy and away from voluntary markets. Three important issues remain as to whether this trend will continue in the short-term future. The first is the fact that the federal production incentive will likely run out of funds in late 2009 according to the Minister of Natural Resources[164]. This program has been important in initiating wind power development in Canada and its renewal or lack thereof may significantly impact the profitability of green power projects bidding in competitive markets, and may reduce the provincial appetite for supplementary support programs such as local RFPs and RPSs. Secondly, whether provinces and utilities will perceive their own targets and goals as maximums or as points from which to continue to build once they are met. Finally some very significant decisions will be made in near future in many provinces with respect to grid infrastructure and power plant procurement, notably Ontario. Decisions on where power lines are built and what generating technology has grid access will have major consequences for green power development well into the future.

The outcomes of aforementioned factors, as well as the public's general sustained interest in green power will have significant impacts on what type of green power programs are prevalent. A reduction, or stagnation, in government and utility programs may see a resurgence of the voluntary market, while continued or expanded large-scale program may further reduce or specialize voluntary programs. In the US, the voluntary market has historically been slightly greater than the compliance market. This fact may suggest that the voluntary market is more important than the compliance market for developing new source of renewable generation. On the contrary, this fact may suggest that the compliance market in the US has not been strong enough to stimulate fast growth of renewable generation.

There remains significant room for green power growth in Canada to reduce the environmental impact of non-renewable electricity sources and to meet growing demand and replace aging infrastructure. Many countries in Europe have shown that sustained green power growth can continue for decades, and the recent growth in Canada could therefore be sustained for many years.

[164] Hansard transcript, Standing Committee on Natural Resources, Thursday, April 23, 2009.

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Appendix A. Corporations Purchasing Green Power

Over the past five to ten years, corporations around the world have made commitments to power their operations with low-impact electricity in increasing numbers. Some companies invest in green power to demonstrate their commitment to sustainability; other companies invest in green power to offset the risk of relying heavily on a fuel that is subject to price volatility, such as natural gas. Regardless of the impetus for committing to purchase green power, the trend among companies and corporations to purchase green power is growing rapidly. Canadian companies are no exception.

While an exhaustive list of Canadian companies that purchased green power is impossible to compile from publicly available information, the companies that have purchase contracts with BC Hydro, Bullfrog Power or the Pembina Institute are provided below. BC Hydro lists approximately 50 Green Power Certificate customers, and Bullfrog Power lists approximately 500 customers. The Pembina Institute sold RECs for computers to approximately 40 commercial customers in 2007.

Some of the companies listed below are Canadian subsidiaries of U.S.-based parent companies.

The vast majority of the companies that purchase Bullfrog power are small or medium enterprises that are fully owned within Canada. The list of Pembina's customers includes a higher proportion of large corporations, some of which are divisions of U.S.-based parent companies. Similarly, many of BC Hydro's REC customers are larger institutions or enterprises, some of which are divisions of U.S.-based parent companies.

The following companies have purchase contracts under BC Hydro's Green Power Certificate program:[165]

- Aquametrix Research Ltd.
- Bayleaf Software
- BCGEU
- Caffe Fantastico
- Canadian Green Building Council – Western Office
- Capital Regional District
- CIBC
- City of Kamloops
- Dennison Property Management Ltd.
- Eclipse Awards International Inc.
- Envision Credit Union
- Ethical Bean Coffee Company
- Fiber Options Natural
- Garry Murdoch Inc.
- Genesis Recycling Ltd.
- Harbour House Hotel
- InterfaceFLOR Commercial
- Jim Agius Construction Ltd.
- Knight Piésold Consulting
- Kwantlen University College
- Ladybug Organics – Home Delivery & Store
- LP Durante
- Malaspina University-College
- MCW Consultants Ltd.
- Metropolitan Fine Printers Inc.
- Mountain Equipment Co-op – Victoria Store
- NRC Institute for Fuel Cell Innovation
- Plutonic Power Corporation
- Prism Engineering Ltd.
- Resort Municipality of Whistler
- RBC Royal Bank
- Saje Natural Wellness
- Salt Spring Coffee Co.
- Signals Design Group
- Signs of the Times
- Simon Fraser University
- Stantec
- Staples Business Depot
- SYLVIS Environmental
- Thrifty Foods
- Trafford Publishing
- TransLink
- University of Victoria
- Urban Harvest Organic Delivery
- Vancouver Port Authority
- Wal-Mart Canada Corp.
- Wastech Services Ltd./GVRD

[165] BC Hydro, *Green Power Certificate Purchasers* (February 27 2008a [cited March 24 2008]); available from http://www.bchydro.com/business/gpcerts/gpcerts3690.html.

- Hbc
- Retrix Hosting

Similarly, Bullfrog Power lists approximately 500 companies as customers.[166]

- 2degreesC
- 889 Yonge
- A&M Wood Specialty
- Aboud & Associates
- Accell Graphics
- Acuity
- Adanac Images of Ontario
- Advatum Portable Tradeshow Displays
- Ajax Foot Clinic & Orthotic Centre
- Akuni Adventures
- Alan Harman Investment Advisors
- Alberta Egg Producers
- Algonquin Orthopaedics
- Allsteel - Showroom
- Allwest Commercial Furnishings - Showroom and office space
- Altimeter Design
- AM Communications
- Amaruk
- Amey's Greenwood Taxi
- AMO (Association of Municipalities of Ontario)
- Ampersand Printing
- Ananda Wellness Centre
- Antaeus Workshops
- Aquatech Skin Care
- Arbour Environmental Shoppe
- Arcadia Academy of Music
- Ariad Custom Communications
- ArtofDisplay.com
- Ask Around
- Aspen Gardens Community League
- Assured Mortgage Services
- Asthma Society of Canada
- AutoShare
- Aver Media
- baby on the hip
- Banff Airporter
- Bartlett Lodge
- Baudry Cybernomics - Office and Servers
- Beach Solar Laundromat
- Beaufort Computer
- Beck Taxi
- Bellalita
- Bennington Limousines
- BILD (Building Industry and Land Development Association)
- Forest Stewardship Council - Canada
- Free Your Game
- Freedom International Brokerage Company
- Freeman Real Estate
- Friends Meeting House
- Frilly Lilly - 1 Alberta location
- Frogpond Farm Organic Winery
- Front Door Organics
- G.A.P Adventures - Head Office, Calgary and Toronto Concept Stores
- Genuine Health
- Geometra Design
- George Street Naturopathic Medicine
- Gibson Timber Frames
- Global Energy Services
- GO Lighting Technologies - Warehouse
- Goddesshair
- Gold Seal Homes
- Good Earth Cafés - Eau Claire Market, Crowfoot Crossing and Lougheed locations
- Gooderham's Coffee Company
- Goodman, McDougall & Associates
- Grassroots Environmental Products
- Great Divide Nature Interpretation
- Green Group
- green is black
- Green Living Enterprises
- Green Reason
- Green Rewards
- Greener Daze
- Greenferd Construction
- Greenfields Organic Farm
- Greenpeace Canada
- GreenTech Services Non-Profit
- GriggSport Strategies
- Group One Associates
- Grow Hydroponics & Organics
- Halsall
- Hannam Fertility Centre
- Harvest Moon Organic Bakery
- heart on your sleeve
- Pharmacommunications Group - Production Facility
- Phoenix Engineering
- Phoenix Print Shop
- Pie in the Sky Studios
- PJB Energy Solutions
- Planet Bean - Retail Outlet and Coffee Bar
- Polar Pin
- Pollution Probe
- Polymeric Engineering Limited
- Prairie Sky Cohousing
- Prairieview Elementary School
- Preparedness
- Pretsell Cavanaugh Lawyers
- ProMark Window Film & Blinds
- Quadrangle Architects Limited
- Queensway West Animal Hospital
- QuickPlay Media
- Quintessential Clay
- QuintEssential Credit Union - 2 Ontario locations
- Rabbat Photography
- Rainbow Natural Foods
- RBC - 33 Ontario locations, 13 Alberta locations
- RBR
- REAP (Respect for the Earth and All People)
- Red Bloom Salon
- Red Canoe - National Heritage Brands
- Red Pine Outdoor Equipment
- Reid's Heritage Homes - Cambridge Model Home
- Religious Society of Friends
- Renaissance Yoga and Ayurveda
- Renfro Canada
- Richard Price Financial Management
- Richmond Hill Chamber of Commerce
- Ricoh Canada - Distribution Centre
- Riva Dentistry
- Riverdale Community League
- Riverhouse Company
- Robert Gore & Associates Chartered Accountants
- Robert J Dyck Architect & Engineer
- Rocky Mountain Soap Company

[166] Bullfrog Power, *Bullfrogpowered Green Index* (Date Unknown [cited March 24 2008]); available from http://www.bullfrogpower.com/powered/greenindex.cfm.

- Biltmore Homes - Model Home
- BioPed - Peterborough and Cobourg locations
- Birds 'n Paws
- Black Feather Wilderness Adventures
- Black Sheep Creative
- BLANCO Canada - Customer Service and Distribution Centre
- Bloomers at the Market
- Blue Wilderness Management Group
- Bluestreak Records
- BMO Financial Group - up to 53 branches
- Bon Ton Bakery
- Botan Construction
- Bravado! Designs
- Bridgemark
- Brigham Enterprises
- Broad View Health
- Brock St. Family Chiropractic
- Brook McIlroy/Pace Architects
- Bruce Mau Design
- Building Green
- Bunny Safari Pottery
- Burnbrae Farms - Free Run Omega 3 henhouses
- Burnham Insurance & Financial Services
- Burt's Bees Canada
- Butterfield & Robinson
- Byward Fruit Market
- C M R Law Office
- C.R. Visuals
- C2 Consulting
- Cadbury Adams - Toronto Head Office, National Distribution Centre
- Café Taste
- Caldwell Jeffery
- Calstone
- Cambridge Massage Therapy Clinic
- Cameron's Coffee
- Camp Tanamakoon
- Canada Green Building Council (CaGBC)
- Canada's Outdoor Shows - Head Office
- Canadian Boreal Initiative
- Canadian Business for Social Responsibility (CBSR)
- Canadian Parks and Wilderness Society - Calgary/Banff Chapter
- Canadian Tours International
- Canadian Wind Energy Association (CanWEA)
- CanamPac ULC
- Carbon Busters
- Carleton Place Nursery
- Carter McRae Events
- Heartwood Place
- Heather McCarvell Photography
- Helmutt's Pet Supply
- Her Therapeutic Massage & Hydrotheraphy
- Hidden Bench Vineyards & Winery
- Highland Technology
- hikingcamping.com
- Hobbs & Co. Wine Merchants
- HOK Canada - Toronto office
- Homes By Avi
- Horrocks & Co.
- Hot Shots
- HUNTERS International Insurance
- I Am Designs
- IDMG
- Incitement Marketing
- InCourage - Georgetown office
- In-Dey-Go Fundraising
- Indian Road Family Dentistry
- Industrial Chimney Maintenance
- INDUSTRYimages
- Inertia Engineering + Design
- Ingauge Metalworks
- Inkpro Contracting
- Innocore Sales & Marketing
- Innovative Response Marketing
- INSCAPE - Downtown Toronto Showroom
- InterfaceFLOR Commercial - Toronto Showroom
- Investeco Capital
- Irene Mathyssen, MP - Constituency Office
- Isherwood Geostructural Engineers
- ISX Tours
- Ivanhoe Cambridge - 13 Ontario malls (50%)
- Ivey Foundation
- Jacques Whitford Ltd. - Markham office
- Jake By The Lake
- Jayne's Gourmet Catering
- JMA Consulting
- Joanne Jones Financial Planning Services
- John Willmott Architect
- Jorritsma Design
- JRB & Company
- Jump Design
- Kappel & Associates
- KCP Energy
- Keilhauer - Headquarters
- Kew Beach Veterinary Hospital
- Rona Carstairs
- Roofing Contracting Services
- Room Service Catering
- Royal LePage Rocky Mountain Realty
- Royal LePage, Lakes of Muskoka
- S.H.I.M.ie Productions
- Saffron Rouge
- Sarkis Equine
- Scale Models Plus
- Secured Courier
- Seize the Moment Photography
- Seventy Six Davenport - The Florian Sales Centre
- Shadowfax
- Shaftesbury Films
- Shamus MacWee
- Sidetrail Media
- Sierra Club of Canada - Toronto and Edmonton offices
- Simcoe Court Reporting
- Simplifusion
- Small Potatoes Urban Delivery
- Smart Site
- SMART Watering Systems
- Social Capital Partners
- Spinhaven Bed and Breakfast
- SpinHost
- SR Management
- St. Agatha Parish
- St. Gabriel's Passionist Parish
- St. Paul Veterinary Clinic
- Steam Whistle Brewing
- Stickling's Specialty Bakery
- Stoneset Equities
- Storage Spot
- Stubbe Chocolates & Pastries - Toronto location
- Student Union of Confederation College Inc.
- Studio de Vie Essence Life Studio
- Succeed
- Sugarbush Cabinet Company
- Summerhill Group
- Susan Harris Design
- Switch Marketing and Communications
- Tay Valley Physiotherapy
- Taylor Label
- Techsense Management
- Ted Handy and Associates
- Temple B'Nai Tikvah
- TerraChoice Environmental Marketing
- Terrevista Earth Imaging
- The Adventure Travel Company -

- Centre Commons Perennials
- Century 21 Lanthorn Real Estate - Don Ross - home office
- Cervélo Cycles
- Chocolaterie Bernard Callebaut - Head Office and 5 Alberta locations
- Chris McKhool Concerts
- Christie Lites
- Ciker Costumes
- Cinder/Smoke Clothing
- Citizens Bank of Canada - Toronto office
- City of Mississauga - Civic Centre
- Clean Air Foundation
- CleanPix
- Clearly Green Design
- Climate Change Central
- CM Consulting
- CMS Web Solutions
- Coca-Cola - Canadian Head Office
- CodeProject - Head Office and servers
- COHOS EVAMY - Toronto office
- Collingwood Communications
- Community Midwives of Hamilton
- Contech Construction Services
- Copperhead Mechanical
- Cotton Ginny - 2 Alberta stores, 4 Ontario stores
- Couchiching Conservancy
- Credit Union Central of Ontario
- Credit Valley Conservation
- Crescent
- Crystal Homes - Model Home G62
- CTI Working Environments
- Cube Gallery
- Cupid & Psyche
- Current Reno's Contracting
- Cybertex
- Davis
- "Davis + Henderson - 3 Ontario locations
- 1 Alberta location"
- Deacon's Bioconsulting
- Dean Palmer Photography
- Deer Trails Retreat/Bed & Breakfast
- Design Air
- DGS/Project Management Solutions
- DigiGraphics - Head Office
- Discovery Child Care Centre
- D'Lux Lighting Design
- Domus Café
- Douglas Square Chiropractic
- Dr. Bob Adler, Dentist
- Dr. Gregory Bidinosti Rockway Chiropractic Clinic
- Dr. I.R. Noland
- Dr. William Newby, Psychologist
- Dragonfly Ridge Studio and Chickadee
- Key Gordon Communications
- Kick Off Sports Bar & Café
- Kimmick Landscaping
- KingSett Capital
- KIVA Landscape Design Build
- Kiwi Gardens
- Labbe-Leech Interiors
- Lake Ontario Waterkeeper
- Lakehead Unitarian Fellowship
- Lakeside Logistics
- LaserNetworks
- Lazer Graphics
- Liis Windischmann/Beyond the Sky Productions
- Little Siding and Roofing
- Little Stream Bakery
- Local Food Plus (LFP)
- Location Equipment Supply
- London Home Builders' Association (LHBA)
- London House Bed & Breakfast
- Lowe-Martin Group - Toronto production facility
- Loyalist Management Systems
- lululemon athletica - 15 Ontario stores, 7 Alberta stores
- LUX Beauty Boutique
- M3 Financial Group - Head Office
- M5V Condominiums - Presentation Centre
- Magpie Jewellery
- Mama Muxima
- Manning Consulting Group
- Manulife Financial - GTA and Ottawa Real Estate Offices and Global Headquarters (common employee amenities)
- Mark Levine & Associates
- Market Cleaners
- McDougall Signs & Graphics
- McMillan Binch Mendelsohn LLP - Client Service Centre
- Me to We Style Inc.
- Menno S. Martin
- Mercedez Condominium
- Meritas Mutual Funds
- Merlyn Power
- Metro Toronto Convention Centre - Administration offices and electronic signage
- Metrogate Presentation Centre
- Michael Suthern Computer Services
- Migrations Travel and Cruise Centre
- mined reCREATIONS
- Toronto office
- The Bullring coffee pub
- The Coup
- The Debut Group
- The Delphi Group
- The Doggie Motel
- The Event Group
- The Healthy Lifestyle Store
- The Jonah Group
- The Kee to Bala
- The Message Parlour
- The Montessori Country School - School Library
- The Natural Step Canada
- The Office of Gilbert Li
- The Otesha Project
- The Pembina Institute
- The Planet Bakery
- The Production Kitchen
- The Republic of Yonge & Eglinton - Sales Office
- The Richmond
- The Sisters of St. Joseph, London - Chapel and Suites
- The Sterling Hall School - Music Centre
- The Thompson Rosemount Group - Guelph office
- The Union Yoga Centre
- The Yoga Sanctuary
- Third World Bazaar
- Thomas Entertainment
- Thompson Print Management
- Three Wisemen
- Tookish Digital Communication
- Toronto and Region Conservation - Head Office, Kortright Centre for Conservation, and Restoration Services Centre
- Toronto Community Foundation (TCF)
- Toronto Green Community
- Touchstone Technologies
- Tour d'Afrique
- Town of Caledon - Town Hall
- Township of Rideau Lakes - Township Office
- Trailhead Kingston
- Transport Canada - Sudbury TCC
- Trauma Management Group
- Treefrog Interactive
- Turco Persian Rug Company
- TwinPro Graphics
- Unitarian Congregation of Niagara
- Upper Canada College - Residences
- Upper Canada Forest Products
- Upper Canada Property Management

Cabin
- Dymin Steel
- Earth Rangers
- eBay Canada
- Eccentric Artists Technical Services
- ECHOage.com
- Eckville District Savings and Credit Union
- Eclipse
- ECO3
- EcoDomestica ReDesign
- EcoEthic
- ecoSanity
- EcoSleeve Product Line
- El Cielo Lakech EcoLodge and Ranch
- Element Model Suite
- Elements The Patagonia Store
- Elm Tree Dental
- Elora Centre for Environmental Excellence (ECEE)
- Emergency Lighting Services
- Emma's Heart
- EnerVision
- EnerWorks
- Enviro-mental
- Environics
- Environmental Defence
- Environmental Health Technologies
- EnviroRentals
- Envirotech Office Systems
- Erin Community Radio
- Essence of Life Wellness Care
- Even Better Eco-Friendly Cleaning Services
- Everdale Environmental Learning Centre
- EvolutionGreen.com
- Leopard Frog Music
- LFG Home Delivery Solutions
- Liberty Clothing
- Lifford Wine Agency
- Family Massage Therapy Clinic and Therapeutic Supply Outlet
- Federation House - OSSTF 29 & ETFO
- Fine Craft Upholstery
- Flexahopper Plastics
- Flux Lighting
- Foamco Industries
- Foodstuffs - store and basement/storage
- Footprints Eco-Resort & Group Get-Away
- MiraTel Solutions
- Montauk Sofa - Calgary and Toronto locations
- Montgomery Sisam Architects
- Mother-ease Cloth Diapers
- Motion 1 Corp
- motum b2b
- Mountain Equipment Co-op - Calgary and Edmonton stores
- MPH Graphics
- Multatuli Coffee Merchants
- Muskoka in the City
- Nadir Fluorescent Service
- Nadurra Wood Corp.
- NAL Insurance
- Nancy MacKneson
- Nathanael Gray Architect
- Noah's Natural Foods - Head Office
- Noble Cellars Wine Imports
- Nomad Travel
- North American Logistics Services
- Northern Purification Systems
- On Your Marks Print & Design
- Ontario Association of Social Workers (OASW)
- Ontario Ministry of the Environment - Head Office
- Opal Carew, Romance Author
- Open Concept Consulting
- OPM (Outstanding Promotional Marketing)
- Organic Botanic
- Our Lady's Missionaries
- Our Natural World
- Pablo Pikelin Plans & Permits
- PAC (Packaging Association of Canada)
- Pacific Wine and Spirits
- Palgrave United Church & Manse
- Pandor Productions
- Pandora Press
- Panel Source International
- Parry Sound Family Physicians
- Pass It On Store
- Paul Hahn & Co.
- Paula Meier Associates
- Peel Elementary Teachers' Local (PETL)
- Pepper Cellars
- Performance Woodburning & Gas
- Urban Strategies
- Valleypine Farms
- Van Valkenburg Communications
- Vance Motors
- VAULT Solutions
- Venable Park Investment Counsel
- Ventus Energy
- Veritas Communications
- Vernacare
- Village Yoga Studio & Healing Therapies
- Virgin Mobile Canada - Canadian Head Office
- Vital Engineering
- W Studio
- Wal-Mart Canada - 3 Alberta stores & 3 Ontario Supercentres
- Walter and Duncan Gordon Foundation
- Warren's Waterless Printing
- Wee Book Inn - Head Office and 3 Alberta locations
- Wellington Financial LP
- WendyLynn Custom Homes
- West Photo
- Westfalen Orthotic Services
- White Squall Paddling Centre & Town Store
- Wiggers Custom Furniture
- Wild Rock Outfitters
- William D. Martin, Barrister and Solicitor
- With Gratitude
- Wood Street Renovations & Restorations
- Wooden It Be Nice
- Woodside Pottery
- WOOL-TYME - Kingston location
- Words Worth Books
- WorkCabin
- WORLD Salon
- WWF-Canada
- Yes Absolutely
- Your Body You
- Your Healthy House
- Youth Emergency Shelter Society - Head Office
- Zephyr North
- Zipcar Canada
- ZipLocal

The Pembina Institute sold RECs to the following commercial customers in 2007.

- AIM Language Learning
- Fairmont Hotels
- Minto Energy Management

- Alberta Museums Association
- Alcan Inc.
- Amaranth Whole Foods Market
- Bernard Callebaut
- Canadian Centre for Pollution Prevention
- CH2M Hill
- Clean Calgary Association
- Climate Change Central
- Co-Operators Group (The)
- Deloitte
- DIRTT Environmental Solutions
- DynamicHosting.biz
- Emerald Environmental Ltd.
- EnerVision
- Engineers Without Borders
- Good Earth Coffeehouse and Bakery
- Grapefruit Media
- Green Path Energy Ltd
- HT Naturals Inc. (World headquarters) - Anthony Caro
- Hugo Bonjean
- Ideum
- Innisfail Self-Storage & RV Parking
- Masha Krupp Translation Group Ltd.
- McGill University - Faculty of Law - ELM
- Millwoods Bottle Depot
- Mountain Equipment Co-op
- Natural Step Canada
- Norbuck Honey Farm
- PC Corp
- PCL Construction Resources Inc.
- Pembina Institute for Appropriate Development
- Planet Organic Market
- Rimbey Foods
- Spartek Systems Inc.
- Suncor Energy Inc.
- TrafX Research Limited
- Wendy Lynn Custom Homes
- Yamnuska Inc.

Appendix B. EcoLogo-Certified Electricity Products

The following information is courtesy of the EcoLogo website.[167]

Product Name	Brand Name	Manufacturer
Bullfrog Commercial	Bullfrog Commercial	Bullfrog Power Inc.
	Direct Energy Commercial	Direct Energy Marketing Limited
10% ECO-PACK - Commercial	EPCOR	Epcor Utilities Inc.
10% ECO-PACK - Small Commercial	EPCOR	Epcor Utilities Inc.
100% Premium Plus - Commercial	EPCOR	Epcor Utilities Inc.
100% Premium Plus - Small Commercial	EPCOR	Epcor Utilities Inc.
25% ECO-PACK Premium - Commercial	EPCOR	Epcor Utilities Inc.
25% ECO-PACK Premium - Small Commercial	EPCOR	Epcor Utilities Inc.
50% Premium Plus - Commercial	EPCOR	Epcor Utilities Inc.
50% Premium Plus - Small Commercial	EPCOR	Epcor Utilities Inc.
10% ECO-PACK - Commercial	EPCOR	Epcor Utilities Inc.
10% ECO-PACK - Commercial	EPCOR	Epcor Utilities Inc.
10% ECO-PACK - Small Commercial	EPCOR	Epcor Utilities Inc.
10% ECO-PACK - Small Commercial	EPCOR	Epcor Utilities Inc.
100% ECO-PACK Premium Plus - Small Commercial	EPCOR	Epcor Utilities Inc.
100% ECO-PACK Premium Plus - Small Commercial	EPCOR	Epcor Utilities Inc.
100% Premium Plus - Commercial	EPCOR	Epcor Utilities Inc.
100% Premium Plus - Commercial	EPCOR	Epcor Utilities Inc.

[167] TerraChoice Environmental Marketing, "Category: Electricity Products," (2007a), http://www.ecologo.org/en/certifiedgreenproducts/category.asp?category_id=24 (accessed May 20, 2008)

Product Name	Brand Name	Manufacturer
25% ECO-PACK Premium - Commercial	EPCOR	Epcor Utilities Inc.
25% ECO-PACK Premium - Commercial	EPCOR	Epcor Utilities Inc.
25% ECO-PACK Premium - Small Commercial	EPCOR	Epcor Utilities Inc.
25% ECO-PACK Premium - Small Commercial	EPCOR	Epcor Utilities Inc.
50% ECO-PACK Premium Plus - Small Commercial	EPCOR	Epcor Utilities Inc.
50% ECO-PACK Premium Plus - Small Commercial	EPCOR	Epcor Utilities Inc.
50% Premium Plus - Commercial	EPCOR	Epcor Utilities Inc.
50% Premium Plus - Commercial	EPCOR	Epcor Utilities Inc.
Greenmax™		Vision Quest Windelectric Inc. / ENMAX Green Power Inc.
NewMix Super.		Constellation NewEnergy Canada, Inc.
Greenmax™		Vision Quest Windelectric Inc. / ENMAX Green Power Inc.
Bullfrog Residential	Bullfrog Residential	Bullfrog Power Inc.
	Direct Energy Commercial	Direct Energy Marketing Limited
10% ECO-PACK - Residential	EPCOR	Epcor Utilities Inc.
10% ECO-PACK - Residential	EPCOR	Epcor Utilities Inc.
10% ECO-PACK - Residential	EPCOR	Epcor Utilities Inc.
100% Premium Plus - Residential	EPCOR	Epcor Utilities Inc.
100% Premium Plus - Residential	EPCOR	Epcor Utilities Inc.
100% Premium Plus - Residential	EPCOR	Epcor Utilities Inc.
25% ECO-PACK - Residential	EPCOR	Epcor Utilities Inc.
25% ECO-PACK Premium - Residential	EPCOR	Epcor Utilities Inc.
25% ECO-PACK Premium Residential	EPCOR	Epcor Utilities Inc.
50% ECO-PACK - Residential	EPCOR	Epcor Utilities Inc.

Product Name	Brand Name	Manufacturer
50% Premium Plus - Residential	EPCOR	Epcor Utilities Inc.
50% Premium Plus - Residential	EPCOR	Epcor Utilities Inc.

Appendix C. Program Information Forms

Green Power Programs in Canada – 2007

Alberta Municipal Services Corporation Electricity Aggregation

Identification

Acquiring entity (incl. entity type, ie. corporate, gov't, institutional)	Alberta Municipal Services Corporation (on behalf of numerous participating Alberta municipalities)
Province	Alberta
Name of Program	Electricity Aggregation (renewable component only)
Program start date	2004
Program type / brief description	AMSC provides an electricity aggregation program for bulk electricity procurement by participating Alberta municipalities. While most of this electricity is from conventional sources, the original program from 2004-2008 set a minimum threshold of 20% from renewable sources. AMSC purchases its electricity through retailer Nexen Marketing. As of 2009, a new program will no longer mandate that 20% of the AMSC electricity purchases are from renewable sources; participating municipalities can purchase as much or as little green power as they like as a proportion of their total purchased through the program.
Contact person (Name, email, phone)	

Acquisition program characteristics

Program characteristics	
Sectors affected	Alberta municipalities

Program characteristics	
Total MWh purchased in 2007	Approximately 70,000 MWh in 2006; similar or higher in 2007
Change in purchases over previous years	Previous years began at 20% of total electricity purchased under the program; 2006/2007 numbers represent an increase over previous years (50,944.8 MWh would be 20% of total 354,974 MWh / year purchased; 70,000 MWh represents a significant increase over the 20% threshold)

Green Power Programs in Canada – 2007

BC Hydro Calls for Power 2002/03

Identification

Company offering Program	BC Hydro
Province	BC
Name of Program	BC Hydro Request for Generation (RFG) / Calls for Power 2002/03 Green Power RFG http://www.bchydro.com/info/ipp/ipp958.html
Contact person (Name, email, phone)	Cindy Verschoor Manager, Stakeholder Engagement 16th Floor - 333 Dunsmuir Street Vancouver, BC V6B-5R3 Ph: (604) 623-3601 Cell:(604) 505-6317 Fax:(604) 623-3977

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	Key requirements included: • **Renewable:** The energy source must be replenishable by natural processes within a reasonable length of time - at the longest, within about one average human life span. For example, hydroelectric generation relies on water, which is a renewable resource. Natural gas electrical generation relies on a fossil fuel, a resource that does not meet this renewable criterion.

Program proponent characteristics	
	• **Licensable:** The project must meet all relevant regulations and standards. • **Socially responsible:** The project must be developed in a socially responsible manner. This criterion must be judged on a site-specific basis. Every project within BC Hydro's green acquisition process is reviewed according to specific social responsibility criteria. • **Low environmental impact:** The project must avoid unacceptably high environmental impacts such as damage to fish populations, endangered species or air quality. This criterion is evaluated on a site and technology-specific basis. Every green project within BC Hydro's acquisition process is reviewed according to the criteria that correspond to the project's technology.
Type and source of certification (note: more on this below)	2002/03 Green Power Generation Green Criteria. http://www.bchydro.com/info/ipp/ipp959.html
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Acquire a credible, low-cost green generation portfolio that meets corporate acquisition targets and market demand for green energy http://www.bchydro.com/rx_files/info/info4030.pdf
Perceived barriers	Firmness of energy
Specific sources and vintages of generation	In 2002/03 B.C. Hydro issued a green power generation request for generation (RFG). That procurement process resulted in the approval of 16 projects 14 hydro, one landfill gas and one wind energy – representing 1,764 GWhs of new generation, to be purchased by BC Hydro under 10- to 20-year contracts. http://www.bchydro.com/info/ipp/ipp958.html
Ownership of environmental attributes	BC Hydro

Performance

Program performance indicators

Year (indicate calendar or fiscal)	2007
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	[contracts awarded for 58.5 MW / 176 GWh – status of projects was not provided by utility]
Biomass	
Solar	
Small Hydro	[contracts awarded for 441 MW / 1572 GWh – status of projects was not provided by utility]
Other	Landfill gas [contracts awarded for 1.85 MW / 15 GWh – status of projects was not provided by utility]

2002/03 Green Power Generation

BC Hydro has announced the projects that successfully bid into the 2002/03 Green Power Generation (GPG) procurement process. Combined, the 16 projects (shown below) – 14 hydro, one landfill gas and one wind energy – represent 1,764 gigawatt hours of new green generation, to be purchased by BC Hydro under 10- to 20-year contracts. All projects must be operational by September 30, 2006.

Successful projects under BC Hydro's 2002/03 Green Power Generation Call

Project	Developer	Location	Capacity (megawatts)	Energy (gigawatt hours/ year)
1. Ashlu Creek Hydroelectric Project	Ledcor Power Inc.	Squamish	42	200
2. Bear Hydro Project	Regional Power Inc.	Sechelt	16	77
3. Berkey Creek	Princeton Energy Inc.	Hope	1.5	6.5

Hydroelectric Generation Project				
4. Brilliant Expansion Project	Brilliant Expansion Power Corporation	Castlegar	120	203
5. China Creek Hydro Project	Hupacasath First Nation	Port Alberni	5.6	25
6. Cypress Creek Hydroelectric Project	Synex Energy Resources Ltd.	Gold River	3.1	11
7. Forrest Kerr Run-of-River Hydroelectric Project	Coast Mountain Hydro Corp.	Stewart	112	541
8. Holberg Wind Energy Project	Stothert Power Corp. / Global Renewable Energy Partners Inc.	Holberg	58.5	176
9. Hunter Creek Hydroelectric Generation Project	Princeton Energy Inc.	Hope	2.4	10
10. Maxim Landfill Gas Cogeneration Project	Maxim Power (BC) Inc.	Delta	1.85	15
11. Mkw'alts Creek Hydro Project	Cloudworks Energy LP	Mount Currie	45	154
12. Pierce Creek Hydroelectric Generation Project	Larson Farms Inc. No. 593815	Chilliwack	0.77	3
13. South Cranberry Creek Power Project	Advanced Energy Systems 1 Limited Partnership	Revelstoke	6.6	33
14. Spuzzum Creek Power Project	Interpac Resources Ltd.	Boston Bar	29	90

15. Ucona River Hydro Project	Ucona River Joint Venture	Gold River	35	125
16. Zeballos Lake Hydro Project	Pacific Rim Power Corp.	Zeballos	21.85	93

http://www.bchydro.com/info/ipp/ipp958.html

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	BC Hydro Green Criteria June 2003 http://www.bchydro.com/rx_files/info/info4793.pdf
Stated objectives	BC Clean Electricity refers to electricity generated from resources and facilities built in British Columbia that have a lesser environmental impact relative to conventional generation sources and technology. The definition is intended to be dynamic and incorporates an expectation of continuous improvement in energy development -- economically, environmentally and socially.

Certification types (products, generators, both)	Generators To briefly summarize, for a project to be considered green it must be: • **Renewable:** The energy source must be replenishable by natural processes within a reasonable length of time - at the longest, within about one average human life span. For example, hydroelectric generation relies on water, which is a renewable resource. Natural gas electrical generation relies on a fossil fuel, a resource that does not meet this renewable criterion. • **Licensable:** The project must meet all relevant regulations and standards. • **Socially responsible:** The project must be developed in a socially responsible manner. This criterion must be judged on a site-specific basis. Every project within BC Hydro's green acquisition process is reviewed according to specific social responsibility criteria. • **Low environmental impact:** The project must avoid unacceptably high environmental impacts such as damage to fish populations, endangered species or air quality. This criterion is evaluated on a site and technology-specific basis. Every green project within BC Hydro's acquisition process is reviewed according to the criteria that correspond to the project's technology.
Eligible product categories (can disaggregate into technology categories if easier?)	Low Impact Biogas Low Impact Biomass Low Impact Hydroelectric Low Impact Wave Low Impact Wind Socially Responsible
Distinction between vintage of generation (yes/no and cut-off date if any)	Only generators that applied for and were awarded agreements under the 2003/04 call for power.

Green Power Programs in Canada – 2007

BC Hydro Calls for Power 2006

Identification

Company offering Program	BC Hydro
Province	BC
Name of Program	BC Hydro Request for Generation (RFG) / Calls for Power 2006 Open Call for Power http://www.bchydro.com/news/2006/jul/release47609.html
Contact person (Name, email, phone)	Cindy Verschoor Manager, Stakeholder Engagement 16th Floor - 333 Dunsmuir Street Vancouver, BC V6B-5R3 Ph: (604) 623-3601 Cell:(604) 505-6317 Fax:(604) 623-3977

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	This call did not specify criteria for facilities, but at the time the utility was operating under the provincial government's direction for electricity distributors to pursue a voluntary goal to acquire 50 percent of new supply from BC Clean Electricity.
Type and source of certification (note: more on this below)	BC Clean Electricity www.em.gov.bc.ca/AlternativeEnergy/Clean_Energy_2005.pdf

Program proponent characteristics	
Impetus for program (e.g. customer demand, financial opportunity, etc.)	50 percent voluntary target was introduced in the BC Government's 2002 Energy Plan. The Energy Plan is built on the following four cornerstones: • Low electricity rates and public ownership of BC Hydro; • Secure reliable energy supply; • More private sector opportunities; and • Environmental responsibility and no nuclear power sources. http://www.em.gov.bc.ca/AlternativeEnergy/Clean_Energy_2005.pdf
Specific sources and vintages of generation	The 2006 call resulted in 38 contracts being awarded, including 29 hydro, three wind, two biomass, two waste heat and two coal/biomass projects. The coal/biomass projects were subsequently cancelled following the 2007 BC Energy Plan, which establishes a zero emission standard for greenhouse gas emissions from coal-fired plants. http://www.bchydro.com/news/2006/jul/release47609.html
Ownership of environmental attributes	BC Hydro

Performance

Program performance indicators	
Year (indicate calendar or fiscal)	2007
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	[contracts awarded for 352 MW / 979 GWh – status of projects was not provided by utility]
Biomass	[contracts awarded for 140 MW / 1186 GWh – status of projects was not provided by utility]
Solar	

Small Hydro	[contracts awarded for 842 MW / 3077 GWh – status of projects was not provided by utility]
Other	Waste heat [contracts awarded for 12 MW / 75 GWh – status of projects was not provided by utility]

On July 27, 2006, BC Hydro awarded 38 contracts to IPPs across BC. The contracts include 29 hydro, three wind, two biomass, two waste heat and two coal/biomass projects totalling in approximately 7,000 GWh of energy per year. On August 31, 2006, BC Hydro filed the Report on the Call for Tenders Process [PDF, 3.6 Mb] with the BCUC. On September 21, the BCUC accepted all 38 EPAs for filing pursuant to Section 71 of the Utilities Commission Act

Bidder Name	Project Name	Energy Source	Plant Capacity (MW)	Total Energy (GWh/yr)	Status
Plutonic Power Corporation	East Toba and Montrose Hydroelectric Project	Water	196	702	Information not provided
AESWapiti Energy Corporation	AESWapiti Energy Corporation	Coal / Biomass	184	1,612	
Dokie Wind Energy Inc.	Dokie Wind Project	Wind	180	536	Information not provided
Bear Mountain Wind Limited Partnership	Bear Mountain Wind Park	Wind	120	371	Information not provided
3986314 Canada Inc.	Canada - Glacier / Howser / East – Project	Water	90.5	341	Information not provided
Green Island Energy Ltd.	Gold River Power Project	Biomass	90	745	Information not provided
Kwalsa Energy Limited Partnership	Kwalsa Energy Project	Water	85.9	384	Information not provided

Anyox Hydro Electric Corp.	Anyox and Kitsault River Hydroelectric Projects	Water	56.5	242	Information not provided
Compliance Power Corporation	Princeton Power Project	Coal / Biomass	56	421	
Upper Stave Energy Limited Partnership	Upper Stave Energy Project	Water	54.7	264	Information not provided
Mackenzie Green Energy Inc.	Mackenzie Green Energy Centre	Biomass / Other	50	441	Information not provided
Kwoiek Creek Resources Limited Partnership	Kwoiek Creek Hydroelectric Project	Water	49.9	147	Information not provided
Mount Hays Wind Farm Limited Partnership	Mount Hays Wind Farm	Wind	25.2	72	Information not provided
Canadian Hydro Developers, Inc.	Bone Creek Hydro Project	Water	20	81	Information not provided
Songhees Creek Hydro Inc.	Songhees Creek Hydro Project	Water	15	61	Information not provided
Plutonic Power Corporation	Rainy River Hydroelectric Project	Water	15	51	Information not provided
Hydromax Energy Ltd.	Lower Clowhom	Water	9.99	48	Information not provided
Hydromax Energy Ltd.	Upper Clowhom	Water	9.99	45	Information not provided
Global Cogenix Industrial Corporation	Kookipi Creek Hydroelectric Project	Water	9.99	39	Information not provided
Cogenix Power Corporation	Log Creek Hydroelectric Project	Water	9.99	38	Information not provided

Canadian Hydro Developers, Inc.	Clemina Creek Hydro Project	Water	9.95	31	Information not provided
KMC Energy Corp.	Tamihi Creek Hydro Project	Water	9.9	52	Information not provided
Valisa Energy Incorporated	Serpentine Creek Hydro Project	Water	9.6	29	Information not provided
Synex Energy Resources Ltd.	Victoria Lake Hydroelectric Project	Water	9.5	39	Information not provided
Second Reality Effects Inc.	Fries Creek Project	Water	9	41	Information not provided
Renewable Power Corp.	Tyson Creek Hydro Project	Water	7.5	48	Information not provided
Hupacasath First Nation	Franklin River Hydro Project	Water	6.65	19	Information not provided
Axiom Power Inc.	Clint Creek Hydro Project	Water	6	27	Information not provided
EnPower Green Energy Generation Inc.	Savona ERG Project	Waste Heat	5.89	41	Information not provided
EnPower Green Energy Generation Inc.	150 Mile House ERG Project	Waste Heat	5.89	34	Information not provided
Maroon Creek Hydro Partnership	Maroon Creek Hydro Project	Water	5	25	Information not provided
Spuzzum Creek Power Corp.	Sakwi Creek Run of River Project	Water	5	21	Information not provided
Canadian Hydro Developers, Inc.	English Creek Hydro Project	Water	5	19	Information

					not provided
Synex Energy Resources Ltd.	Barr Creek Hydroelectric Project	Water	4	15	Information not provided
Raging River Power & Mining Inc.	Raging River 2	Water	4	13	Information not provided
Synex Energy Resources Ltd.	McKelvie Creek Hydroelectric Project	Water	3.4	14	Information not provided
Advanced Energy Systems Ltd.	Cranberry Creek Power Project	Water	3	11	Information not provided
District of Lake Country	Eldorado Reservoir	Water	0.8	4	Information not provided
Subtotal			**1,439**	**7,125**	
Brilliant Expansion Power Corporation	Brilliant Expansion Project (2)	Water	120	226	
Total			**1,559**	**7,351**	

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	BC Hydro
Stated objectives	BC Clean Electricity refers to electricity generated from resources and facilities built in British Columbia that have a lesser environmental impact relative to conventional generation sources and technology. The definition is intended to be dynamic and incorporates an expectation of continuous improvement in energy development -- economically, environmentally and socially.
Certification types (products, generators, both)	Generators Generally, an electricity producer generates BC Clean Electricity if the facility is certified or certifiable under Environment Canada's Environmental Choice[M] Program, and for facilities of 50 MW or more, if the plant receives an Environmental Assessment Certificate from the British Columbia Environmental Assessment Office.

Eligible product categories (can disaggregate into technology categories if easier?)	Resources and technological applications that may qualify as a source for BC Clean Electricity production are listed below: ***Biogas Energy*** Facilities producing biogas include landfill sites, sewage treatment plants and anaerobic digestion organic waste processing facilities. ***Biomass Energy*** - means electricity generated from the combustion or gasification of clean biomass. Clean biomass is derived from organic waste material that has no other commercial use or is the alternative with the lowest environmental impact and with no other higher-order use. Clean biomass does not include organic material that has been treated with organic and/or inorganic substances to change, protect or supplement the physical properties of the materials. ***Cogeneration*** - Cogeneration aims to maximize the efficiency of energy resource combustion by producing electricity and heat from one or more boilers, combustion turbines or engines at a single facility. To qualify as BC Clean Electricity, the fuels used must have no other commercial use or have the lowest environmental impact compared to other alternatives and have no other higher-order use. Such fuels include biomass and municipal solid waste. Portions of energy from a cogeneration project may be considered BC Clean Electricity if: • The calculated proportion of energy output (thermal and electrical) is attributable to a fuel source or technology defined as BC Clean; or • An existing simple-cycle or combined-cycle generation facility is retrofitted and the incremental energy produced meets the BC Clean criteria for supply-side efficiency gains. ***Energy Recovery Generation (ERG)*** - means electricity produced from the recovery of waste energy from an industrial process. Eligible processes use a closed-loop system and do not use fossil fuels as an input source within the ERG technology process. The only product of ERG is electricity. ***Geothermal Energy*** - means electricity produced using the natural heat of the earth and all substances that derive an added value from it, including steam, water and water vapour heated by the natural heat of the earth and all substances dissolved in the steam, water or water vapour obtained from a well. This does not include hydrocarbons. ***Hydrocarbon Energy*** - means electricity produced from a facility combusting or converting fossil fuel using a closed-loop process whereby all air and water emissions from the operation of the facility are either deemed to be zero, negligible, or subject to long-term sequestration from the immediate receiving environment. Such a system requires approval of the Minister of Energy, Mines and Petroleum Resources for classification as BC Clean Electricity. ***Hydro Energy*** - means electricity generated from a system or technology that uses a mechanical method to capture and convert the potential energy of water.

	Hydrogen - Usually recognized as an energy currency, hydrogen can also be used as a primary fuel source for internal combustion engines. Hydrogen produced from a renewable resource and combusted in an internal combustion process or otherwise converted into electricity is considered BC Clean. ***Solar Energy*** - means electricity generated by converting the radiant light or heat energy of the sun through the use of photovoltaic and concentrating solar thermal technologies. ***Supply-Side Efficiency Gains*** – means an upgrade to an existing facility that uses or results in the use of a renewable energy source and creates an incremental supply of electricity. ***Tidal Energy*** - means electricity produced by harnessing the natural rise and fall of a tide in an estuary or bay of the ocean, provided the system does not use technology that results in negative impacts to marine life and ecosystems. ***Wave Energy*** - means electricity produced by harnessing the natural rise and fall of waves in the ocean, provided the system does not use technology that results in negative impacts to marine life and ecosystems. ***Wind Energy*** - means electricity produced from a system of airfoils or blades that spin a drive shaft to capture the kinetic energy of the wind. ***Other Potential BC Clean Electricity Sources –*** can include a project where the proponent or electricity distributor can demonstrate to the satisfaction of the Minister of Energy, Mines and Petroleum Resources that a project or application of technology, otherwise excluded by this guideline or not qualifying for certification under the Environmental Choice[M] Program should be recognized as producing BC Clean Electricity.
Distinction between vintage of generation (yes/no and cut-off date if any)	Only generators that applied for and were awarded agreements under the 2006 call for power.
Allows for "blended" products (ie. Green-e allows up to 50% of certified product to be "brown")	See eligible product above

Green Power Programs in Canada – 2007

BC Hydro Calls for Power 2007/08

Identification

Company offering Program	BC Hydro
Province	BC
Name of Program	BC Hydro Request for Generation (RFG) / Calls for Power 2007/08 Clean Power Call http://www.bchydro.com/info/ipp/ipp48319.html Bioenergy call for Power http://www.bchydro.com/info/ipp/ipp51371.html
Contact person (Name, email, phone)	Cindy Verschoor Manager, Stakeholder Engagement 16th Floor - 333 Dunsmuir Street Vancouver, BC V6B-5R3 Ph: (604) 623-3601 Cell:(604) 505-6317 Fax:(604) 623-3977

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	Clean Power Call: The criteria to meet the province's "clean or renewable energy" requirement are being reviewed in draft form by stakeholders. These draft definitions indicate that qualification can be met through Environmental Choice certification, meeting the definitions developed by the government (these draft definitions include Energy Recovery Generation, hydrocarbon generation

Program proponent characteristics	
	with zero greenhouse gas emissions, as well as more typical renewable definitions), or recognized by the Minister of Energy, Mines and Petroleum Resources as meeting the definition for clean or renewable. Bioenergy Call: The request for proposal (RFP) for Phase I, issued in February 2008, is for projects that are immediately viable and do not need new tenure from the Ministry of Forests and Range. B.C. Hydro plans to release the RFP for Phase II in July 2008, pending completion of an ongoing biomass inventory and forest tenure analysis currently being undertaken by the Ministry of Forests and Range.
Type and source of certification (note: more on this below)	*British Columbia's Clean or Renewable Electricity Guidelines* (2008) http://www.em.gov.bc.ca/AlternativeEnergy/cre_defs.pdf draft
Impetus for program (e.g. customer demand, financial opportunity, etc.)	In February 2007, the B.C. government released its *BC Energy Plan: A Vision for Clean Energy Leadership*, which indicated that at least 90% of all electricity generated in the province must continue to come from clean or renewable sources. The B.C. Energy Plan also requires self-sufficiency to meet electricity needs by 2016, prohibits nuclear generation, and establishes a zero emission standard for greenhouse gas emissions from coal-fired plants. http://www.energyplan.gov.bc.ca
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	Clean energy call: to meet the Energy Plan goals Bioenergy call: to utilize wood infected by the mountain pine beetle as well as other wood fibre fuel sources. The Bioenergy Call will assist in enabling B.C. to be electricity self-sufficient as outlined in the new Energy Plan, and allow BC Hydro to secure firm, clean energy.
Specific sources and vintages of generation	New sources
Ownership of environmental attributes	BC Hydro

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	BC Ministry of Energy Mines and Petroleum Resources THE FOLLOWING ARE DRAFT RECOMMENDATIONS AS OF May 13, 2008 http://www.em.gov.bc.ca/AlternativeEnergy/cre_defs.pdf
Stated objectives	Electricity generated in British Columbia may be reported as Clean or Renewable Electricity if: 1) The facility is in compliance with all applicable Federal and Provincial environmental regulations; AND 2) The facility satisfies one of the following requirements: a) The electricity is generated in a facility that uses a Clean or Renewable Electricity Resource or Technology as defined in this document. b) The electricity is generated in a facility that fulfills one of the following requirements: • Can demonstrate that the facility meets the certification criteria for "electricity- renewable low-impact" as defined by Environment Canada's Environmental Choice℠ Program; or • The facility maintains Environmental Choice℠ Program certification. c) Electricity is generated using a process, resource, or technology that is not recognized as Clean or Renewable in this document, but receives recognition from the Minister of Energy, Mines and Petroleum Resources as Clean or Renewable Electricity.
Certification types (products, generators, both)	Generators

Eligible product categories (can disaggregate into technology categories if easier?)	Resources and technological applications that may qualify as a source for Clean or Renewable Electricity production are listed below: **Biogas Energy -** means electricity generated from a system that captures biogas for combustion or conversion to electricity. Biogas means the gaseous products (primarily methane and carbon dioxide) produced from organic waste material. Facilities producing biogas include landfill sites, sewage treatment plants, and anaerobic digestion organic waste processing facilities. **Biomass Energy -** means electricity generated from the combustion or gasification of organic materials. Biomass includes, but is not limited to: • Dedicated energy crops; • Liquid fuels derived from biomass including bio-oil, ethanol, methanol, and diesel; and • Clean organically sourced material separated from municipal solid waste (MSW) and processed to serve as a combustion fuel. Clean biomass does not include organic material that has been treated with organic and/or inorganic substances such as paints, creosote, pentachlorophenol or chromated copper arsenate, to change, protect, or supplement the physical properties of the materials. If a facility co-fires fuels, or uses a mix of fuels that includes fossil fuels, only the proportion of the total electric output that can be attributed to the use of a clean or renewable fuel source qualifies as clean or renewable electricity. The proportion of the total electric output that qualifies as clean or renewable electricity must be calculated based on the proportion that clean or renewable energy constitutes of the total energy input used by the renewable energy system to generate electricity, or if practicable, separate metering. **Energy Recovery Generation (ERG) -** means electricity produced from the recovery of waste energy from an industrial process that would otherwise have been vented or emitted into the atmosphere. The only product of ERG is electricity. ERG represents a net environmental improvement relative to existing energy production because it uses the waste of other processes to generate electricity. Therefore, all output from an ERG facility is considered Clean or Renewable Electricity. **Geothermal Energy -** means electricity produced using the natural heat of the earth and all substances that derive an added value from it, including steam, water and water vapour heated by the natural heat of the earth and all substances dissolved in the steam, water or water vapour obtained from a well. This does not include hydrocarbons or water that has a temperature less than 80°C at the point where it reaches the surface.

	Hydrocarbon Energy - means electricity produced from a facility combusting or converting fossil fuel using a closed-loop process whereby all greenhouse gas emissions from the operation of the facility are either deemed to be zero, negligible, or subject to long-term sequestration from the immediate receiving environment. Such a system requires approval of the Minister of Energy, Mines and Petroleum Resources for classification as Clean or Renewable Electricity. **Hydro Energy -** means electricity generated from a system or technology that uses a mechanical method to capture and convert the potential energy of water. **Hydrogen -** usually recognized as an energy currency, hydrogen can also be used as a primary fuel source for internal combustion engines. Hydrogen produced from either a clean or renewable resource, or captured as a waste by-product of an industrial process, and then combusted in an internal combustion process or otherwise converted into electricity, is considered Clean or Renewable. **Municipal Solid Waste (MSW) -** incineration of MSW to produce energy has both positive and negative environmental impacts. The release of carbon dioxide and other emissions is a negative impact, but reducing the amount of materials in landfills has benefits. Therefore, the combustion of MSW for electricity generation may be considered Clean or Renewable Electricity. A MSW incineration system requires approval of the Minister of Energy, Mines and Petroleum Resources for classification as Clean or Renewable Electricity. **Solar Energy -** means electricity generated by converting the radiant light or heat energy of the sun through the use of photovoltaic and concentrating solar thermal technologies. **Tidal Energy -** means electricity produced by harnessing the natural rise and fall of a tide in an estuary or bay of the ocean. **Wave Energy -** means electricity produced by harnessing the natural rise and fall of waves in the ocean. **Wind Energy -** means electricity produced from a system of airfoils or blades that spin a drive shaft to capture the kinetic energy of the wind. **Other Potential Clean or Renewable Electricity Sources -** can include a project where the proponent or electricity distributor can demonstrate to the satisfaction of the Minister of Energy, Mines and Petroleum Resources that a project or application of technology otherwise excluded by this guideline, or not qualifying for certification under the Environmental Choice℠ Program, should be recognized as producing Clean or Renewable Electricity.

	For Bioenergy Call Phase I:
	
	Electrical energy generated from Forest-based Biomass by Projects located in British Columbia. Projects may be "greenfield" generation Projects or Projects and undertaken by Customers to utilize Forest-based Biomass in the generation of electrical energy.
	
	BC Hydro will consider Projects that meet the following eligibility requirements:
	
	• Fuel Type: Forest-based Biomass, including mill solid wood residues (hog fuel, sawdust, chips and/or chunks), pulp mill residues (hog fuel and black liquor), roadside and landing residues, and biomass derived from standing timber, without access to new timber harvesting tenure.
	• Location: Projects to be located in British Columbia, excluding Fort Nelson and other areas of the Province from which BC Hydro would be required to transmit energy through another out-of-province jurisdiction to the Lower Mainland.
	• Technology: Projects must use "proven" generation technologies. Nuclear technology is not eligible. "Proven" technologies are generation technologies, which are readily available in commercial markets and in commercial use (not demonstration use only), as evidenced by at least three generation plants (which need not be owned or operated by the Proponent) generating electrical energy for a period of not less than three years, to a standard of reliability generally required by good utility practice and the terms of the EPA.
	• Clean: Entire output from the Project must qualify as "clean energy" in accordance with guidelines to be published by the British Columbia Ministry of Energy, Mines and Petroleum Resources. The guidelines will be available at the following website: www.em.gov.bc.ca/AlternativeEnergy.
	• Project Type:
	  • New (i.e. "greenfield") generation Projects, or incremental generation from new generating units at existing generation plants currently synchronized with the System, which are not servicing directly a Customer industrial load (i.e. IPP Projects), or
	  • New self-generation, or incremental self-generation, in any event excess of the Customer's GBL at a Customer's facility to serve the Customer's industrial load at the facility (i.e. load displacement) and/or effect net energy export to the System (i.e. Customer Projects), but excluding generation projects, where the current output is under contract through a load displacement or demand side management agreement with BC Hdyro.
	• Metering: Project output must be capable of being metered separately or alternate
	http://www.bchydro.com/rx_files/info/info55030.pdf

Green Power Programs in Canada – 2007

BC Hydro Green Criteria

Identification

Company offering Program	BC Hydro
Province	British Columbia
Name of Program	Green Criteria http://www.bchydro.com/rx_files/info/info4793.pdf
Contact person (Name, email, phone)	

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	BC Hydro
Stated objectives	BC Clean Electricity refers to electricity generated from resources and facilities built in British Columbia that have a lesser environmental impact relative to conventional generation sources and technology. The definition is intended to be dynamic and incorporates an expectation of continuous improvement in energy development -- economically, environmentally and socially.

Certification types (products, generators, both)	Generators To briefly summarize, for a project to be considered green it must be: • **Renewable:** The energy source must be replenishable by natural processes within a reasonable length of time - at the longest, within about one average human life span. For example, hydroelectric generation relies on water, which is a renewable resource. Natural gas electrical generation relies on a fossil fuel, a resource that does not meet this renewable criterion. • **Licensable:** The project must meet all relevant regulations and standards. • **Socially responsible:** The project must be developed in a socially responsible manner. This criterion must be judged on a site-specific basis. Every project within BC Hydro's green acquisition process is reviewed according to specific social responsibility criteria. • **Low environmental impact:** The project must avoid unacceptably high environmental impacts such as damage to fish populations, endangered species or air quality. This criterion is evaluated on a site and technology-specific basis. Every green project within BC Hydro's acquisition process is reviewed according to the criteria that correspond to the project's technology.
Eligible product categories (can disaggregate into technology categories if easier?)	Low Impact Biogas Low Impact Biomass Low Impact Hydroelectric Low Impact Wave Low Impact Wind Socially Responsible
Distinction between vintage of generation (yes/no and cut-off date if any)	Only generators that applied for and were awarded agreements under the 2003/04 call for power.

Green Power Programs in Canada – 2007

BC Hydro Green Power Certificates

Identification

Company offering Program	BC Hydro
Province	British Columbia
Name of Program	BC Hydro Green Power Certificates
Contact person (Name, email, phone)	Margo Best

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	BC Hydro used a detailed list of criteria for green power. The technologies included: Low Impact Biogas Low Impact Biomass Low Impact Hydroelectric Low Impact Wave Low Impact Wind Socially Responsible However, any technology also needed to comply with the criteria list in http://www.bchydro.com/rx_files/info/info4793.pdf
Type and source of certification (note: more on this below)	EcoLogo certification through TerraChoice Environmental Services Inc. for all projects that were operational post 2001. http://www.bchydro.com/environment/greenpower/greenpower1664.html
Specific sources and vintages of	BC Hydro has 16 projects that successfully bid into the 2002/03 Green Power Generation (GPG)

Program proponent characteristics	
generation	procurement process. Combined, the 16 projects – 14 hydro, one landfill gas and one wind energy – represent 1,764 gigawatt hours of new green generation, to be purchased by BC Hydro under 10- to 20-year contracts. All projects must be operational by September 30, 2006.

Marketing (program customer characteristics)

Program customer characteristics	
Program / product design	BC Hydro has purchased green power, at a premium, to supply the GPC program. However, since green electricity goes into our integrated power grid, there is no way to guarantee that green electrons flow from a specific generating facility to a specific customer. Instead, Green Power Certificates credit purchasers with the environmental attributes of new green power, separate from the electrons – creating the same benefit as if green electricity flowed directly to the purchaser.
Price premium over regular rates / cost recovery	Pricing discounts for large volume purchases, and the introduction of multi-year purchase options. (from 2004/05 report http://www.bchydro.com/info/reports/reports23747.html)
Customer sectors affected	GPCs are now offered to BC Hydro's institutional, commercial and industrial customers. This represents an expansion from 2004/05 when GPCs were only available to large industrial and commercial customers
Key customers	Companies like CIBC, TransLink, and Wal-Mart have made significant commitments toward GPC purchases.

Marketing (performance indicators)

Program performance indicators	
Year (indicate calendar or fiscal)	F2007
Number / % of customers enrolled	

Total	80 customers
MWh sold	
Total	67,084 MWh, 50% increase from f2006.

Certification

Green power certification / standards comparison characteristics	
Stated objectives	2002/03 Green Power Generation Green Criteria BC Hydro evaluates potentially green project proposals against detailed low environmental impact and social responsibility criteria. To briefly summarize, for a project to be considered green it must be: • Renewable: The energy source must be replenishable by natural processes within a reasonable length of time - at the longest, within about one average human life span. For example, hydroelectric generation relies on water, which is a renewable resource. Natural gas electrical generation relies on a fossil fuel, a resource that does not meet this renewable criterion. • Licensable: The project must meet all relevant regulations and standards. • Socially responsible: The project must be developed in a socially responsible manner. This criterion must be judged on a site-specific basis. Every project within BC Hydro's green acquisition process is reviewed according to specific social responsibility criteria. • Low environmental impact: The project must avoid unacceptably high environmental impacts such as damage to fish populations, endangered species or air quality. This criterion is evaluated on a site and technology-specific basis. Every green project within BC Hydro's acquisition process is reviewed according to the criteria that correspond to the project's To view or download the detailed low-impact and social responsibility criteria, please see 2002/03 Green Power Generation Green Criteria From http://www.bchydro.com/info/ipp/ipp959.html, accessed February 27, 2008

Third party verification	BC Hydro hires an independent auditor, following the end of each fiscal year, to: • Perform a review of our tracking system, to confirm both the volume of green electricity entering our grid and the allocation of each megawatt hour of generation met all commitments. • To verify that our claims and commitments to Green Power Certificate purchasers are accurate, and that our customers receive what we promised in our contract.

Benefits

Environmental Benefits	
Greenhouse gases (kg CO_2e / MWh)	
During 2007	24,000 tonnes of greenhouse gas emissions (2006/07)

References

http://www.bchydro.com/info/ipp/ipp48319.html

http://www.bchydro.com/business/gpcerts/gpcerts3621.html

Green Power Programs in Canada – 2007

BC Hydro Net Metering

Identification

Company offering Program	BC Hydro
Province	British Columbia
Name of Program	BC Hydro Net Metering Program http://www.bchydro.com/info/ipp/ipp8842.html
Contact person (Name, email, phone)	

Program characteristics

Program characteristics	
Eligible technology / size	Sources must be 50 kW or less and located on the customer's premises. Customers who generate less electricity than they use will pay BC Hydro for the net electricity at their usual rate. Customers who generate more electricity than they use will receive a credit from BC Hydro that goes to their account and can be applied against future consumption charges. On an annual basis, the customer will be credited for any excess generation at a rate of 5.4 cents/kWh. Customers must first sign an interconnection agreement with BC Hydro and comply with its terms.
Type and source of certification (note: more on this below)	BC Clean, as defined by the BC Ministry of Energy Mines and Petroleum Resources that is connected to the BC Hydro distribution system
Program objectives (e.g. GHG reduction, CAC reduction,	Electricity self sufficiency and clean electricity

Program characteristics	
branding, etc.)	
Customer sectors affected	Residential and commercial

Performance indicators

Program performance indicators	
Year (indicate calendar or fiscal)	2007
Number / % of customers enrolled	
Residential	
Commercial	
Institutional	
Industrial	
Total	"There are currently 38 active participants representing an installed generation capacity of 246.6 kW, and 15 additional applications in process representing 176.8 kW.
Change in number / % of customers over previous years	
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	0.0107
Biomass	

Solar	0.129
Small Hydro	0.1137
Other	0.170 fuel cell
Total	The total resource (active plus applications) of 423.4 kW consists of 113.7 kW of hydro, 170 kW of fuel cell, 129 kW of photovoltaic and 10.7 kW of wind

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	BC Hydro / BC MEMPR
Certification types (products, generators, both)	Generators
Eligible product categories (can disaggregate into technology categories if easier?)	The BC Government's definition of BC Clean is: "BC Clean electricity refers to alternative energy technologies that result in a net environmental improvement relative to existing energy production. Examples may include small/micro hydro, wind, solar, photovoltaic, geothermal, tidal, wave and *biomass energy, as well as cogeneration of heat and power, energy from landfill gas and municipal solid waste, fuel cells and efficiency improvements at existing facilities."*

Green Power Programs in Canada – 2007

BC Hydro Standing Offer Program

Identification

Company offering Program	BC Hydro
Province	BC
Name of Program	BC Hydro Standing Offer Program http://www.bchydro.com/info/ipp/ipp51323.html
Contact person (Name, email, phone)	

Program characteristics

Program proponent characteristics	
Eligible technology / size	The Program is a process to purchase energy from small projects with a nameplate capacity greater than 0.05 megawatts but not more than 10 megawatts. The program is currently limited to Proven Generation Technologies, with the exception of nuclear power.
Type and source of certification (note: more on this below)	Eligibility criteria is defined by BC Hydro in the Standing Offer Program Rules (April 2008). http://www.bchydro.com/rx_files/info/info55729.pdf
Impetus for program (e.g. customer demand, financial opportunity, etc.)	In February 2007, the B.C. government released its *BC Energy Plan: A Vision for Clean Energy Leadership*, which directed BC Hydro to implement a Standing Offer Program to encourage the development of small and clean energy projects throughout British Columbia. http://www.energyplan.gov.bc.ca

Program proponent characteristics	
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	Electricity self sufficiency and clean electricity
Specific sources and vintages of generation	New sources
Ownership of environmental attributes	It is mandatory for Developers to transfer any Environmental Attributes (including any on-site emission reduction credits) for the energy delivered and sold under the Project EPA to BC Hydro. An additional payment of $3.10 (2008$) will be made for each MWh of Project energy that receives Environmental Certification and is delivered to BC Hydro under a Project EPA. The Environmental Attributes price will be revised no sooner than at the end of the second year of the Program.

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	BC Hydro Standing Offer Program Rules http://www.bchydro.com/rx_files/info/info55729.pdf
Stated objectives	In previous years, BC Hydro has issued a number of calls for power with varying requirements of the projects and participants. While these calls were successful in obtaining power for the province from both small and large sources, both BC Hydro and the provincial government were concerned that the administrative burden of participation in the calls was too great for small developers.
Certification types (products, generators, both)	Generators

Eligible product categories (can disaggregate into technology categories if easier?)	The Developer must provide evidence that the energy acquired under the Project EPA will be Clean, Renewable or High Efficiency Co-generation. The Clean, Renewable and High Efficiency Co-generation requirement applies only to the portion of energy that BC Hydro will buy under a Project EPA. The Program is a process to purchase energy from small Projects with a Nameplate Capacity greater than 0.05 megawatts (MW) but not more than 10 MW. All Proven Generation Technologies are eligible to participate in the Program, except nuclear. Prototype and near commercial technologies are not eligible to participate in the Program. Energy from a new generator that is not part of a Common Generation Facility – The Nameplate Capacity of the new generator must be greater than 0.05 MW but not more than 10 MW. The full output from the new generator will be sold to BC Hydro under the Project EPA. Energy from a Project that is part of a Common Generation Facility – The following types of Common Generation Facilities are eligible: (1) an Existing Generation Facility with a Nameplate Capacity greater than 0.05 MW, and (2) an increase in the Nameplate Capacity of an Existing Generation Facility whereby the new capacity is greater than 0.05 MW but not more than 10 MW, and (3) a new generator added to an Existing Generation Facility where the Nameplate Capacity of the new generator is greater than 0.05 MW but not more than 10 MW. BC Hydro will acquire energy generated by the Common Generation Facility (including the Project) to a maximum of 110 per cent of the Project Capacity. The Project Capacity is limited to 10 MW.

Green Power Programs in Canada – 2007

BC Rent and Land Use Policies for Wind Power Projects

Identification

Company offering Program	BC Ministry of Agriculture and Lands Staff
Province	British Columbia
Name of Program	Participation rent policy for wind energy project / Land Use Operational Policy for Wind Power Projects http://www.em.gov.bc.ca/alternativeenergy/windpower/default.htm
Contact person (Name, email, phone)	Geoff Turner, BC Ministry of Energy Mines and Petroleum Resources

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	Applies to all wind projects on upland, foreshore, or aquatic Crown land (essentially all wind projects)
Type and source of certification (note: more on this below)	None
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Energy for Our Future: A Plan for British Columbia, produced by the Ministry of Energy Mines, and Petroleum Resources notes that alternative energy sources could be harnessed to meet our energy needs and generate renewed economic growth and prosperity for all British Columbians and states that "the private sector will develop new electricity generation" (MEMPR, 2002).

Performance

Program performance indicators	
Year (indicate calendar or fiscal)	2007 calendar
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	None by the end of 2007 - three wind power projects have won electricity purchase agreements with BC Hydro and are under construction (or will be soon) these projects have a cumulative nameplate capacity of 325 MW
Biomass	
Solar	
Small Hydro	
Other	
Total	

Green Power Programs in Canada – 2007

Bullfrog Power – Green Power

Identification

Company offering Program	Bullfrog Power
Province	Ontario / Alberta
Name of Program	Bullfrogpowered
Contact person (Name, email, phone)	Theresa Howland (VP Western Division), 403.802.4255

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	Any of wind or low-impact hydroelectric.
Type and source of certification (note: more on this below)	Environmental Choice Program EcoLogo.
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Residential and commercial voluntary customer demand.
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	Bullfrog Power provides Canadians with a convenient way to directly impact the balance of power in their province by supporting locally generated renewable power. By voluntarily agreeing to pay a premium above conventional electricity rates, Bullfrog Powers customers are helping to reshape the landscape of electricity generation in Canada by causing a direct increase in the amount of new renewable generation that comes online. By supporting the growth of green power in their province,

Program proponent characteristics	
	customers are reducing their own and their province's impact on the environment and contributing to cleaner, healthier and sustainable energy future for Canadians. **Our mission is to provide practical energy choices that enable people to create a sustainable world for future generations.** At Bullfrog Power, we believe individuals and businesses can play an important role in increasing the amount of renewable generation in the country, thereby reducing GHG and other harmful emissions. We are a "double bottom line" company that maintains a dual focus on environmental responsibility and profitability. The company has pledged to donate 10% of profits to organizations that support sustainability. http://www.bullfrogpower.com/about/mission.cfm
Perceived barriers	The most significant barriers in today's green power operating environment are: • Large gap between costs of conventional electricity and price of renewables, caused predominantly by government policies that subsidize conventional electricity generation and other policies that inflate the cost of renewable electricity • Lack of significant government support for creating a self-sustaining voluntary retail market • Lack of consistent federal and/or provincial green power procurement initiatives to show government commitment to reduction of their own environmental footprint
Specific sources and vintages of generation	The Company purchases current vintages of generation from several projects. These projects may change over time, but have included: Alberta: • Alberta Wind Energy Corporation (http://www.albertawindenergy.com/Main.aspx) Ontario: • Sky Generation (http://www.skygeneration.ca/) • Schneider Power (http://www.schneiderpower.com/)

Program proponent characteristics	
	• Brookfield Power (http://www.brookfieldpower.com/) All MWh's sold by the Company during the year were generated within 12 months of the sale.
Ownership of environmental attributes	Bullfrog Power acquires the rights to all environmental attributes of every MWh purchased from the EcoLogo certified producers and retires those environmental attributes on behalf of its customers. (http://www.bullfrogpower.com/clean/on_clean.cfm)

Marketing (program customer characteristics)

Program customer characteristics	
Perceived barriers	The most significant barriers in today's marketplace: • Price premium of renewable electricity over conventional electricity • Lack of public awareness about the availability of green power programs • Lack of awareness of the benefits of choosing 100% renewable green power • Lack of urgency for customers to act and make proactive decisions to reduce their individual environmental footprint and affect climate change • Confusion in the marketplace around the direct reduction of greenhouse gas emissions through the purchase of green power vs the purchase of a carbon offset product to attempt to offset previously created emissions
Marketing strategy	Public education on the benefits of purchasing 100% renewable green power. Transparency around program green power sources, ownership of environmental attributes and benefits of emission reductions. Partnering with environmental non-governmental organizations such as The Pembina Institute, World Wildlife Foundation, Pollution Probe, etc to assist in education about the environmental benefits of purchasing green power. Providing residential customers with branded bullfrogpowered materials such as stickers and lawn signs.

	Provide commercial customers with employee programs to aid in raising awareness about and educating employees on the benefits of purchasing green power. Also provide branded bullfrogpowered materials such as decals and signs and license to use bullfrogpowered identifiers on collateral, web, and other communications vehicles. Nominal advertisement in selected local and national media.
Program / product design	In Ontario, Bullfrog Power sells green electricity and Green Power Certificates (GPC's) generated and injected onto the local Ontario interconnected electricity system. In Alberta, Bullfrog Power sells Green Power Certificates generated and injected onto the local Alberta interconnected electricity system. The program is designed to be inclusive of all non-regulated voluntary green power consumers including those from the residential, commercial, institutional and industrial sectors. Green power is sold on a per MWh basis.
Price premium over regular rates / cost recovery	Ontario Residential bullfrogpower costs 8.9 cents / kWh (includes the cost of conventional electricity). Ontario Commercial bullfrogpower costs 3.0 cents / kWh over regular rates Alberta bullfrogpower costs 2.0 cents / kWh over regular rates.
Customer sectors affected	Residential and commercial voluntary market.
Key customers	Residential customers and large commercial clients (see Bullfrog Founders Club and Bullfrogpowered Green Index). http://www.bullfrogpower.com/powered/homes.cfm http://www.bullfrogpower.com/powered/greenindex.cfm

Marketing (performance indicators)

Program performance indicators	
Year (indicate calendar or fiscal)	For the fiscal year ended December 31, 2007
Number / % of customers enrolled	
Residential	Approximately 5,000.
Commercial	Approximately 500.
Institutional	Included in Commercial customer #.
Industrial	Included in Commercial customer #.
Total	Approximately 5,500.
Change in number / % of customers over previous years	Approximately 1,500 at December 31, 2006 267% increase from 2006
MWh sold	
Residential	Customer usage information is confidential.
Commercial	Customer usage information is confidential.
Institutional	Customer usage information is confidential.
Industrial	Customer usage information is confidential.
Total	Customer usage information is confidential.
Subscriber retention rate	
Residential	Customer retention rates are confidential.

Commercial	Customer retention rates are confidential.
Institutional	Customer retention rates are confidential.
Industrial	Customer retention rates are confidential.
Total	Customer retention rates are confidential.
Additional resources installed during 2007 under the program (MW)	
Wind	3.6 MW at Oldman River Wind Energy Project, Alberta Wind Energy 1.6 MW at Providence Bay/Spring Bay Wind Farm, Schneider Power
Biomass	None.
Solar	None.
Small Hydro	MW resource information is confidential.
Other	None.
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	MW resource information is confidential.
Biomass	None.
Solar	None.
Small Hydro	MW resource information is confidential.
Other	None.
Total generation during 2007 (MWh)	
Wind	MWh generation information is confidential.

Biomass	None.
Solar	None.
Small Hydro	MWh generation information is confidential.
Other	None.
Change in total generation from previous year(s) (MWh)	222% increase from 2006 in total generation (MWh).
Total generation to date (at end of 2007) (MWh)	
Wind	MWh generation information is confidential.
Biomass	None.
Solar	None.
Small Hydro	MWh generation information is confidential.
Other	None.

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	Environmental Choice EcoLogo

Benefits

Environmental Benefits	
Greenhouse gases (kg CO_2e)	
During 2007	Greenhouse gas emission reduction information based on customer usage is confidential.
Cumulative to the end of 2007	Greenhouse gas emission reduction information based on customer usage is confidential.
Criteria air contaminants (kg) – Nox, SO2, VOC, PM-2.5	
During 2007	Criteria air contaminants emission reduction information based on customer usage is confidential.
Cumulative to the end of 2007	Criteria air contaminants emission reduction information based on customer usage is confidential.

Green Power Programs in Canada – 2007

Canadian Hydro Developers Renewable Energy Certificates

Identification

Company offering Program	Canadian Hydro Developers
Province	British Columbia, Alberta and Ontario
Name of Program	Renewable Energy Certificates
Contact person	Steve O'Gorman

Marketing (program proponent characteristics)

Program proponent characteristics	
Type and source of certification (note: more on this below)	Facilities are EcoLogo certified. CHD
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Improve economics of projects.
Perceived barriers	

Program proponent characteristics	
Specific sources and vintages of generation	

Province	Type	Plant	Capacity (MW)
B.C.	hydro	Akolkolex	10.0
	hydro	Pingston	45.0
	hydro	Upper Mamquam	25.0
Alberta	hydro	Belly River	3.0
	hydro	Waterton	2.8
	hydro	St. Mary	2.3
	hydro	Taylor	13.0
	wind	Cowley Ridge	21.4
	wind	Cowley North	19.5
	wind	Sinnott	6.5
	wind	Taylor	3.4
	wind	Soderglen[1]	70.5
	biomass	Grande Prairie EcoPower® Centre	25.0
Ontario	hydro	Ragged Chute	6.6
	hydro	Moose Rapids	1.3
	hydro	Appleton	1.4
	hydro	Galetta	1.6
	hydro	Misema	3.2
	wind	Melancthon I	67.5
Québec	wind	Le Nordais[6]	99.0

http://www.canhydro.com/pdf/Financials/2007_CdnHydro_AnnualReport.pdf

Ownership of environmental attributes	Ownership is transferred to the buyer upon sale of RECs.

Marketing (program customer characteristics)

Program customer characteristics	
Perceived barriers	
Acquisition and marketing strategy	
Program / product design	
Price premium over regular rates / cost recovery	Each contract is negotiated separately and is confidential
Customer sectors affected	
Key customers	Mostly long-term contracts with commercial and institutional customers

Marketing (performance indicators)

Program performance indicators	
Year (indicate calendar or fiscal)	2007
Number / % of customers enrolled	
Residential	
Commercial	
Institutional	
Industrial	
Total	

Change in number / % of customers over previous years	
MWh sold	
Residential	
Commercial	
Institutional	
Industrial	
Total	600,000
Subscriber retention rate	
Residential	
Commercial	
Institutional	
Industrial	
Total	Near 100% due to long-term nature of contracts
Additional resources installed during 2007 under the program (MW)	
Wind	
Biomass	
Solar	
Small Hydro	

Other	No additional resources can be attributed to the REC program.
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	252.6 MW (No resources can be attributed solely to the REC program)
Biomass	25.0 MW (No resources can be attributed solely to the REC program)
Solar	0 MW
Small Hydro	86.2 MW (No resources can be attributed solely to the REC program)
Other	
Total generation during 2007 (MWh)	
Wind	430,694 MWh (No resources can be attributed solely to the REC program)
Biomass	123,695 MWh (No resources can be attributed solely to the REC program)
Solar	0 MWh
Small Hydro	367,286 MWh(No resources can be attributed solely to the REC program)
Other	
Change in total generation from previous year(s) (MWh)	214,794 MWh (increase of 30% compared to 2006) (No resources can be attributed solely to the REC program)
Total generation to date (at end of 2007) (MWh)	
Wind	
Biomass	
Solar	

Small Hydro	
Other	

Certification

Green power certification / standards comparison characteristics	
Name of certification or standard	EcoLogo – facilities only
Program authority (licensing body)	TerraChoice Environmental Marketing
Ownership of environmental attributes	Transferred with sale of REC
Third party verification	Yes

Benefits

Environmental Benefits
CHD does not wish to quantify environmental benefits to avoid confusion about ownership. CHD does not lay claim to any emissions reductions whatsoever; only REC customers may make such claims.

Green Power Programs in Canada – 2007

Canadian Renewable and Conservation Expenses

Identification

Acquiring entity (incl. entity type, ie. corporate, gov't, institutional)	
Province	Federal program
Name of Program	Canadian Renewable and Conservation Expenses
Program start date	August 2007 (runs until the end of 2010)
Program type / brief description	Canadian Renewable and Conservation Expenses (CRCE) allows for expenses associated with starting a renewable energy project to be deducted in full in the year incurred or transferred to investors using flow-through shares, provided at least 50 percent of the capital costs of the property are considered eligible under Class 43.1 (see Class 43.1 and 43.2 Information Collection Template for more details).
Contact person (Name, email, phone)	http://www.iea.org/textbase/pm/?mode=re&action=detail&id=66 http://www.iea.org/textbase/pm/?mode=re&action=detail&id=1232 http://www.canren.gc.ca/app/filerepository/General-tax_incentives.pdf

Acquisition program characteristics

Program characteristics	
Eligible technology / size	Eligible costs under CRCE include intangible costs such as pre-feasibility and feasibility studies, site resource analysis, negotiation and site approval costs, service connection costs (ie. grid connection costs), and test wind turbines. To qualify, at least 50% of the capital costs of the property would be described in Class 43.1 and 43.2. (http://www.iea.org/Textbase/pm/?mode=re&id=66&action=detail)

Program characteristics	
	"Costs related to the acquisition and installation of a test wind turbine - defined as 'the first wind turbine installed at the site of a proposed wind farm, whose primary purpose is to test the energy production at the site' - are included in the CRCE category of expenses. In 2002, CRCE eligibility was extended to multiple test wind turbines under the following conditions: - combined energy capacity of test wind turbines not to exceed 20% of project planned nameplate capacity (one third for projects less than less than 6 MW); - no other wind turbine within 1.5 km of a test wind turbine for 120 days; and - interconnection with electrical transmission/distribution system not shared with another project." (http://www.iea.org/Textbase/pm/?mode=re&id=66&action=detail)
Impetus for program (e.g. marketing, standards, etc.)	"CRCE is intended to promote the development of conservation and renewable energy projects in the same way that is currently done for investments in other types of resource activities." (http://www.energyalternatives.ca/PDF/NRCAN_tax_incentives.pdf)

Green Power Programs in Canada – 2007

City of Calgary Green Energy

Identification

Acquiring entity (incl. entity type, ie. corporate, gov't, institutional)	City of Calgary Green Energy
Province	Alberta
Name of Program	City of Calgary Green Energy (includes Ride the Wind program)
Program start date	2007 (September 2001 for Ride the Wind program)
Program type / brief description	The City of Calgary has entered into a 20-year power purchase contract with City-owned utility ENMAX to provide the city with 75% of its power requirements as green power. For the Ride the Wind program, Calgary Transit previously purchased green electricity delivered by ENMAX, which has an agreement with TransAlta Wind (formerly VisionQuest WindElectric) to develop a program that provides enough green power to supply electricity for Calgary's light rail transit "CTrain" system. In the most recent iteration of the City's contract with ENMAX, the power for the Ride the Wind program is included in the green power purchase.
Contact person (Name, email, phone)	Ron Raymond, City of Calgary

Acquisition program characteristics

Program characteristics	
Total MWh purchased in 2007	262,500 MWh; approximately 26 million kWh used for Ride the Wind program
Total resources installed by the end of 2007 under the program (since 2001) (MW)	

Program characteristics	
Wind	2001: 12 wind turbines at 660 kw capacity 2007: Taber wind farm (80 MW capacity); partial impetus from City of Calgary's 20-year commitment to purchase of green power (http://www.nrcan-rncan.gc.ca/media/newcom/2007/2007100-eng.php)
Biomass	
Solar	
Small Hydro	
Other	

Green Power Programs in Canada – 2007

Class 43.1 and Class 43.2

Identification

Acquiring entity (incl. entity type, ie. corporate, gov't, institutional)	
Province	Federal program
Name of Program	Class 43.1 is a tax provision in Schedule II of the *Income Tax Act* that provides taxpayers with an accelerated capital cost allowance for certain renewable energy equipment. Class 43.1 allows taxpayers to deduct the cost of eligible equipment at up to 30% per year, on a declining balance basis. Class 43.2 is similar to Class 43.1, and is also in Schedule II of the *Income Tax Act.* Class 43.1, is available for eligible equipment acquired on or after February 23, 2005 and before 2020. An accelerated capital cost allowance of 50% per year is provided under Class 43.2 for certain costs, raised from 30% under Class 43.1. The 2007 federal budget extended applications for Class 43.2 provisions for green power equipment from the end of 2011 to the beginning of 2020.
Program start date	Class 43.1 provisions and CRCE initiated in 1996 federal budget; Class 43.2 added in 2005 federal budget.
Program type / brief description	Class 43.1
Contact person (Name, email, phone)	http://www.iea.org/textbase/pm/?mode=re&action=detail&id=66 http://www.iea.org/textbase/pm/?mode=re&action=detail&id=1232

Acquisition program characteristics

Program characteristics	
Eligible technology / size	Eligible green power systems include small-scale hydroelectric installations (15 MW average annual

Program characteristics	
	capacity or lower), wind power systems, solar photovoltaic systems, geothermal electrical systems, and biogas systems. The same technology eligibility requirements that apply to the Class 43.1 Accelerated Capital Cost Allowance also apply to the Canadian Renewable and Conservation Expenses incentive below; wave and tidal also allowed per 2007 provisions. Eligible costs under Class 43.1 Accelerated Capital Cost Allowance include machinery and equipment, and related design and engineering costs as well as other services required to make the system operational.
Source of power purchased	
Type and source of certification (note: more on this below)	
Impetus for program (e.g. marketing, standards, etc.)	*The Government of Canada wants Canadians to invest in a healthier environment, a more stable energy future and a more competitive economy.* (http://www.energyalternatives.ca/PDF/NRCAN_tax_incentives.pdf)
Total MWh purchased in 2007	NA
Change in purchases over previous years	NA

Green Power Programs in Canada – 2007

Community Power Fund

Identification

Acquiring entity	
Province	Ontario
Name of Program	Community Power Fund
Program start date	August 2007 (runs until the end of 2010)
Program type / brief description	"The Community Power Fund is a $3 million Fund that will support project development activities of Ontario-based community organizations pursuing local renewable energy projects. The Fund will disburse $2.5 million in grants and spend $500,000 on operations, capacity building and management. We will initially operate for 3.5 years, from August 2007 until the end of 2010. The Fund is seeking additional seed money in order to make a transition from a short-term grant program into a sustainable loan and investment organization. The Fund is seeking $10 million in seed money before 2010 to make this transition." - http://www.cpfund.ca/about-the-fund.html The fund is operating two grant programs. The first is a Small Grant Program for feasibility studies and strategic opportunity exploration. Eligible applicants may receive up to $25,000 toward their projects. The second is a Large Grant Program to support project development, with the possibility of up to $300,000 in funding.
Contact person (Name, email, phone)	

Acquisition program characteristics

Program characteristics	
Eligible technology / size	Eligible technologies include wind, solar PV, solar thermal, biogas, small-hydro, and geo-thermal. Proponents must be pursuing a Community Power project as defined by the Ontario Sustainable

	Energy Association.
Type and source of certification (note: more on this below)	Must meet Ontario Sustainable Energy Association's definition of "community power"
Impetus for program (e.g. marketing, standards, etc.)	Mission of the Community Power Fund "is to ensure sufficient financial resources are available to realize the vision of Community Power in Ontario." Specific objectives of the fund's initial endowment include: • 75 MW of Community Power • Sufficient funding for up to 15 Community Power projects • Offset ~50,000 Tonnes of greenhouse gas emissions • Increase the number of Community Power members and investors to at least 25,000 • Increase the number of fulltime, skilled personnel in the Community Power sector • Increase local investment in Community Power projects to ~$15 million • Keep and recirculate the ~$15 million "local energy dollars" within the local communities where projects are sited • Long-term goals: • 500 MW of Community Power by 2015 in Ontario • 10,000 MW of Community Power by 2025
Sectors affected (participants for capacity acquisition)	Open to not-for-profits, co-operatives, co-operatively structured corporations, unincorporated groups and First Nations organizations pursuing Community Power projects
Total MWh purchased in 2007	*NA*
Change in purchases over previous years	*NA*
Additional resources installed during 2007 under the program (MW)	
Other	As a result of first $1.1 million disbursement from the fund (January 2008): Once completed, the projects will represent over 170 MW of community-owned renewable energy. Projects include:* • 80 MWs of First Nations wind projects located in northern and southwestern Ontario; • a Toronto housing co-operative solar thermal initiative;

	• a northeastern Ontario small-hydro project, and; • a project involving 13 southwestern Ontario farm families working together todevelop over 50 MW of wind on their land.

Green Power Programs in Canada – 2007

Constellation New Energy Renewable Energy Solutions

Identification

Company offering Program	Constellation New Energy
Province	Alberta and Ontario
Name of Program	Renewable Energy Solutions (New Mix Super under New Answers) New Mix GreenLeaf or New Mix EcoLogo
Contact person (Name, email, phone)	Check with Pembina Institute

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	All types eligible; sell whatever is in inventory
Type and source of certification (note: more on this below)	EcoLogo and Green Leaf power
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Have successful green power operations in US; saw business opportunity in Canada
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	Most customers are buying for marketing opportunities RECs are not sold as carbon offsets

Program proponent characteristics	
Perceived barriers	
Specific sources and vintages of generation	
Ownership of environmental attributes	Passed on to customers

Marketing (program customer characteristics)

Program customer characteristics	
Perceived barriers	Not a very liquid market in Canada
Acquisition and marketing strategy	
Program / product design	Sell environmental attributes in two ways: can sell green bundled with electricity charge or as REC blocks. Customer decides whether to buy green power or RECs.
Price premium over regular rates / cost recovery	Based on spot price and type of product mix
Customer sectors affected	Commercial institutional industrial only (no residential)
Key customers	

Marketing (performance indicators)

Program performance indicators	
Year	2007
Number / % of customers enrolled	

Total	Nothing sold in 2007
MWh sold	
Total	Nothing sold in 2007

Green Power Programs in Canada – 2007

Direct Energy Green Plan

Identification

Company offering Program	Direct Energy
Province	Alberta and Ontario
Name of Program	Green Plan
Contact person (Name, email, phone)	Sayed Khoja 416.758.8853 Fax: 1-877-420-3777 Jay Robertson 403.290.5385

Program proponent characteristics

Program proponent characteristics	
Eligible technology / size (e.g. wind, biogas, solar, etc.; >10MW, <100MW, etc.)	Any EcoLogo
Type and source of certification (e.g. must the product be EcoLogo certified? Must the facilities be EcoLogo certified?)	EcoLogo certified – facilities and website Alberta wind Ontario run-of-river Currently adding

Program proponent characteristics	
	US – Green-E EcoLogo has reviewed supply contracts Minimum 50%/50% type I (can't sell more than 50% type I)
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Customers are demanding the product Direct Energy seen as an end-to-end energy supplier, want to ensure all product types are covered
Perceived barriers	Lack of coordinated market, no market pricing, no central market for wholesale New generators in Ontario are OPA contracted – no new supply of green power for resale by third parties
Ownership of environmental attributes (does the generator retain the attributes? Are the attributes sold bundled with the power?)	Direct Energy retires attributes. PWC audits retirement process.

Program customer characteristics

Program customer characteristics	
Marketing strategy	Actively promoted – listed on website Green power is not core product
Program / product design elements	Industrial as well as commercial residential Mass markets – residential, small commercial based on average DE business – mid- to large commercial industrial Ontario – 100% of an average residential customer

	Alberta – 15% of typical annual 1,080 kWh for residential Commercial is ~4x the residential Renewable attributes
Price premium over regular rates / cost recovery	Price varies. Price is fixed for a month at a time. $3.1/MWh – premium $2.60/MWh – premium http://www.directenergy.com/EN/Alberta/RES/Pages/Dereg/ELE/CurrentPricing.aspx
Customer sectors affected	Residential and small commercial Mid to large commercial and industrial

Performance indicators

Program performance indicators	
Year (indicate calendar or fiscal)	2007
Total	No performance indicators disclosed

Green Power Programs in Canada – 2007

ecoENERGY for Renewable Power

Identification

Acquiring entity (incl. entity type, ie. corporate, gov't, institutional)	Government of Canada
Province	All
Name of Program	ecoENERGY for Renewable Power (taking over for WPPI)
Program start date	Commitment of funds began April 1, 2007 (WPPI commitment of funds ended March 31, 2007)
Program type / brief description	"ecoENERGY for Renewable Power will invest $1.48 billion to increase Canada's supply of clean electricity from renewable sources such as wind, biomass, low-impact hydro, geothermal, solar photovoltaic and ocean energy. It will encourage the production of 14.3 terrawatt hours of new electricity from renewable energy sources, enough electricity to power about one million homes. ecoENERGY for Renewable Power will provide an incentive of one cent per kilowatt-hour for up to 10 years to eligible low-impact, renewable electricity projects constructed over the next four years, April 1, 2007 to March 31, 2011." (http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/index-eng.cfm)
Contact person (Name, email, phone)	(http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/index-eng.cfm)

Acquisition program characteristics

Program characteristics	
Eligible technology / size	Project must be commissioned from April 1, 2007 to March 31, 2011, except for wind, which could be commissioned anytime after March 31, 2006 (and would be eligible to receive payment starting

Program characteristics	
	April 1, 2007) Project must be 1MW+ rated capacity, excepting wind constructed in the March 31, 2006 to before April 1, 2007 which must be 500kW+ (ie. provided carry-over from WPPI) • test wind turbines installed using CRCE tax allowance are not eligible • maximum contribution per project is $80 million over 10 years • maximum contributions to an eligible recipient (proponent) over the life of the ecoENERGY for Renewable Power program is $256 million. **Maximum capacity factor levels** The maximum capacity factors per technology will be as follows: • biomass energy: 80 percent • hydro energy: 60 percent • wind energy (offshore): 42 percent • wind energy (onshore): 35 percent • photovoltaic energy: 20 percen (http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/conditions-03-eng.cfm)
Type and source of certification (note: more on this below)	EcoLogo / Environmental Choice Program (ECP) – must be a "Low-impact renewable-generating facility" under ECP
Sectors affected (participants for capacity acquisition)	"Businesses, municipalities, institutions and organizations" (not homeowners)
Total MWh purchased in 2007	NA
Change in purchases over previous years	NA

Program characteristics	
Additional resources installed during 2007 under the program (MW) Totals provided are for projects with a contribution agreement under the ecoENERGY program	
Wind	269.5
Biomass	
Solar	
Small Hydro	
Other	
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW) Totals provided are for projects with a contribution agreement under the ecoENERGY program	
Wind	598
Biomass	
Solar	
Small Hydro	
Other	

Green Power Programs in Canada – 2007

EcoLogo Certification

Identification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	Managed by TerraChoice Environmental Marketing Inc.
Stated objectives	This category comprises electricity from renewable energy sources which are apt to impose relatively low impacts on the environment and produce potential benefits including, inter alia, low net greenhouse gas emissions, limited or no depletion of non-renewable resources, reduced emissions of other pollutants and reduced impacts on aquatic, riparian and terrestrial ecosystems and species.
Certification types (products, generators, both)	Products and generating facilities

Eligible product categories (can disaggregate into technology categories if easier?)	The EcoLogo Program has certified over 7500 products as "EcoLogo certified green products and services" in the following categories: • Automotive Related Products and Services, • Building and Construction Products, • Cleaning and Janitorial Products, • Consumer Products, • Containers Packaging Bags and Sacks, • Electricity Products, Events, • Fuels Lubricants and Related Products, • Marine Products, • Office Furniture Equipment and Business Products, • Printing Products and Services, • Pulp and Paper Products, • Services. Specifically for renewable electricity, the following categories are available as stated in CCD003 for Electricity – Renewable Low-Impact: • Alternative-use electricity; • Biogas-fuelled electricity; • Biomass-fuelled electricity; • Solar-powered electricity; • Water-powered electricity; and • Wind-powered electricity.
Product criteria	The following is taken directly from the Certification Criteria Document.[1]

[1] Environmental Choice Program, *Certification Criteria Document CCD-003* (2006) http://www.ecologo.org/common/assets/criterias/CCD-003.pdf (last accessed April 24, 2008).

	2. This category comprises electricity from renewable energy sources which are apt to impose relatively low impacts on the environment and produce potential benefits including, inter alia, low net greenhouse gas emissions, limited or no depletion of non-renewable resources, reduced emissions of other pollutants and reduced impacts on aquatic, riparian and terrestrial ecosystems and species. Generating technologies specifically recognized in this criteria document include: (a) alternative-use electricity; (b) biogas-fuelled electricity; (c) biomass-fuelled electricity; (d) solar-powered electricity; (e) water-powered electricity; and (f) wind-powered electricity. 3. To meet the requirements of this Criteria document, the **electricity - renewable low-impact** must: (a) meet or exceed all applicable governmental, industrial safety and performance standards; and (b) be generated in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the *Fisheries Act* and the *Canadian Environmental Protection Act, 1999*, (CEPA, 1999). 4. To meet the requirements of this Criteria document, the **electricity - renewable low-impact** must: (a) be accompanied by evidence that appropriate consultation with communities and stakeholders has occurred, issues of concern have been reasonably addressed, and, where applicable, reasonable mitigation of negative impacts has been addressed; (b) be accompanied by evidence that prior or conflicting land use, biodiversity losses and scenic, recreational and cultural values have been addressed during project planning and development; (c) be accompanied by evidence that the project will not result in irreparable/unmitigable degradation or loss of the site's heritage, cultural, recreational and/or touristic values; (d) be generated in a manner that is reliable and practical (e.g. not in research and development stages, actually generating electricity);

	(e) be generated by only that proportion of fuel heat input attributed to eligible renewable sources in order to be designated as ECP-certified; (f) be generated in a manner such that no adverse impacts are created for any species designated as endangered or threatened; and (g) meet the criteria and associated definitions in this criteria document that are applicable to the generation technology employed. 5. To meet the requirements of this criteria document, **alternative-use electricity** must be generated in such a manner that all applicable certification criteria and definitions in this criteria document are met. The environmental impacts from the existing operation and the alternative-use process will be reviewed and allocated on a case-by-case basis. 6. To meet the requirements of this Criteria document, **biogas-fuelled electricity** must be generated in such a manner that the total of load points assessed for operational air emissions of carbon monoxide (CO), particulate matter (PM), nitrogen oxides (NO_X measured as NO_2) and sulphur oxides (SO_X measured as SO_2), as determined in Appendix 2, does not exceed 6. In cases where the biogas is used as a partial substitute in a generation facility that is designed to primarily utilize non-renewable fuels, load point calculations will be based only on those operational air emission values that may be allocated to the combustion of the biogas. 7. To meet the requirements of this criteria document, **biomass-fuelled electricity** must be generated in such a manner that: (a) the total of load points assessed for operational air emissions of carbon monoxide (CO), particulate matter (PM), nitrogen oxides (NO_X measured as NO_2) and sulphur oxides (SO_X measured as SO_2) , as determined in Appendix 2, does not exceed 6; In cases where the clean biomass is used as a partial substitute in a generation facility that is designed to primarily utilize non-renewable fuels, load point calculations will be based only on those operational air emission values that can may be allocated to the combustion of the clean biomass. (b) if generated from wood-wastes and/or agricultural wastes, and in cases where the generator and the waste source share common ownership: i) use only wood-wastes and/or agricultural wastes that have been sourced from operations that have implemented a sound environmental management system and are adhering to sound environmental management practices,

	ii) ensure the rate of harvest does not exceed levels that can be sustained, and iii) not use wastes from species that are listed in the CITES Appendices; (c) if generated from clean biomass fuel sources containing salt-laden wood, de-inking sludge or spent pulping liquors from mills using elemental chlorine bleaching, the facility must not emit polychlorinated dioxins and/or furans in excess of one of the following, whichever may be lower: i) 100 pg I-TEQ/m3; or ii) the limits for new pulp and paper boilers burning salt-laden wood as specified in the Canada Wide Standards for Dioxins and Furans (Canadian Council of Ministers of the Environment); and (d) if generated from dedicated energy crops: i) use only dedicated energy crops that have been sourced from operations that have implemented a sound environmental management system and are adhering to sound environmental management practices, and ii) ensure the rate of harvest does not exceed levels that can be sustained. 8. To meet the requirements of this criteria document, **solar-powered electricity** must be generated in such a manner that adequate arrangements (i.e., financial reserves) have been made for the proper disposal or recycling of all solid waste resulting from the generation of electricity, including the disposal of equipment or machinery used in the generation process itself, that contains measurable levels of cadmium. 9. To meet the requirements of this criteria document, **water-powered electricity** must be generated in such a manner that the generating facility: (a) operates in compliance with all regulatory licenses, regulatory requirements and/or other authorizations pertaining to fisheries (including, for facilities located in Canada, the *Fisheries Act*), without regard to waivers or variances that may be granted or authorized; (b) operates in compliance with all regulatory licenses, regulatory requirements and/or other authorizations regarding water levels and flows, without regard to waivers or variances that may be granted or authorized; (c) does not operate under any authorization with terms and conditions allowing the harmful alteration, disruption or destruction of fish habitat unless: i) such harmful alteration, disruption or destruction is not affecting the limiting factor controlling productive capacity, ii) loss of the affected habitat is compensated by the creation of similar habitat, supporting the same stock, at or

	near the development site within the same ecological unit such that the created habitat replaces lost productive capacity, within an approved safety factor. For facilities located in Canada, these conditional authorizations include those issued under Section 35(2) of the *Fisheries Act*, by the Minister of Fisheries and Oceans or under regulations made by Governor in Council under the *Fisheries Act*. (d) within practical limits and subject to regulatory direction and approval, ensures that plant operations are coordinated with any other water-control facilities that influence water levels and/or flows operating on the same waterway, in order to mitigate impacts and protect indigenous species and the habitat upon which they depend; (e) as a maximum, causes as much water to flow out of the head pond as is received in any 48-hour period; In cases where this particular criterion cannot be met, the ECP will none-the-less consider certification if the applicant submits evidence that indicates those hydrological and ecological components key to sustainability of the surrounding watershed are maintained. As a minimum, this evidence must include environmental impact assessments and documentation from a formal public consultation process. In cases where neither of the above conditions is met, the applicant can opt to apply to a multi-stakeholder and public Electricity Review Process to demonstrate equal or lower adverse environmental impacts. (f) operates such that reduced water flows in the bypassed reach and reaches downstream of diversion dams and/or dykes are not detrimental to indigenous aquatic and riparian species; (g) operates such that instream flows downstream of the tailrace are adequate to support downstream indigenous aquatic and riparian species at pre-project ranges; (h) operates such that water quality in a head pond, a bypassed reach, reaches downstream of the tailrace and reaches downstream of any diversion dams and/or dykes remains comparable to pre-project quality in unaltered bodies of water or waterways within the local watershed; (i) operates such that any changes in water temperature caused by the facility in the head pond or in reaches downstream of the tailrace or downstream of any diversion dams and/or dykes are not detrimental to indigenous aquatic species; (j) where a human-made structure is placed across a waterway where no natural barriers exist, provides fish passage when necessary for the purpose of maintaining pre-existing migration patterns for fish communities both upstream and downstream; and (k) provides any measures (including *inter alia* trash racks, oversized intake structures designed to slow intake velocities, underwater strobe and sound, fish screens) necessary to minimize fish mortality that would occur through impingement and entrainment.

	10. To meet the requirements of this criteria document, wind-powered electricity must be generated in such a manner that: (a) the generating facility and its structures are not detrimental to indigenous or migratory avian species; (b) the generating facility and its structures are not located in an area that is protected for avian species designated as endangered or threatened; (c) construction activities or routine turbine operations do not cause excessive soil erosion such as silting of nearby drainage, streams, ponds, or lakes that would be harmful to aquatic or riparian species and/or increase erosion from steep slopes, plateau edges, or access roadways; and (d) excavated soil is replaced, and uprooted vegetation replanted, after construction or scrapping, where this can be done without interfering with the operation and servicing of the wind facility.
Distinction between vintage of generation (yes/no and cut-off date if any)	The CCD defines electricity into the following 4 categories: **Type I Electricity** is ECP-certified electricity from a generation facility that began operations prior to January 1, 1991. **Type II Electricity** is ECP-certified electricity from a generation facility that began generating electricity from January 1, 1991 to March 31, 2001. **Type III Electricity** is ECP-certified electricity from a generation facility that began generating electricity on or after April 1, 2001. **Type IV Electricity** is ECP-certified electricity from a generation facility that began generating electricity on or after April 1, 2001. It is a designation given only in situations where the Government of Canada is purchasing green power and specifically requesting this designation.
Allows for "blended" products (ie. Green-e allows up to 50% of certified product to be "brown")	The following is taken directly from the Certification Criteria Document.[2] References to Type I, II and III Electricity all refer to ECP-certified electricity (ECP [=] Environmental Choice Program). To meet the requirements of this criteria document, marketers of electricity must be able to demonstrate to the satisfaction of the Environmental Choice Program that the portion of their multisourced power product conforming to this criteria document incorporates a minimum of 50% Type II Electricity and/or Type III Electricity and a maximum of 50% Type I Electricity.

[2] Ibid. .

Types of pollutants (emissions) considered	Biogas-fuelled electricity: CO, PM, NO_2, SO_2. Biomass-fuelled electricity: CO, PM, NO_2, SO_2, polychlorinated dioxins and/or furans
Considerations of other impacts (land use, social etc.)	Consultation with communities and stakeholders; Conflicting land use, biodiversity losses and scenic, recreational and cultural values have been addressed during project planning and development; Will not result in loss of site's heritage, cultural, recreational and/or touristic values; Reliability and practicality; No adverse impacts are created for endangered or threatened species; Solar-powered electricity: financial reserves for proper disposal or recycling of all solid waste and equipment; Water-powered electricity: complies with fisheries regulatory requirements, complies with maintaining water levels and flows requirements, does not harmfully alter disrupt or destroy fish habitat as well as other specifications related to water quality. Wind-powered electricity: not detrimental to indigenous or migratory avian species, does not affect endangered or threatened avian species, do not cause excessive soil erosion, excavated soil is replaced and vegetation replanted after construction.
Levels of certification	Only 1 level of certification. Either pass or fail.
Ownership of environmental attributes	The rights to the environmental benefits must either be: • Passed on, transferred or sold to the customer as part of the electricity product in any transaction; or • Retired by the marketer or seller of the certified electricity such that the environmental benefits may no longer be transferred to, sold to or donated on behalf of any other customer.
Third party verification	None required prior to application for EcoLogo certification.
Adherence to accepted accounting principles	Successfully audited by Global EcoLabelling Network (GEN) through GENICES accreditation program for compliance with ISO 14024.

Stringency (?) – in our proposal	
Ongoing verification requirements	Annual compliance requirements include monitoring of: Generation quantities, 3rd Party Audit Reports, Monitoring Data, and assurance of no double-counting.[3]
Other characteristics	Launched by Federal Government in 1988. EcoLogo is North America's oldest (and the world's second oldest) environmental standard and certification organization. EcoLogo is managed by TerraChoice Environmental Marketing Inc. It is the only North American standard accredited by the Global Labeling Network as meeting ISO 14024 standard for Type 1 environmental labels (3rd party certified, multi-attibute). EcoLogo is a Type 1 eco-label program (as defined by ISO 14024) and compares products/services with others in the same category, develops rigorous and scientifically relevant criteria and awards EcoLogo to those that are environmentally preferable. EcoLogo is only 1 of a handful (internationally) that has successfully been audited by the Global Ecolabelling Network (GEN) through the GENICES accreditation program for ISO 14024 compliance. EcoLogo uses Certification Criteria Documents (CCDs). They are developed in a public and open process that is open to user groups, product producers, government/regulators, academia, ENGOs, and other environmental advocates. The criteria address multiple environmental attributes related to human health and environmental considerations throughout the life cycle of the product. There are currently 122 CCDs addressing over 250 product types.

All information given has been obtained from CCD 003 and from the Environmental Choice website at: http://www.ecologo.org/

The TerraChoice will be reviewing the EcoLogo standard (CCD-003) later this year and considering including the GreenLeaf TRCs program within CCD-003 as they are so closely related.[4]

[3] Julie Baribeau, TerraChoice. May, 2008.

[4] Ibid.

References

Baribeau, Julie, TerraChoice. May, 2008

Environmental Choice Program. *Certification Criteria Document CCD-003*, 2006, http://www.ecologo.org/common/assets/criterias/CCD-003.pdf (last accessed April 24, 2008).

Green Power Programs in Canada – 2007

Energy Ottawa Green Power

Identification

Company offering program	Energy Ottawa (affiliate of Hydro Ottawa)
Province	Ontario
Name of program	Energy Ottawa Green Power
Contact person	613.225.0418 Chris Whitehead, Director of Generation chriswhitehead@energyottawa.com

Marketing

Program proponent characteristics	
Eligible technology / size	N/A (generators should be eligible for EcoLogo certification)
Type and source of certification	Chaudière #2 and Chaudière #4 are Type III EcoLogo-certified. The product itself is not certified.
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Energy Ottawa is committed to developing innovative sources of green power generation—and marketing the green power we produce directly to environmentally-conscious private and public sector customers. Respect for the environment is a central value of our business, and our green power operations are hardworking examples of our commitment. We're examining all possibilities from a business and environmental perspective. Our commitment to environmental responsibility means we are continually exploring alternative and innovative ways to develop new sources of green power and bring this capacity to the marketplace.
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	See above

Specific sources and vintages of generation	Trail Road Generating Station (landfill gas), 5 MW capacity, operating since January 2007[1] Chaudière Falls Generating Stations (2 stations - small hydro), 110 GWh / year, built 1891 and 1900, major refurbishment in 2001 110 GWh, attributes of 90 GWh to PWGSC,
Ownership of environmental attributes	For Trail Road Generation Station only, "the electricity and associated environmental attributes from the station will be sold to the Province of Ontario under a 20-year contract to assist the Province in meeting its goal to have 10% of Ontario's power supplied by renewable generation by 2010."[2] Check for Chaudiere Falls stations
Customer sectors affected	Commercial, institutional
Key customers	Government of Ontario purchasing 100% of Trail Road Landfill Gas project output electricity / attributes under 20-year contract

[1] http://www.energyottawa.com/green_power/index.cfm?dsp=template&act=view3&template_id=183&lang=e

[2] http://www.energyottawa.com/green_power/index.cfm?dsp=template&act=view3&template_id=183&lang=e

Green Power Programs in Canada – 2007

EPCOR Green Power

Identification

Company offering Program	EPCOR
Province	Alberta
Name of Program	Green Power
Contact person (Name, email, phone)	Amanda Rosychuk Don Gerke 780.412.7773 Energy Services, EPCOR

Marketing (program proponent characteristics)

Program proponent characteristics	
Type and source of certification (note: more on this below)	Eco-Logo
Impetus for program (e.g. customer demand, financial opportunity, etc.)	This program is longer running - . EPCOR has not pursued approval for new Green Power customers since "the sentiment in Alberta was that this should be a competitive product offered by competitive retailers only."
Specific sources and vintages of generation	The 900 kW Weather Dancer wind turbine on the Peigan Nation Reserve; the 23 MW Whitecourt waste wood-fired facility; the 12.75 MW Taylor hydro plant (installed in 2000); and 13.4 kW of solar roof panels installed in 1996 at the EPCOR Centre.
Ownership of environmental	Following Eco-Logo guidelines

Program proponent characteristics	
attributes	

Marketing (performance indicators)

Program performance indicators	
Year (indicate calendar or fiscal)	2007
Number / % of customers enrolled	
Total	"a few thousand by the end of 2007"
MWh sold	
Total	3 000 MWh
Subscriber retention rate	
Total	Overall declining since EPCOR can not offer this product to new customers
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	0.9 MW
Biomass	23 MW
Solar	0.0134 MW
Small Hydro	12.75 MW
Other	

Green Power Programs in Canada – 2007

Green Leaf Tradeable Renewable Certificates

Identification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	TerraChoice Environmental Services Inc. The program began in 2003.
Stated objectives	The following is taken directly from the Green Leaf Tradeable Renewable Certificates Program Standard.[1] The goals of TerraChoice's Green Leaf™ TRCs program are to: • generate real environmental benefits; • reduce dependence on depleting energy sources and on foreign energy supplies; • support the growth of the domestic renewable energy market; • create opportunities for rural communities where renewable low-impact electricity generation facilities can be and often are already located; and • create the opportunity for anyone to support renewable energy development, regardless of whether they pay an electric bill (renters, for instance) or whether their utility offers a green power option.
Certification types (products, generators, both)	Products. Green Leaf TRCs are sold with a minimum block size of 100 kWh. Certified Tradeable Renewable Energy Certificates make sure that the power represented by these initially came from truly green power sources. TRCs allow these attributes to be separated from the electricity itself, and passed on or sold as a separate product

[1] TerraChoice Environmental Services, *Green Leaf Tradeable Renewable Electricity Certificates (TRCs) Program Standard* (2002)

Eligible product categories (can disaggregate into technology categories if easier?)	Certified TRCs can come from any of the following generation technologies: • Alternative-use electricity; • Biogas-fuelled electricity; • Biomass-fuelled electricity; • Solar-powered electricity; • Water-powered electricity; and • Wind-powered electricity.
Product criteria	The following is taken directly from the following 2 documents: • Green Leaf Tradeable Renewable Certificates Program Standard.[2] • Technical Requirements for Electricity Generation Facilities. [3] The first document (Program Standard) outlines general program criteria where the second document (Technical Requirements) outlines the generation facility criteria for specific generation technologies (electricity from alternative-use, biogas-fuelled =, biomass-fuelled, solar-powered, water-powered and wind-powered). **Green Leaf Tradeable Renewable Certificates Program Standard** **Interpretation of Tradeable Renewable Electricity Certificate (TRC)** 1) Green Leaf™ TRCs must be generated by the electricity from an approved electricity generation facility. This means that the facility must either be certified by the Environmental ChoiceM Program for generating renewable low-impact electricity, or meet the requirements specified in the Green Leaf™ TRCs Technical requirements for Electricity Generation Facilities. These facilities meet requirements that are of the highest stringency and reflect electricity sources with the lowest environmental impacts. 2) Green Leaf™ TRCs must be designated as either Level A or Level B by the Green Leaf™ TRCs Program. a) Level A Green Leaf™ TRCs are associated with Level A electricity and are generated by a facility that began operations on or after April 1, 2001. b) Level B Green Leaf™ TRCs are associated with Level B electricity and are generated by a facility that

[2] Ibid.

[3] TerraChoice Environmental Services, "Technical Requirements for Electricity Generation Facilities," (2003).

began operations from January 1, 1991 to March 31, 2001 inclusive.

Environmental Attributes

1) Green Leaf™ TRCs must have attached all of the relevant environmental attributes associated with the generation of the renewable low-impact electricity to the full extent possible based on current regulatory and legal requirements. In other words, the TRCs must represent all of the environmental attributes associated with the offsetting of the same quantity of null electricity from the grid.
2) Environmental attributes must be associated on a unit-to-unit basis; in other words, one TRC unit must have the associated environmental attributes of 100 kilowatt-hours of electricity.
3) Green Leaf™ TRCs must be either passed on or sold to the final end-use party (or owner) or be retired on behalf of final end-use party.
4) In no way can the environmental attributes associated with the Green Leaf™ TRCs be counted more than one time.
    a) The environmental attributes associated with the renewable low-impact electricity in comparison to the null electricity it offsets from the grid must not have been sold or otherwise separated from the electricity, and then delivered to any other user besides the final end-use party.
    b) Prior to being passed on or sold to the final end-use party, the Green Leaf™ TRCs, the environmental attributes or the electricity that generated them must not have been used to meet a regulatory requirement including *inter alia*:
        i) cap-and-trade programs;
        ii) emissions control programs;
        iii) renewable portfolio standards;
        iv) air emission regulatory limits for the generating facility.
    c) Prior to being passed on or sold to the final end-use party, the Green LeafTM TRCs or the electricity that generated them must not have been used to meet a non-regulatory mandate including *inter alia*:
        i) fulfilling governmental procurement policies;
        ii) fulfilling private sector procurement policies;
        iii) calculating another company's or institution's portfolio mix.

d) Green Leaf™ TRCs cannot be passed on, sold to or retired/donated on behalf of more than one final end-use party.

5) TRCs that are generated by facilities receiving or obtaining tax incentive payments are eligible to be designated as "Green LeafTM TRCs" to the extent possible under laws, regulations and contractual arrangements governing the tax incentive programs.

Electricity Delivery to the Grid

1) The electricity from which the Green LeafTM TRCs came can in no way be represented or sold as "green", as renewable low-impact or as having low environmental impacts.

2) Green LeafTM TRCs must be sold in blocks of at least 100 kilowatt-hours per month. This minimum quantity represents approximately 17% of the electricity used by an average household. Green Leaf™ TRCs may be sold in blocks larger that this minimum.

3) Green LeafTM TRCs must be generated by the actual amount of electricity delivered to the grid, and not the facility's capacity.

4) The facility that generated the electricity and associated Green Leaf™ TRCs must be connected to grid. Off-line facilities are not eligible to produce Green Leaf™ TRCs.

From the Technical Requirements for Electricity Generation Facilities document:

1) This category comprises electricity from renewable energy sources which are apt to impose relatively low impacts on the environment and produce potential benefits including, inter alia, low net greenhouse gas emissions, limited or no depletion of non-renewable resources, reduced emissions of other pollutants and reduced impacts on aquatic, riparian and terrestrial ecosystems and species.
Generating technologies specifically recognized in this criteria document include:

   a) alternative-use electricity;

   b) biogas-fuelled electricity;

   c) biomass-fuelled electricity;

   d) solar-powered electricity;

   e) water-powered electricity; and

   f) wind-powered electricity.

	2) To meet the requirements of this document, the electricity must: a) meet or exceed all applicable governmental, industrial safety and performance standards; b) be generated in such a manner that all steps of the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the *Fisheries Act* and the *Canadian Environmental Protection Act*, 1999, (CEPA, 1999); c) be accompanied by evidence that appropriate consultation with communities and stakeholders has occurred, issues of concern have been reasonably addressed, and, where applicable, reasonable mitigation of negative impacts has been addressed; d) be accompanied by evidence that prior or conflicting land use, biodiversity losses and scenic, recreational and cultural values have been addressed during project planning and development; e) be accompanied by evidence that the project will not result in irreparable/unmitigable degradation or loss of the site's heritage, cultural, recreational and/or touristic values; f) be generated in a manner that is reliable and practical (e.g. not in research and development stages, actually generating electricity); g) be generated by only that proportion of fuel heat input attributed to eligible renewable sources in order to be designated as ECP-certified; h) be generated in a manner such that no adverse impacts are created for any species designated as endangered or threatened; and i) meet the criteria and associated definitions in this criteria document that are applicable to the generation technology employed. 3) To meet the requirements of this document, alternative-use electricity must be generated in such a manner that all applicable certification criteria and definitions in this criteria document are met. The environmental impacts from the existing operation and the alternative-use process will be reviewed and allocated on a case-by-case basis. 4) To meet the requirements of this document, biogas-fuelled electricity must be generated in such a manner that the total of load points assessed for operational air emissions of carbon monoxide (CO), particulate matter (PM), nitrogen oxides (NO_X measured as NO_2) and sulphur oxides (SO_X measured as SO_2), as determined in Appendix 2, does not exceed 6.

In cases where the biogas is used as a partial substitute in a generation facility that is designed to primarily utilize non-renewable fuels, load point calculations will be based only on those operational air emission values that can may be allocated to the combustion of the biogas.

5) To meet the requirements of this document, biomass-fuelled electricity must be generated in such a manner that:

   a) the total of load points assessed for operational air emissions of carbon monoxide (CO), particulate matter (PM), nitrogen oxides (NO_X measured as NO_2) and sulphur oxides (SO_X measured as SO_2) , as determined in Appendix 2, does not exceed 6; In cases where the clean biomass is used as a partial substitute in a generation facility that is designed to primarily utilize non-renewable fuels, load point calculations will be based only on those operational air emission values that can may be allocated to the combustion of the clean biomass.

   b) if generated from wood-wastes and/or agricultural wastes, and in cases where the generator and the waste source share common ownership:

      i) use only wood-wastes and/or agricultural wastes that have been sourced from operations that have implemented a sound environmental management system and are adhering to sound environmental management practices,

      ii) ensure the rate of harvest does not exceed levels that can be sustained, and

      iii) not use wastes from species that are listed in the CITES Appendices;

   c) if generated from clean biomass fuel sources containing salt-laden wood, de-inking sludge or spent pulping liquors from mills using elemental chlorine bleaching, the facility must not emit polychlorinated dioxins and/or furans in excess of one of the following, whichever may be lower:

      i) 100 pg I-TEQ/m^3; or

      ii) the limits for new pulp and paper boilers burning salt-laden wood as specified in the Canada Wide Standards for Dioxins and Furans (Canadian Council of Ministers of the Environment); and

   d) if generated from dedicated energy crops:

      i) use only dedicated energy crops that have been sourced from operations that have implemented a sound environmental management system and are adhering to sound environmental management practices, and

ii) ensure the rate of harvest does not exceed levels that can be sustained.

6) To meet the requirements of this document, solar-powered electricity must be generated in such a manner that adequate arrangements (i.e., financial reserves) have been made for the proper disposal or recycling of all solid waste resulting from the generation of electricity, including the disposal of equipment or machinery used in the generation process itself, that contains measurable levels of cadmium.

7) To meet the requirements of this document, water-powered electricity must be generated in such a manner that the generating facility:

a) operates in compliance with all regulatory licenses, regulatory requirements and/or other authorizations pertaining to fisheries (including, for facilities located in Canada, the *Fisheries Act*), without regard to waivers or variances that may be granted or authorized;

b) operates in compliance with all regulatory licenses, regulatory requirements and/or other authorizations regarding water levels and flows, without regard to waivers or variances that may be granted or authorized;

c) does not operate under any authorization with terms and conditions allowing the harmful alteration, disruption or destruction of fish habitat unless:

i) such harmful alteration, disruption or destruction is not affecting the limiting factor controlling productive capacity,

ii) loss of the affected habitat is compensated by the creation of similar habitat, supporting the same stock, at or near the development site within the same ecological unit such that the created habitat replaces lost productive capacity, within an approved safety factor.
For facilities located in Canada, these conditional authorizations include those issued under Section 35(2) of the *Fisheries Act*, by the Minister of Fisheries and Oceans or under regulations made by Governor in Council under the Fisheries Act.

d) within practical limits and subject to regulatory direction and approval, ensures that plant operations are coordinated with any other water-control facilities that influence water levels and/or flows operating on the same waterway, in order to mitigate impacts and protect indigenous species and the habitat upon which they depend;

e) as a maximum, causes as much water to flow out of the head pond as is received in any 48-hour period; In cases where this particular criterion cannot be met, the Program will none-the-less consider certification if the applicant submits evidence that indicates those hydrological and ecological components key to

	sustainability of the surrounding watershed are maintained. As a minimum, this evidence must include environmental impact assessments and documentation from a formal public consultation process. In cases where neither of the above conditions is met, the applicant can opt to apply to a multi-stakeholder and public Electricity Review Process to demonstrate equal or lower adverse environmental impacts. f) operates such that reduced water flows in the bypassed reach and reaches downstream of diversion dams and/or dykes are not detrimental to indigenous aquatic and riparian species; g) operates such that instream flows downstream of the tailrace are adequate to support downstream indigenous aquatic and riparian species at pre-project ranges; h) operates such that water quality in a head pond, a bypassed reach, reaches downstream of the tailrace and reaches downstream of any diversion dams and/or dykes remains comparable to pre-project quality in unaltered bodies of water or waterways within the local watershed; i) operates such that any changes in water temperature caused by the facility in the head pond or in reaches downstream of the tailrace or downstream of any diversion dams and/or dykes are not detrimental to indigenous aquatic species; j) where a human-made structure is placed across a waterway where no natural barriers exist, provides fish passage when necessary for the purpose of maintaining pre-existing migration patterns for fish communities both upstream and downstream; and k) provides any measures (including inter alia trash racks, oversized intake structures designed to slow intake velocities, underwater strobe and sound, fish screens) necessary to minimize fish mortality that would occur through impingement and entrainment. 8) To meet the requirements of this document, wind-powered electricity must be generated in such a manner that: a) the generating facility and its structures are not detrimental to indigenous or migratory avian species; b) the generating facility and its structures are not located in an area that is protected for avian species designated as endangered or threatened; c) construction activities or routine turbine operations do not cause excessive soil erosion such as silting of nearby drainage, streams, ponds, or lakes that would be harmful to aquatic or riparian species and/or increase erosion from steep slopes, plateau edges, or access roadways; and d) excavated soil is replaced, and uprooted vegetation replanted, after construction or scrapping, where this can be done without interfering with the operation and servicing of the wind facility.

Distinction between vintage of generation (yes/no and cut-off date if any)	Green Leaf Tradeable Renewable Electricity Certificates Program specifies vintage into the following 2 categories: • Type A electricity – renewable low-impact electricity from a generation facility that began generating electricity on or after April 1, 2001. • Type B electricity – renewable low-impact electricity from a generation facility that began generating electricity from January 1, 1991 to March 31, 2001 inclusive.
Allows for "blended" products (ie. Green-e allows up to 50% of certified product to be "brown")	Green Leaf does not allow for blended products.
Types of pollutants (emissions) considered	Biogas-fuelled electricity: CO, PM, NO_2, SO_2. Biomass-fuelled electricity: CO, PM, NO_2, SO_2, polychlorinated dioxins and/or furans

Considerations of other impacts (land use, social etc.)	Consultation with communities and stakeholders; Conflicting land use, biodiversity losses and scenic, recreational and cultural values have been addressed during project planning and development; Will not result in loss of site's heritage, cultural, recreational and/or touristic values; Reliability and practicality; No adverse impacts are created for endangered or threatened species; Solar-powered electricity: financial reserves for proper disposal or recycling of all solid waste and equipment; Water-powered electricity: complies with fisheries regulatory requirements, complies with maintaining water levels and flows requirements, does not harmfully alter disrupt or destroy fish habitat as well as other specifications related to water quality. Wind-powered electricity: not detrimental to indigenous or migratory avian species, does not affect endangered or threatened avian species, do not cause excessive soil erosion, excavated soil is replaced and vegetation replanted after construction.
Levels of certification	Only 1 level of certification. Either pass or fail.
Ownership of environmental attributes	Only the final end-use party (or owner) can make any claims about the TRCs. This includes any printed, electronic or broadcast materials. Green Leaf™ TRCs can only be claimed, used, retired sold and/or donated by the final end-use party. The decision to claim, use, retire, sell and/or donate the TRCs can only be made or agreed to by the final end-use party. The final end-use party can claim, use or retire Green Leaf™ TRCs one time only. Once claimed, they may no longer be used, sold, donated or claimed in any other way. Green Leaf™ TRCs are considered to be automatically retired when the one of the following actions occurs: a) A party promotes itself in association with the Green Leaf™ TRCs, as owning the TRCs, as owning the associated environmental benefits or as participating in the Green Leaf™ TRCs Program. b) The TRCs have been used to meet a regulatory requirement including *inter alia*: i) cap-and-trade programs;

	ii) emissions control programs; iii) renewable portfolio standards; iv) air emission regulatory limits for the generating facility. c) The TRCs have been used to meet a non-regulatory mandate including *inter alia*: i) fulfilling governmental procurement policies; ii) fulfilling private sector procurement policies; iii) calculating another company's or institution's portfolio mix. The final end-use party is eligible to become an Authorized User and use the Green Leaf™ TRCs symbol and/or the words "Green Leaf™" or "Green Leaf™ TRCs" in their own marketing and communications materials if all of the following conditions are met: a) The final end-use party must have signed an Authorized Use License Agreement with the Green Leaf™ TRCs Program. b) The Green Leaf™ TRCs symbol and/or the words "Green Leaf™" or "Green Leaf™ TRCs" must be accompanied by a criteria statement indicating the percentage of total electricity load represented by the TRCs. The Green Leaf™ TRCs Program must review and approve of all marketing and communications materials using Green Leaf™ TRCs symbol and/or the words "Green Leaf™" or "Green Leaf™ TRCs".
Third party verification	An audit and verification of all Green Leaf TRCs transactions must be performed on an annual basis by an accredited third party.

Adherence to accepted accounting principles	The following is excerpted from the Technical Requirements document which applies to biomass facilities: "sound environmental management system" means a system, including inter alia the ISO 14000 series of standards, used to manage forest and/or agricultural products that incorporates sound environmental management practices. At a minimum, system elements must include: (a) planning elements such as: identifying forest and/or agricultural resources; identifying environmental aspects; assessing environmental impacts; identifying environmental legislative and regulatory requirements; and defining and committing to environmental policies, objectives and targets; (b) operational elements such as: defining roles and assigning responsibilities; providing adequate staff training; communicating environmental aspects and policies both internally and externally; implementing an environmental management program based on identified environmental aspects and impacts; documenting all policies, goals and procedures; periodically reviewing and, where necessary, revising the system; performing public consultation and/or outreach; and establishing an environmental emergency preparedness and response plan; and (c) monitoring and measurement elements such as: monitoring and measuring key aspects of the system; evaluating and mitigating negative environmental impacts; correcting non-conformance with the management system; performing internal reviews; and having third party audits performed;
Ongoing verification requirements	Annual.

References

TerraChoice Environmental Services. *Green Leaf Tradeable Renewable Electricity Certificates (TRCs) Program Standard*, 2002

———. "Technical Requirements for Electricity Generation Facilities." (2003).

Green Power Programs in Canada – 2007

Green Tags Ontario

Identification

Company offering program	Green Tags Ontario (Grey-Bruce Renewable Energy Co-op)
Province	Ontario
Name of program	Green Tags Ontario
Start date	2002
Notes:	Informally folded into Bullfrog Power
Contact person	

Marketing

Program proponent characteristics	
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Demonstrate the viability of a green power market in Ontario; demonstrate that consumer interest in green power purchasing existed
Specific sources and vintages of generation	Ferndale wind turbine (SkyGeneration – Glen Estil): 1.8 MW (output of turbine now sold to Bullfrog Power) – Commercial operation achieved November, 2002

Green Power Programs in Canada – 2007

Green-E Renewable Energy Certification

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	Green-E Renewable Energy Certification 
Stated objectives	• Bolster customer confidence in the reliability of retail electricity products reflecting renewable energy generation. • Expand the retail market for electricity products incorporating renewable energy, including expanding the demand for new renewable energy generation. • Provide customers clear information about retail "green" electricity products to enable them to make informed purchasing decisions. • Encourage the deployment of electricity products that minimize air pollution and reduce greenhouse gas emissions.
Certification types (products, generators, both)	Green-e certifies products

Eligible product categories (can disaggregate into technology categories if easier?)	Renewable Energy Certificate Certification • REC Single Mix Product • REC Multiple Mix Product • REC Broker Certification Green Pricing Program Certification • Utility Green Pricing Program – The utility can sell one single green pricing mix to its residential and/or commercial customers. The utility must source within a geographic boundary. Competitive Electricity Product Certification • Regional Electricity Single Mix Contract: Certification of one unique retail product mix to residential, commercial and/or wholesale customers. Regional Electricity Multiple Mix Contract: Certification of up to 100 unique mixes of eligible resources offered to commercial and/or wholesale customers only.

Product criteria	• The electricity must come from one of the sources listed in the "Other Characteristics Section"
	• Green-e certified products can not include any electricity required by the State or Federal governments.
	• RECs can only be used once.
	• Utility green pricing products must source electricity from:
	  • The state where the customer is located
	  • The North American Electric Reliability Corporation (NERC) region, Independent System Operator (ISO), Regional Transmission Organization (RTO) or Balancing Authority Area of the customer being served; and/or
	  • An adjacent NERC, ISO, RTO or Balancing Authority Area region where the electricity bundled with a REC, is wheeled into the respective region of the customer being served.
	Product sold to residential customers must meet the following additional criteria:
	• Retail electricity offerings must offset at least 25% of a residential customer's electricity usage with new renewables above and beyond any state mandated Renewable Portfolio Standard (RPS). A marketer or utility that offers to offset less than 50% of a customers electricity must also offer a 100% option.
	• Block products of 100% Green-e certified electricity must have a minimum size of 100 kWh/month
	Commercial purchases have no limitations, however to display the Green-e logo they must meet requirements outlined in this document. http://www.green-e.org/getcert_bus_what.shtml

Distinction between vintage of generation (yes/no and cut-off date if any)	Green-e requires the facility to be new as of January 1st, 1997. There are more detailed requirements available in their standard. Also, Green-e certified product may include only renewables that are generated in the calendar year in which the product is sold the first three months of the following calendar year, or the last six months of the prior calendar year.

Allows for "blended" products (ie. Green-e allows up to 50% of certified product to be "brown")	Green-e allows for blended products if at least one of the following is met: • The facility is located in an electric system control area that makes use of a generation tracking system (e.g., NEGIS, PJM-GATS, WREGIS) that is fully capable of accurately measuring and reporting the differentiated (biomass-fired and non-biomass-fired) electrical output from the facility; or • The biomass is in a gaseous or liquid state, is separately metered and there are contracts in place to verify that the biomass portion was converted to electricity; or • Facilities that do not meet either of the criteria above may be eligible subject to case-by-case review by the Green-e Governance Board.	
Types of pollutants (emissions) considered	• - NO_x, SO_x, Ozone, particulate matter, carbon dioxide, mercury, nuclear energy	
Considerations of other impacts (land use, social etc.)	• Impact on human health "An EPA study found that for every dollar that we have spent on pollution controls since 1970, we have gained $45 in health and environmental benefits" • Reduces the need for imported fuels • Diversifies the fuel mix • Economic development	
Levels of certification	Green-e does not discuss different levels of certification, but does provide specific standards for different products. See certification types above.	
Third party verification	Ownership of environmental attributes	Green-e
Adherence to accepted accounting principles	The Green-e verification process requires "an independent certified public accountant to perform the process audit… in accordance with the American Institute of Certified Public Accountants (AICPA)."[1]	

[1] Green-e. *Annual Verification Process Audit Instructions: for Participants in Green-e Energy.* (2008)

Ongoing verification requirements	Providers of retail and wholesale Green-e certified renewable energy products must complete annual third-party verification audit of their renewable energy purchases and sales.

Other characteristics	The following sources of electricity are eligible:
	• Solar Electric
	• Wind
	• Geothermal
	• Hydropower
	• Green-e will consider adopting ocean-based resources and will review these technologies as they mature and as practical application reaches near term.
	• Solid, liquid, and gaseous forms of Biomass from the following fuels:
	  • All woody waste;
	  • All agricultural crops or waste;
	  • All animal and other organic waste;
	  • All energy crop;
	  • Landfill gas and wastewater methane; and
	  • Municipal Solid Waste
	• Biodiesel
	• Fuel Cells

Main Sources	• Hydropower from new generation capacity on a non-impoundment or new generation capacity on an existing impoundment that meets one or more of the following conditions:
	  • The hydropower facility is certified by the Low Impact Hydropower Institute
	  • The facility is a run-of-the-river hydropower facility with a total rated nameplate capacity equal to or less than 5MW. Multiple turbines will not be counted separately and cannot add up to more than 5MW nameplate capacity; or
	  • The hydropower facility consists of a turbine in a pipeline or a turbine in an irrigation canal.
	• Solid, liquid, and gaseous forms of Biomass from the following fuels:
	  • All woody waste;
	  • All agricultural crops or waste;
	  • All animal and other organic waste;
	  • All energy crop;
	  • Landfill gas and wastewater methane; and
	  • Municipal Solid Waste is eligible if it is first converted to a clean burning fuel that is then used to generate electricity. The solid waste conversion facility for converting the municipal solid waste to a clean burning fuel must meet the following criteria:
	  • The facility uses a non-combustion thermal process to convert the MSW to a clean burning fuel.
	  • The technology is designed to produce no discharges of air contaminants or emissions, including greenhouse gases.
	  • The technology produces no discharges to surface or groundwater
	  • The technology produces no hazardous wastes
	  • To the maximum extent feasible, the technology removes all recyclable materials, including plastics, and marketable green waste compostable materials from the solid waste stream prior to the conversion process and the owner or operator of the facility certifies that those materials will be recycled or composted.

Green Power Programs in Canada – 2007

ENMAX Greenmax

Identification

Company offering Program	Enmax
Province	Alberta
Name of Program	Greenmax
Contact person (Name, email, phone)	Heather Rainville

Note from Enmax:

"From a renewable energy program perspective, we are currently updating and revising our renewable energy program and are unable to provide the information requested by your report at this time.

ENMAX will be pleased to report on relevant areas when our program is finalized."[1]

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	Wind

[1] Heather Rainville. Email, April 16, 2008.

Marketing (performance indicators)

Program performance indicators	
Total generation during 2007 (MWh)	
Wind	548,506 MWh

References

Rainville, Heather. Email, April 16, 2008.

Green Power Programs in Canada – 2007

Hydro-Québec Wind Power

Identification

Acquiring entity	Hydro-Québec
Province	Québec
Name of Program	Wind power at Hydro-Québec; Request for Tenders A/O 2005/03
Program start date	First commercially operational project in 1998; A/O 2005/03 launched on October 31, 2005
Program type / brief description	Hydro-Québec released its RFT on October 31, 2005 calling for 2,000 MW of wind generated capacity. It received 66 bids from 25 developers for a total of 7,724 MW. The call for tender A/O 2005/03 has not yet been awarded.
Contact person (Name, email, phone)	Jean-Philippe D Laporte Much of the following is based on the limited information available on the website www.hydroquebec.com/learning/eolienne/index.html Information request submitted via web form

Acquisition program characteristics

Program characteristics	
Eligible technology / size	Wind power (no size limits specified)
Source of power purchased	None constructed to date. All power must be generated within Québec.
Impetus for program (e.g. marketing, standards, etc.)	Hydro-Québec's stated objectives are • "To continue working towards sustainable development

<table>
<tr><th colspan="2">Program characteristics</th></tr>
<tr><td></td><td>

To guarantee a reliable, high-quality supply of electricity at a competitive price
To become a world leader in integrating wind power into major power systems”

</td></tr>
<tr><td>Specific sources and vintages of generation</td><td>
The following table outlines Hydro-Québec’s wind power
<table>
<tr><th>Project Name</th><th>Commissioning date</th><th>Capacity (MW)</th></tr>
<tr><td>Rivière-du-Loup wind farm</td><td>2008 (scheduled)</td><td>171</td></tr>
<tr><td>Baie-des-Sable wind farm</td><td>2006</td><td>109.5</td></tr>
<tr><td>Jadrin d’éole (Saint-Ulric-Saint-Léandre) wind farm</td><td>2009</td><td>150</td></tr>
<tr><td>Test bank – Saint-Ulric wind farm</td><td>1998</td><td>2.25</td></tr>
<tr><td>Le Nordais wind farm (Matane)</td><td>1999</td><td>42.75</td></tr>
<tr><td>Les Méchins wind farm</td><td>2009</td><td>150</td></tr>
<tr><td>Le Nordais wind farm (Cap-Chat)</td><td>1998</td><td>57</td></tr>
<tr><td>Carleton wind farm</td><td>2008 (scheduled)</td><td>109.5</td></tr>
<tr><td>Mont-Louis wind farm</td><td>2010</td><td>100.5</td></tr>
<tr><td>Mont-Copper wind farm</td><td>2004</td><td>54</td></tr>
<tr><td>Murdochville wind farm</td><td>TBD</td><td>54</td></tr>
<tr><td>Mont-Miller wind farm</td><td>2005</td><td>54</td></tr>
<tr><td>Montage-Sèche wind farm</td><td>2011</td><td>58.5</td></tr>
<tr><td>L’Anse-à-Valleau wind farm</td><td>2007</td><td>100.5</td></tr>
<tr><td>Renard wind farm</td><td>2003</td><td>2.25</td></tr>
</table>

Many hydropower stations (some with reservoir, some run-of-river – not distinguished on website)
Nothing constructed to date under A/O 2005/03.
</td></tr>
</table>

Program characteristics	
Ownership of environmental attributes	No evidence of Hydro-Québec selling environmental attributes
Acquisition strategy	Public Request for Tenders
Sectors affected	Commercial and industrial 30% of wind turbine costs must be incurred in Matane or Gaspésie-Île-de-la-Madelaine. At least 60% of total project costs must be incurred within Québec.[1] Investments estimated at $4B.
Price premium paid over regular rates / cost recovery	General sales via grid
Total energy added to grid in 2007	HQ Distribution added 381.3 GWh of wind energy to the grid in 2007 and HQ Generation added 350 GWh of wind for a total of 731.3 GWh[2]
Total energy added to grid cumulatively	Since the first installation in 1998, HQ Distribution added 425.3 GWh of wind energy to the grid in 2007 and HQ Generation added 1,000 GWh of wind for a total of 1,425.3 GWh[3]
Additional resources installed during 2007 under the program (MW)	
Wind	The L'Anse-à-Valleau wind farm, with a capacity of 100.5 MW was the only wind project commissioned in 2007.

[1] Hydro-Québec, *Hydro-Québec Distribution's second call for tenders* (Date unknown [cited April 16 2008]); available from http://www.hydroquebec.com/learning/eolienne/pop_appel_2.html.

[2] Jean-Philippe D Laporte. Email, April 21, 2008.

[3] Ibid.

References

Hydro-Québec. Date unknown. *Hydro-Québec Distribution's second call for tenders.* http://www.hydroquebec.com/learning/eolienne/pop_appel_2.html. (accessed April 16, 2008).

Laporte, Jean-Philippe D. Email, April 21, 2008.

Green Power Programs in Canada – 2007

Manitoba Hydro RFPs

Identification

Company offering Program	Manitoba Hydro
Province	Manitoba
Name of Program	RFP
Contact person (Name, email, phone)	Jim Blais, Manitoba Hydro, 204-474-3524 Greg McNeill, Manitoba Hydro, 204-474-4732

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	Wind Farm
Type and source of certification (note: more on this below)	Manitoba is a member of the Western Climate Initiative which will in the future "aim to develop an initial set of eligible project types and approved protocols prior to cap and trade program launch."[1]
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Manitoba Hydro sources the majority of its electricity from large hydro >200MW projects. Although large hydro is not considered a green power source in this report, the incremental environmental benefits of green power are much smaller in comparison with large hydro. Manitoba Hydro has not attempted to market green power to its customers for this reason. Nonetheless, wind power does meet Manitoba Hydro's objective of increasing reliance on renewable energy sources. Manitoba Hydro states that "since 1990, to increase our reliance on renewable

[1] Western Climate Initiative, *Draft Offsets Design Recommendations*, April 3rd, 2008

Program proponent characteristics	
	generation and to reduce our own GHG emissions we have committed to purchase output from a 100 MW wind farm."[2] In 2005, the Province of Manitoba and Manitoba Hydro announced an intention to develop 1,000 MW of wind power by 2015.[3]
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	As there is no program there are no objectives.
Specific sources and vintages of generation	The only green power project in operation in Manitoba is the St. Leon wind farm. Algoquin Power installed the first turbine in
Ownership of environmental attributes	Manitoba Hydro owns the RECs associated with the operation of the St. Leon wind farm.[4]

Marketing (program customer characteristics)

Program customer characteristics	
Perceived barriers	Manitoba Hydro sources 90% of its electricity from renewable sources, including large hydro. Manitoba Hydro finds it difficult to market the incremental benefits of green power (which does not include large hydro) relative their current electricity supply. Because of this Manitoba Hydro has not created programs to market green power specifically.
Program / product design	Manitoba hydro noticed that several proponents were interested in developing wind in Manitoba. Manitoba Hydro created a request for proposal to gain more information on the systems available including cost, electricity generating potential and location. Manitoba Hydro provides no incentive

[2] Manitoba Hydro, *2006 Performance Report,* http://www.hydro.mb.ca/environment/greenhouse_gas/performance.shtml (Accessed March 11th, 2008).

[3] Government of Manitoba, "Energy Minister Announces Next Step in Plan to Further Harvest Manitoba's Wind-Power Potential," (2005).

[4] Personal Communication, Manitoba Hydro, March 2008

	for wind power production or any other green power source. Wind must compete with large hydro in the province.
Price premium over regular rates / cost recovery	No price premium provided is provided.
Customer sectors affected	Power from the wind farm is incorporated into the power pool and is not distinguished from other power generated in the province.
Key customers	N/A

Marketing (performance indicators)

Program performance indicators	
Year (indicate calendar or fiscal)	The wind farm started generation in April of 2005.
MWh sold	
Total	99MW wind power operation
Additional resources installed during 2007 under the program (MW)	
Wind	No additional turbines installed in 2007.
Biomass	N/A
Solar	N/A
Small Hydro	N/A
Other	N/A
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	

Wind	99 MW (Capacity)
Biomass	N/A
Solar	N/A
Small Hydro	N/A
Other	N/A
Total generation during 2007 (MWh)	
Wind	374,000[5]
Biomass	N/A
Solar	N/A
Small Hydro	N/A
Other	N/A
Change in total generation from previous year(s) (MWh)	
Total generation to date (at end of 2007) (MWh)	
Wind	374,000[6]
Biomass	N/A

[5] Algonquin Power provided this value as an estimate of 2007 generation. They were unwilling to release actual production data.

[6] Algonquin Power only provided us with 2007 generation estimates. As the wind farm was not fully operational until mid-2006 we only include 2007 generation here. This value is likely an underestimate of total generation.

Solar	N/A
Small Hydro	N/A
Other	N/A

References

Government of Manitoba. "Energy Minister Announces Next Step in Plan to Further Harvest Manitoba's Wind-Power Potential." 2005.

Green Power Programs in Canada – 2007

Maritime Electric Green Power Program

Identification

Company offering Program	Maritime Electric (Subsidiary of Fortis, Inc.)
Province	PEI
Name of Program	Green Power Program
Contact person (Name, email, phone)	Frank McKearney 902-629-3611

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	5 MW Wind Farm (owned by PEI Energy Corporation)
Type and source of certification (note: more on this below)	None
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Maritime Electric's Green Power Program was initiated following the commissioning in Fall 2001 of the first 5 MW (Phase 1) at the North Cape wind farm by the PEI Energy Corporation. The Green Power Program is one of several sources of funding set up to pay for the expected higher cost of electricity produced by the wind farm as compared to conventional sources of electricity generation.
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	The program was promoted as a way that customers can demonstrate their support for the development of renewable generation. All proceeds collected from the Green Power Program are forwarded to the PEI Energy Corporation, which owns North Cape wind farm.

Program proponent characteristics	
Perceived barriers	Within several months of the program first being offered, it was fully subscribed, and has been close to fully subscribed since then. Subsequent wind power development by the PEI Energy Corporation has not needed funding from a green power program because the price that Maritime Electric pays for the generation is sufficient to cover the full cost of the wind farms. This is why Maritime Electric's Green Power Program has not been expanded.
Specific sources and vintages of generation	600,000 kWh are available annually from the Phase 1 output of PEI Energy Corporation's North Cape wind farm (commissioned in Fall 2001) for Maritime Electric's Green Power Program.
Ownership of environmental attributes	No comment

Marketing (program customer characteristics)

Program customer characteristics	
Perceived barriers	Full subscription
Acquisition and marketing strategy	No comment
Program / product design	Blocks of 50 kWh are sold for $1.25.
Price premium over regular rates / cost recovery	2.5 cents per kWh.
Customer sectors affected	Residential, Commercial, Industrial
Key customers	No comment

Marketing (performance indicators)

Program performance indicators

Year (indicate calendar or fiscal)	2008 (current, same since program inception)
Number / % of customers enrolled	
Residential	425 / 85%
Commercial	70 / 14%
Institutional	0 / 0%
Industrial	5 / 1%
Total	500 (TOTAL Maritime Electric Customers = 77,000)
Change in number / % of customers over previous years	No comment
MWh sold	
Residential	484.5 MWh
Commercial	79.8 MWh
Institutional	0 MWh
Industrial	5.7 MWh
Total	570 MWh (950 blocks of 50 kWh MONTHLY)
Subscriber retention rate	
Residential	No comment
Commercial	No comment

Institutional	No comment
Industrial	No comment
Total	No comment
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	5 MW
Biomass	0
Solar	0
Small Hydro	0
Other	0
Total generation during 2007 (MWh)	
Wind	570 MWh
Biomass	0
Solar	0
Small Hydro	0
Other	0
Change in total generation from previous year(s) (MWh)	Generation for the program has been unchanged since program inception. They have full subscription with no growth.
Total generation to date (at end of 2007) (MWh)	
Wind	3,420 MWh (six years of 570 MWh)

Biomass	0
Solar	0
Small Hydro	0
Other	0

Green Power Programs in Canada – 2007

New Brunswick Power – Embedded Generation Program

Identification

Organization / agency offering program	New Brunswick Power (publicly-traded utility)
Province	New Brunswick
Name of Program	Embedded Generation Program
Contact person (Name, email, phone)	Heather MacLean, NB Power, (506) 458-6618

Program characteristics

Program characteristics	
Description	Organizations or companies generating electricity would be able to sell power to NB Power
Date enacted / implemented	The program hasn't been formally announced
Design considerations	
Eligible technology / size	NB Power is still considering options before launching the program
Type and source of certification required	NB Power is still considering options before launching the program
Target sectors (e.g. producers, utilities, customers, residential,	NB Power is still considering options before launching the program

Program characteristics	
commercial)	
Impetus for program (e.g. customer demand, financial opportunity, etc.)	NB Power wanted to consider innovative ways to generate more power and reduce demand
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	NB Power is still considering options before launching the program
Challenges	NA
Price premium over regular rates / cost recovery	NB Power is still considering options before launching the program
Intended benefits at time of design	NB Power is still considering options before launching the program

Performance Indicators / Results

Performance indicators / results	
Year (indicate calendar or fiscal)	2007 (calendar or fiscal) Not promulgated yet

Green Power Programs in Canada – 2007

New Brunswick Power Net Metering

Identification

Organization / agency offering program	New Brunswick Power (publicly-traded utility) Distribution and Customer Service Corporation
Province	New Brunswick
Name of Program	Non Utility Generation – Net Metering
Contact person (Name, email, phone)	Heather MacLean, NB Power, (506) 458-6618

Program characteristics

Program characteristics	
Description	"A customer may connect a generation unit that uses renewable fuels and has a nameplate rating of up to 100 kW to the New Brunswick Power Distribution and Customer Service Corporation (Disco) grid. The output of the generation unit may be used to offset the customer's own consumption. Monthly credits not used within any month may be carried forward and used to reduce future consumption until March 31 of each year."[1]
Date enacted / implemented	Gradual process during period from 2003 to 2005
Design considerations	

[1] Unknown author, *New Brunswick Power Distribution and Customer Service Corporation: Non Utility Generation - Net Metering* (Date Unknown [cited March 24 2008]); available from http://conservationcouncil.ca/energy/files/Information%20on%20Net%20Metering.pdf.

Program characteristics	
Eligible technology / size	Eligible fuels: biogas, biomass, solar-PV, hydro, and wind Maximum generation capacity: 100 kW "The aggregate capacity of net metering projects and embedded generation on the distribution system within Disco's territory is capped at 21 MW."
Type and source of certification required	"The electricity that is generated must be in compliance with Environment Canada's Environmental Choice Program published in "CERTIFICATION CRITERIA DOCUMENT CCD-003"" Still true
Target sectors (e.g. producers, utilities, customers, residential, commercial)	Any customer Most inquiries are from "average" homeowners
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Want to work with people to aid them in case interested
Challenges	Ensuring people have the right information
Price premium over regular rates / cost recovery	NA NB Power provides meter

Performance Indicators / Results

Performance indicators / results	
Year (indicate calendar or fiscal)	2007

Performance indicators / results	
General response from affected parties	3 customers on program right now; receiving many inquiries

References

Unknown author. Date Unknown. *New Brunswick Power Distribution and Customer Service Corporation: Non Utility Generation - Net Metering*. http://conservationcouncil.ca/energy/files/Information%20on%20Net%20Metering.pdf. (accessed March 24, 2008).

Green Power Programs in Canada – 2007

New Brunswick Climate Action Fund

Identification

Organization / agency offering program	Government of New Brunswick
Province	New Brunswick
Name of Program	Climate Action Fund
Contact person (Name, email, phone)	Martin Boulerice, 506-453-8768 http://www.gnb.ca/Environment

Program characteristics

Program characteristics	
Description	New Brunswick's Climate Action Fund provides $34-million over three years to fund public- and private-sector and non-profit initiatives that reduce or avoid greenhouse gas emissions and air pollution in New Brunswick.
Date enacted / implemented	October 2007
Design considerations	
Eligible technology / size	1. Energy efficiency

Program characteristics	
	2. Clean and renewable energy opportunities - Biomass, solar, wind, and tidal (possibly biomass)[1] any clean and renewable (low-GHG emission, low air pollution) – natural gas can apply in some cases (energy overall) 3. Transportation-related emissions reductions 4. Improved waste management 5. Industrial emissions reductions 6. Reducing greenhouse gas emissions from government operations[2]
Type and source of certification required	No specific certification
Target sectors (e.g. producers, utilities, customers, residential, commercial)	Open to all groups (not for individuals)
Impetus for program (e.g. customer demand, financial opportunity, etc.)	From federal government under EcoTrust. Obligations under EcoTrust.
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	EcoTrust objectives – reduce GHGs and air pollution
Challenges	Just beginning, difficult to assess challenges

[1] New Brunswick Department of Environment, *Climate Change Action Plan 2007-2012 - Summary* ([cited March 13 2008]); available from http://www.gnb.ca/0009/0369/0015/0002-e.asp.

[2] New Brunswick Department of Environment, *New Brunswick Climate Action Fund* (Date unknown [cited March 13 2008]); available from http://www.gnb.ca/0009/0369/0016/0001-e.asp.

Program characteristics	
Price premium over regular rates / cost recovery	NA
Intended benefits at time of design	Primarily environmental

Performance Indicators / Results

Performance indicators / results			
Year (indicate calendar or fiscal)	2007 (fiscal ending March '08)		
General response from affected parties	Not able to share specifics at this time. Interest has been high – non-profits and municipalities (50%), industry (50%)		
Additional resources installed during 2007 under the program			
Wind	$	MW	Comments:
Bioenergy (biogas, biomass)	$	MW	Comments: Landfill gas – construction to be complete in 2009 Funding amount and generation capacity not confirmed
Solar	$	MW	Comments:
Small Hydro	$	MW	Comments:
Other	$	MW	Comments:
Total resources installed by the end of 2007 under the program (cumulative – indicate start date)			
Wind	$	MW	Comments:

Performance indicators / results			
Bioenergy (biogas, biomass)	$	MW	Comments:
Solar	$	MW	Comments:
Small Hydro	$	MW	Comments:
Other	$	MW	Comments:

Additional Comments

Comments
3-yr funding, only 1 project awarded during first year Six engineered landfills, entity of government as non-profit (cost recovery) municipal, industry, non-profit

References

New Brunswick Department of Environment. *Climate Change Action Plan 2007-2012 - Summary.* http://www.gnb.ca/0009/0369/0015/0002-e.asp. (accessed March 13, 2008).

———. Date unknown. *New Brunswick Climate Action Fund.* http://www.gnb.ca/0009/0369/0016/0001-e.asp. (accessed March 13, 2008).

Green Power Programs in Canada – 2007

Nova Scotia Power Renewable Energy Solicitation

Identification

Company offering Program	Nova Scotia Power
Province	Nova Scotia
Name of Program	Nova Scotia Power, RFP for 130 MW of renewable Energy 2007 http://www.nspower.ca/environment/green_power/renewable_energy_solicitation/renewableRFP.shtml.
Contact person (Name, email, phone)	Erika Smeltzer, CET, CEI Electrical Engineering Technologist Nova Scotia Power Inc Meter & Inspection Services (902)869-5324 : Fax(902)869-5311

Program characteristics

Program characteristics	
Eligible technology / size	wind, hydro, ocean energy, biomass, biogas, solar, etc
Type and source of certification (note: more on this below)	Unclear
Impetus for program (e.g. customer demand, financial opportunity, etc.)	In February 2007, Nova Scotia's new Renewable Energy Standards were enacted. These standards call for renewable energy increases of five per cent to the total supply by 2010, and 10 per cent by 2013, on top of renewables already in the system as of 2001. The province estimates that by 2013, "almost 20 per cent of Nova Scotia's electricity will be generated by renewable energy – wind, tidal, biomass, solar and hydro

Program characteristics	
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	Acquire proven supplies of renewable energy from IPPs to be, as a minimum, in compliance with the new Provincial Renewable Energy Standard.

Marketing (performance indicators)

Program performance indicators	
Year (indicate calendar or fiscal)	2007
Additional resources installed during 2007 under the program (MW)	
Wind	0 MW of capacity installed Contracts signed for • Shear Wind Inc. for a 60-megawatt wind farm in Pictou and Antigonish Counties • RMSenergy for wind farms in Pictou and Antigonish counties 51 MW & 6 MW wind farms • EarthFirst Canada Inc, wind farm will have a nameplate capacity of 45 MW • Renewable Energy Services Ltd. (RESL) will deliver 22 megawatts of capacity
Biomass	
Solar	
Small Hydro	
Other	

Green Power Programs in Canada – 2007

NWT – Community Renewable Energy Fund

Identification

Acquiring entity (incl. entity type, ie. corporate, gov't, institutional)	Environment and Natural Resources, Government of the NWT
Province	Northwest Territories
Name of Program	Community Renewable Energy Fund
Program start date	
Program type / brief description	*Community and Aboriginal governments, GNWT departments, boards and agencies, and nonprofit organizations are eligible to apply for this program. The maximum amount of contribution for any project will be $50,000 per year.* (http://www.enr.gov.nt.ca/eps/pdf/AETP_Guidelines_final2.pdf)
Contact person (Name, email, phone)	Alternative Energy Specialist Environment Division Department of Environment and Natural Resources PO Box 1320 Yellowknife, NT, X1A 2L9 Telephone: (867) 873-7654 Facsimile: (867) 873-0221 http://www.enr.gov.nt.ca/eps/pdf/AETP_Guidelines_final2.pdf

Acquisition program characteristics

Program characteristics	
Eligible technology / size	"The following technologies are eligible for funding under CREF: • Photovoltaic (PV) technologies collect solar radiation to produce electricity. • Solar Hot Water Heating Systems consist of large, flat panels that contain a network of pipes that

Program characteristics	
	collect solar radiation for heating water. • Solar Walls are perforated panels installed on a south facing wall allowing air to be preheated before entering the air handler, reducing the load on the conventional heater. • Wind Turbines capture the energy of the wind and convert it into electricity. Monitoring studies to assess and measure the wind resource are eligible. • Biofuel and Synthetic Gas are new technologies for more efficient use of wood, vegetation or agricultural waste for fuels or energy sources. • Ground-source Heat Pumps use heat from the ground and circulate it into a building. Other uses of geothermal energy will also be considered. An applicant may apply for a contribution for a technology not on the list. If they do so, the applicant must provide substantiation that the project is technically feasible and otherwise complies with the program requirements. Proposals for studies, workshops, conferences or other activities will be considered under this fund. However, acceptance will generally be reserved for projects that are able to demonstrate firm and measurable results in greenhouse gas reductions." (http://www.enr.gov.nt.ca/eps/pdf/AETP_Guidelines_final2.pdf)
Impetus for program (e.g. marketing, standards, etc.)	"Recent increases in energy prices have made alternative energy systems more economical in the Northwest Territories (NWT). Concerns about climate change and the need to reduce greenhouse gas emissions from the use of fossil fuels when producing heat or electricity provide a further reason to develop the use of alternative energy sources. This initiative is part of a broader range of measures that the Government of the NWT has put in place through the Energy Plan and Greenhouse Gas Strategy. The Community Renewable Energy Fund funds promising technologies that require demonstration in the NWT in order to prove they are feasible in the north. This contribution is available to community and Aboriginal governments, GNWT departments, boards and agencies, and non-profit organizations to undertake feasibility studies or establish alternative energy demonstration projects as part of their operations. The objective of this fund is to promote projects that advance the knowledge and effectiveness of new clean energy technologies in northern environments." http://www.enr.gov.nt.ca/eps/pdf/AETP_Guidelines_final2.pdf

Green Power Programs in Canada – 2007

NWT Small Renewable Energy Fund

Identification

Acquiring entity (incl. entity type, ie. corporate, gov't, institutional)	Environment and Natural Resources, Government of the NWT
Province	Northwest Territories
Name of Program	Small Renewable Energy Fund
Program start date	
Program type / brief description	"The Small Renewable Energy Fund (SREF) provides funding of up to one-third of the cost of qualified alternative energy systems. The funding will be provided to eligible private residential homeowners and business applicants. The maximum amount that will be provided to any recipient will be $5,000 per year. Homeowners who apply for funding must install the system in their primary residence." http://www.enr.gov.nt.ca/eps/pdf/AETP_Guidelines_final2.pdf
Contact person (Name, email, phone)	Wade Carpenter Alternative Energy Specialist Environment Division Department of Environment and Natural Resources PO Box 1320 Yellowknife, NT, X1A 2L9 Telephone: (867) 873-7654 Facsimile: (867) 873-0221

Acquisition program characteristics

Program characteristics	
Eligible technology / size	• Photovoltaic (PV) • Wind

	• Ground-source Heat Pumps (energy – not power) The following technologies are not eligible under the SREF, as funding for these is available under the NWT Energy Efficiency Incentive Program and the federal ecoENERGY program: • Solar hot water heaters • Wood stoves, pellet stoves and pellet boilers Eligible costs also include • balance of system costs • inverters and electrical control systems • batteries for stand-alone applications • grid-tie packages, and • shipping and installation costs
Type and source of certification (note: more on this below)	NA (qualifying systems as defined within the program)
Impetus for program (e.g. marketing, standards, etc.)	"Recent increases in energy prices have made alternative energy systems more economical in the Northwest Territories (NWT). Concerns about climate change and the need to reduce greenhouse gas emissions from the use of fossil fuels when producing heat or electricity provide a further reason to develop the use of alternative energy sources. This initiative is part of a broader range of measures that the Government of the NWT has put in place through the Energy Plan and Greenhouse Gas Strategy. The Small Renewable Energy Fund is available to assist residential homeowners and commercial businesses that want to incorporate commercially available, clean energy technologies into their home or business for the production of electricity. Technologies eligible for funding were selected because they have been previously demonstrated successful for small-scale applications in the NWT." http://www.enr.gov.nt.ca/eps/pdf/AETP_Guidelines_final2.pdf
Sectors affected (participants for capacity acquisition)	Residences (homeowners); businesses -lots of applications have been from people off-grid -people say how much fuel they currently use (generators) and how much they plan to reduce it by
Acquisition strategy	Not a lot of advertising – are going to start an education / marketing campaign through consultant –

	focus groups in communities to see what they believe their best RE options would be get into
Additional resources installed during 2007 under the program (MW)	
Wind	1.2 kW
Biomass	
Solar	7.3 kW
Small Hydro	
Other	
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	1.2 kW
Biomass	
Solar	7.3 kW
Small Hydro	
Other	

Green Power Programs in Canada – 2007

Oakville Hydro Green Light Pact

Identification

Company offering program	Oakville Hydro Energy Services Inc.
Province	Ontario
Name of program	Oakville Hydro Green Light Pact
Start date	March 2003
Contact person	

Marketing

Program proponent characteristics	
Type and source of certification	EcoLogo
Specific sources and vintages of generation	Orders electricity from Ontario Power Generation Evergreen program (see OPG Evergreen program) 2 MW Completed Landfill Gas Collection and Utilization Project in July 2007 [1]
Program customer characteristics	
Acquisition and marketing strategy	**Why should I buy a "Green Light Pact" ?** "It is completely your choice and your commitment! Many of our customers have indicated that they would like to see more electricity produced from renewable sources. Every one of us in Ontario uses electricity every day of our lives - at home, at work, at school, and even during our leisure time. Now

[1] https://www.halton.ca/ppw/waste/documents/LFG-mediarelease.pdf

	you have the opportunity to contribute to a cleaner environment for the future. By purchasing a "Green Light Pact", you are partnering with Oakville Hydro Energy Services Inc. to contribute to a cleaner environment."
Program / product design	"Green Light Pacts" are available in different yearly sizes. You can purchase a $30.00 Half Pact (equal to 500 kWh over the year), or a $60.00 Full Pact (equal to 1000 kWh over the year). You may buy as many of each kind as you wish. Each "Green Light Pact" is equivalent to 1000 kWh of Green Power being generated and injected into the Ontario electricity grid, and helping to displace the generation of 1000 kWh of electricity from the burning of fossil fuels. This is equivalent to approximately a month of electricity used by a typical home and benefits the environment by reducing greenhouse gas emissions.
Price premium over regular rates / cost recovery	$60 for 1,000 kWh
Customer sectors affected	Residential, commercial, institutional, industrial
Key customers	Town of Oakville – 170,000 kWh Region of Halton – Halton Partners for Clean Air ABREX Paint & Chemical Ltd Omron Dualtec Automotive Electronics Green Rooms Inc.

Program performance indicators	
Change in total MWH from previous year(s)	First 10 months of program (2003-2004), customers purchased 62,700 kWh
Resources installed by the end of 2007 under the program	Try to find capacity installed in 2007 as well as (more importantly) cumulative capacity annual capacity or cumulative capacity for length of program – both are useful, just need start date [see Program information section above] for cumulative to be compared. Should be in MW capacity and include generation type (ie. important to know if 30 MW wind vs. 30 MW solar)

Small hydro	92% (**from OPG Evergreen program, as of 2006)**
Wind	2%
Biomass	6%
Solar	
Other	
Green generation (annual MWh)	To date 422,040 kWh of green power (total) 2007 figures outstanding
Small hydro	
Wind	92%
Biomass	2%
Solar	
Other	

Green Power Programs in Canada – 2007

Ontario Power Authority RFPs

Identification

Acquiring entity	Ontario Power Authority
Province	Ontario
Name of Program	OPA Generation Procurement (specifically, Ontario renewable RFPs within this program)
Program start date	Issued April 2004, winners announced November 2004 ("RES I" at 395 MW); Issued June 2005, winners announced November 2005 ("RES II" at 975 MW); RES III RFP expected to be released in first quarter of 2008 as part of Minister of Energy's directive for OPA to procure 2000 MW of renewable energy supply for projects greater than 10 MW in size
Program type / brief description	Call for proposals resulting in combined 1,370MW of new renewable energy supply, "opening the door to new, clean, renewable energy sources - such as wind, solar, water, biomass and landfill gas."
Contact person (Name, email, phone)	

Acquisition program characteristics

Program characteristics	
Eligible technology / size	Outlined in detail in the RFP; includes wind, solar, small hydro, biomass and landfill gas; between 0.5-100 MW project size for RES I; between 20.0-200.0 MW for RES II
Source of power purchased	NA (purchasing capacity – see "Specific sources and vintages of generation" below)
Perceived barriers	
Specific sources and vintages of generation	Note: * indicates project was commissioned before end of 2007 for purposes of capacity installed RES I: *Eastview Landfill Gas Energy Plant, Guelph Hydro Generation Company (Guelph), 2.5 MW.

	*Erie Shores Wind Farm, Erie Shores Wind Farm L.P. (Port Burwell), 99 MW Erie Shores Wind Farm L.P. is a limited partnership of AIM PowerGen Corporation and the Clean Power Income Fund. *Kingsbridge Wind Power Project, EPCOR Power Development Corporation (Goderich), 39.6 MW. *Melancthon (I) Grey Wind Project, Canadian Hydro Developers, Inc. (Shelburne), 67.5 MW. *Prince Wind Farm (I), Superior Wind Energy Inc. (Prince Township, near Sault Ste. Marie), 99 MW Blue Highlands Wind Farm, Superior Wind Energy Inc. (Blue Mountains), 49.5 MW. Superior Wind Energy is a joint venture between Brascan Power Corporation (51%) and Harmony Wind Energy Inc. (49%). *Trail Road Landfill Gas Generating Station, Energy Ottawa (Ottawa), 5 MW. Energy Ottawa Inc. is a wholly owned subsidiary of Hydro Ottawa Holding Inc. Umbata Falls Hydroelectric Project, a partnership of the Pic River First Nation and Innergex II Income Fund (on White River, near Marathon), 23 MW. *Glen Miller Hydroelectric Project, Innergex II Income Fund, (Trenton), 8 MW. *Hamilton Digester Gas, Hamilton Community Energy, (Hamilton), 1.60 MW. RES II: Island Falls Hydroelectric Project, Yellow Falls Power Ltd Partnership (Canadian Hydro Developers) [Smooth Rock Falls], 20 MW. Kingsbridge II Wind Power Project, Epcor Power Development (Ontario) Limited Partnership [Goderich], 158.7 MW. Kruger Energy Port Alma, Kruger Energy Port Alma Ltd Partnership [Port Alma], 101.2 MW. Leader Wind Power Project A, Leader Wind Corps (Enbridge) [Kincardine], 100.65 MW. Leader Wind Power Project B, Leader Wind Corps (Enbridge) [Kincardine], 99 MW. Melancthon II Wind Project, Canadian Hydro Developers [Shelburne], 132 MW. *Prince II Wind Power Project, Brascan Power Wind - Prince II (Brascan Power) [Sault Ste. Marie], 90 MW.

	*Ripley Wind Power Project, Suncor Energy Products Inc and EHN Windpower Canada Inc. [Ripley], 76 MW. Wolfe Island Wind Project, Canadian Renewable Energy Corps (Canadian Hydro Developers) [Kingston], 197.8 MW.
Total MWh purchased in 2007	Total MWh produced from RES I facilities in 2007: Eastview Landfill Gas Energy Plant: Estimated production for 2007 – 20,625 MWh (estimated based on 2,5 MW contract capacity, using OPA estimated production for Hamilton Digester Gas project below) Erie Shores Wind Farm, Erie Shores Wind Farm: Estimated production for 2007 – 278,000 MWh Kingsbridge Wind Power Project: Estimated production for 2007 – 109,000 MWh Melancthon Grey Wind Project: Estimated production for 2007 – 177,000 MWh Prince Wind Farm: Estimated production for 2007 – 276,000 MWh Blue Highlands Wind Farm: Estimated production for 2007 – Not commissioned (status uncertain) Trail Road Landfill Gas Generating Station: Estimated production for 2007 – 41,000 MWh / year, adjusted downward by 1/12 as generator was commissioned January 31, 2007 = 37,583 MWh Umbata Falls Hydroelectric Project: Estimated production for 2007 – Not commissioned (expected commissioning – Q2 2008) Glen Miller Hydroelectric: Estimated production for 2007 – 41,606 MWh (http://www.innergex.com/teledocu/communiques/com-041125_e.pdf) Hamilton Digester Gas: Estimated production for 2007 – 13,200 MWh Total MWh produced from RES II facilities in 2007: Island Falls Hydroelectric Project: Estimated production for 2007 – Kingsbridge II Wind Power Project: Estimated production for 2007 – Not commissioned (awaiting municipal approvals) Kruger Energy Port Alma: Estimated production for 2007 – Not commissioned (expected commissioning Q4 2008) Leader Wind Power Project A: Estimated production for 2007 – Not commissioned, sold to Enbridge

	Wind Power L.P. (expected commissioning Q4 2008) Leader Wind Power Project B: Estimated production for 2007 – Not commissioned, sold to Enbridge Wind Power L.P. (expected commissioning Q4 2008) Melancthon II Wind Project: Estimated production for 2007 – Not commissioned (expected commissioning Q4 2008) Prince II Wind Power Project: Estimated production for 2007 – 250,909 MWh (extrapolated from OPA Prince Wind I generation estimates) Ripley Wind Power Project: Estimated production for 2007 – Marginal (came on-grid December 21, 2007) Wolfe Island Wind Project: Estimated production for 2007 – Not commissioned (expected commissioning Q4 2008)
Additional resources installed during 2007 under the program (MW)	
Wind	471.1
Biomass	Anaerobic digester: 1.6
Solar	
Small Hydro	8
Other	Landfill gas: 7.5
Total resources installed by the end of 2007 under the program (since 2001) (MW)	
Wind	471.1
Biomass	Anaerobic digester: 1.6
Solar	
Small Hydro	8
Other	Landfill gas: 7.5

Green Power Programs in Canada – 2007

Ontario Power Authority Renewable Energy Standard Offer Program

Identification

Acquiring entity (incl. entity type, ie. corporate, gov't, institutional)	Ontario Power Authority (reports to Government of Ontario)
Province	Ontario
Name of Program	Renewable Energy Standard Offer Program
Program start date	November 2006
Program type / brief description	Within three years of the execution date of the Contract, the Commercial Operation Date of the Contract Facility (other than waterpower Projects) must be declared (8 years for waterpower) 20-year contract length, with payments from the OPA The Contract, other than for PV Contract Facilities, includes an escalation on 20% of the Base Rate (but not the On-Peak Performance Incentive Payment) on the basis of increases in the Consumer Price Index
Contact person (Name, email, phone)	

Acquisition program characteristics

Program characteristics	
Eligible technology / size	Under 10 MW nameplate capacity

Program characteristics	
	Must connect to distribution (50kv or less) rather than transmission Solar PV; thermal electric solar; wind; renewable biomass / biogas; hydro Must be a "Renewable Generation Facility" as defined by the program rules: "a facility that generates Electricity that is delivered through an LDC-owned meter or other meter as provided by the Distribution System Code to a Distribution System or Load Customer from any one of the following sources: wind, Thermal Electric Solar, PV, Renewable Biomass, Bio-gas, Bio-fuel, landfill gas, or water;" (http://www.powerauthority.on.ca/Storage/32/2804_RESOP_Program_Rules_Version_2.0.pdf)
Sectors affected (participants for capacity acquisition)	Everybody excluding Ontario Power Generation
Price premium paid over regular rates / cost recovery	42.0 cents / kWh for solar PV, 11.0 cents / kWh for all other generators, 3.52 cents / kWh on-peak performance incentive (to qualify for on-peak incentive, project must be able to generate electricity for a minimum of 80% of the on-peak hours during the course of a calendar year under normal weather conditions and operating circumstances; excludes wind and PV)
Total MWh purchased in 2007	*NA*
Change in purchases over previous years	*NA*
Additional resources installed during 2007 under the program (MW)	
Wind	2.775
Biomass	Landfill gas = 16.64
Solar	0.32
Small Hydro	5.08
Other	Biogas = 0.23

Program characteristics	
Capacity of contracts executed to end of April 2008 under the program (MW) *Note: these are merely contracts signed under the program and should not be taken as an indicator of the capacity that will be constructed*	
Wind	747.844
Biomass	66.878
Solar	420.007
Small Hydro	66.079
Total	1,300.608

Green Power Programs in Canada – 2007

Ontario Power Generation Evergreen Energy

Identification

Company offering program	Ontario Power Generation
Province	Ontario
Name of program	OPG Evergreen™ Energy
Start date	
Contact person	OPG Sustainable Development / OPG 2006 Sustainable Development Report

Marketing

Program proponent characteristics	
Specific sources and vintages of generation	32 EcoLogo-certified facilities (29 small hydrolectric, and three wind) w/ total 133 MW capacity 9 MW Huron Wind Project (2002) 1.8 MW Pickering Wind Generation Station (2001) Hydro facilities all less than 12 MW capacity per facility, EcoLogo registered – full list available at http://www.opg.com/power/hydro/evergreen_energy/ Non-EcoLogo evergreen – Eugenia Falls hydroelectric station: 6.1 MW

Program customer characteristics

Key customers	Toronto and Region Conservation, Oakville Hydro

Program performance indicators	
Number / % of customers enrolled	
Total	% of total electricity generated – Evergreen: 2006: 811 GWh, 2005: 688 2004: 780 GWh, 2003: 774 GWh, 2002: 737 GWh Total: 2006: 110,308 2005: 113,732 2004: 110,135 2003: 114,459 2002: 121,425 % in 2006: 0.071% (less than 1%) compared to 0.067%in 2003
Green generation (annual MWh)	Annual MWh generated by EcoLogo-certified Evergreen sources: 2006: 811 GWh, 2005: 688 2004: 780 GWh, 2003: 774 GWh, 2002: 737 GWh EcoLogo-certified Green Power generation capacity from 32 OPG stations (29 small hydro stations including 4 NEPG stations), 2 wind turbines, and 50% of Huron Wind (5 wind turbines, partnership with a consortium of Canadian companies): 134 MW (as of Dec 31, 2006) EcoLogo-certified Green Power capacity available from Power Purchase Agreements: 12 MW Total Evergreen EcoLogo-certified Green Power capacity: 146 MW Other Evergreen Energy capacity (non-EcoLogo): Eugenia Falls hydroelectric station: 6.1 MW)

Green Power Programs in Canada – 2007

Prince Edward Island Minimum Purchase Price

Identification

Company offering Program	Government of Prince Edward Island and utilities
Province	Prince Edward Island
Name of Program	Minimum Purchase Price (policy)
Contact person (Name, email, phone)	Ron Estabrooks, Energy Advisor for Department of Environment, Energy and Forestry 902-368-5011

Program characteristics

Program characteristics	
Description	The minimum purchase price policy mandates that utilities pay a minimum of 7.75 cents/kWh for electricity generated by renewable sources
Date enacted / implemented	December 2005
Design considerations	
Eligible technology / size	Applies to renewables (wind, small hydro, biomass, solar – wide open) Greater than 1 MW
Type and source of certification required	Unknown
Target sectors (e.g. producers, utilities, customers, residential,	Utilities (City of Summerside, Maritime Electric)

Program characteristics	
commercial)	Utilities' residential customers Utilities' commercial customers
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Allow more penetration of renewables into energy mix Renewable Energy Act mandated that utilities must have 15% renewables by 2010 (now at 18%) Concern about environment (climate change, sustainability) Keep farmers on the land Exposure to pricing (off-island sources) – price stability, security of source, Economic development
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	Reduce carbon intensity of electricity Increase autonomy over electricity supply Spur economic development
Price premium over regular rates / cost recovery	$0.0775/kWh Determined the profit margin that would get someone involved with renewable energy Province buys electricity from New Brunswick Power. Maritime Electric with Pointe Lepreau (nuclear, natural gas, oil, large hydro) February 2008 – avoided cost was $0.12/kWh Avoided cost can be as low as 4.5 cents, mostly closer to 7 or 8 cents

Performance Indicators / Results

Performance indicators / results			
Year (indicate calendar or fiscal)	2007 (calendar)		
General response from affected parties	Utility wasn't too pleased about the deal (forecasting wind is not easy) but is very pleased now		
Additional resources installed during 2007 under the program			
Wind	$ 100 million	45.5 MW	Comments: Commissioned East Point turbines in 2007 Jan 1 '07: 16 MW Dec 31 '07: 72.5 MW (11 MW destined for export) Another 80 MW in 2008 500 MW of wind by 2013
Bioenergy (biogas, biomass)	$	0 MW	Comments:
Solar	$	0 MW	Comments:
Small Hydro	$	0 MW	Comments:
Other	$	0 MW	Comments:
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)			
Wind	$	MW	Comments: Province owns 40.56 MW of installed wind generation capacity (20% of peak demand). All energy is sold under the minimum purchase price, mostly to Maritime Electric then to its customers. The private sector owns 29 MW of installed wind generation

Performance indicators / results			
			capacity with plans for an additional 80 MW. Some of this is sold to the City of Summerside's utility (which services 10,000 households); the remainder, which represents the majority of the energy, is sold to Maritime Electric then to its customers.
Bioenergy (biogas, biomass)	$	MW	Comments:
Solar	$	MW	Comments:
Small Hydro	$	MW	Comments:
Other	$	MW	Comments:
Total generation during 2007 (MWh)			
Wind	PEI Energy Corp produces 37 GWh at North Cape 87 GWh at East Point 110 GWh in 2007 10 GWh 29 GWh by Suez (commissioned in June / July) 170 GWh – 200 GWh		
Biomass			
Solar			
Small Hydro			
Other			
Change in total			

Performance indicators / results	
generation from previous year(s) (MWh)	
Total generation to date (at end of 2007) (MWh)	
Wind	2001 to 2007: 300 GWh (first commercial wind farm established in November 2001)
Biomass	
Solar	
Small Hydro	
Other	

Benefits

Environmental Benefits	
Greenhouse gases (kg CO_2e)	
During 2007	East Point displaces 70,000 t CO_2e /yr (0.6 t CO_{2e} / MWh grid from New Brunswick) North Cape ~ 15,000 t CO_2e / yr Margin is bunker sea 150,000 t CO_2e / yr
Criteria air contaminants reduced (NO_x, SO_2, $PM_{2.5}$, VOCs) (kg)	
During 2007	Not quantified
Cumulative	Not quantified

Environmental Benefits	
Other benefits (social, economic – briefly)	Benefits to agricultural community Payback if on property, another pool if within 1x height, another pool if within 3x height Pooling $200,000/yr Community gets $25,000/yr for general revenue Landowner gets 2.5% of revenue from particular turbine

Additional Comments

Comments
• 18% of power from wind • PEI has backup generation sources (fossil fuel based) • Province owns 40.56MW of installed wind power capacity (20% of peak demand) • Total electricity: 112 GWh, 110 GWh from wind

Green Power Programs in Canada – 2007

Prince Edward Island Net Metering Program

Identification

Organization / agency offering program	Government of Prince Edward Island and utilities
Province	PEI
Name of Program	Net Metering Program
Contact person (Name, email, phone)	Ron Estabrooks, Energy Advisor for Department of Environment, energy, forestry 902-368-5011

Program characteristics

Program characteristics	
Description	Generators smaller than 100kW receive credit for any excess energy they supply to the grid at the same price as they pay for that power from the utility.
Date enacted / implemented	December 31, 2005
Design considerations	
Eligible technology / size	All renewables less than 100 kW[1]
Type and source of certification	Must meet qualifications of utility (based on safety)

[1] Government of Prince Edward Island, *Renewable Energy Act Proclaimed and Regulations Passed* (December 22 2005 [cited March 13 2008]); available from http://www.gov.pe.ca/news/getrelease.php3?number=4419.

Program characteristics	
required	Minimum distance from homes
Target sectors (e.g. producers, utilities, customers, residential, commercial)	Producers: small businesses and farms
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Give people ability to control electricity destiny
Challenges	Utility didn't think customer would appreciate challenges of distribution etc.
Price premium over regular rates / cost recovery	Same price as utilities charge for electricity sales

Performance Indicators / Results

Performance indicators / results			
Year (indicate calendar or fiscal)	2007		
General response from affected parties	10 kW from residential Not overwhelming Interest in small hydro, just conceptual at this point		
Additional resources installed during 2007 under the program			
General			Fewer than 12 customers

Green Power Programs in Canada – 2007

PEI Small Green Energy Sales Tax Exemption

Identification

Organization / agency offering program	Government of Prince Edward Island
Province	PEI
Name of Program	Small Green Energy Sales Tax Exemption
Contact person (Name, email, phone)	Ron Estabrooks, Energy Advisor for Department of Environment, Energy, Forestry 902-368-5011 rgestabr@gov.pe.ca

Program characteristics

Program characteristics	
Description	PST exemption for renewable energy technology purchased in PEI. Renewable (solar, wind, geothermal, biomass, methane recapture) Wind: whole unit is exempt of PST Utility-sized equipment – towers and foundations pay PST. Blades and turbines exempt from PST PST exemption for wood pellet stove (stopped in 2008, expect to offer again) PST exemption for ground source, solar, heat exchange for grey water Different set of legislation (Revenue Tax Act)
Date enacted / implemented	Retroactive to April 8, 2005

Program characteristics	
Design considerations	
Eligible technology / size	Wind, biogas, ground-source or geothermal, solar thermal, solar PV, drain water heat recovery Up to 100 kW
Type and source of certification required	Ron isn't sure
Target sectors (e.g. producers, utilities, customers, residential, commercial)	Residential, commercial institutional → buyers Commercial, industrial, manufacturing → producers and retailers
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Environmental piece (carbon emissions), economic development (local jobs: maintenance) Retailers of renewable energy equipment (Renewable Energy Technologies)
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	Reduce emissions, strengthen local economies Stimulate growth of renewables sector – keep money on PEI Give people ability to control energy prices
Challenges	
Price premium over regular rates / cost recovery	PEI Provincial Sales Tax = 10%
Intended benefits at time of design	

Performance Indicators / Results

Performance indicators / results	
Year (indicate calendar or fiscal)	2007 (calendar or fiscal)

Green Power Programs in Canada – 2007

Pembina Wind Power for Computers

Identification

Company offering Program	The Pembina Institute
Province	Alberta
Name of Program	Wind Power by Pembina
Contact person (Name, email, phone)	Rich Wong 819.483.6288 x33

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	Wind power (any size)
Type and source of certification (note: more on this below)	Environmental Choice Program EcoLogo Certification
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Expansion of renewable energy deployment in Canada currently focused on computers only.
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	GHG reduction
Perceived barriers	Shortage of returns on the program to justify administration and active marketing of the program.

Program proponent characteristics	
	RECs sources only available in Ontario/Alberta from Bullfrog.
Specific sources and vintages of generation	Bullfrog Power (2007)
Ownership of environmental attributes	Bullfrog Power

Marketing (program customer characteristics)

Program customer characteristics	
Perceived barriers	Cost high in relation to carbon offsets. Difficult to explain differences between offsets to customers. Hard to distribute products by only soft-marketing on website. RECs only available for Ontario/Alberta from Bullfrog.
Acquisition and marketing strategy	Acquired RECs through Bullfrog Power exclusively. Marketing has been significantly reduced. We no longer actively market the Wind Power Computer program. Pembina only offers wind power computers to corporate clients. Residential customers are directed to the Wind Power Computer program via active website (http://www.pembina.org/wind).
Program / product design	Computer tag (sticker) for wind powered computers that is intended to place on the computer. 8.5x11 certificates available for homes/businesses that are esthetically pleasing.
Price premium over regular rates / cost recovery	Purchase price: $5/MWh. Certificates Price: $27 / MWh Certificates Monthly Price: $27 / MWh Desktops Price:$39 for 1.44 MWh ($27.08 / MWh)

	Laptops Price: $18 for 0.33 MWh ($54.54 / MWh)
Customer sectors affected	Residential (individuals), commercial, institutional and industrial customers .
Key customers	Individuals that purchase Wind Power Computer tags. Corporate clients that purchase Wind Power Computer tags for their operations.

Marketing (performance indicators)

Program performance indicators	
Year (indicate calendar or fiscal)	2007
Number / % of customers enrolled	
Residential	322 customers (90% of customers)
Commercial	32 customers (9% of customers)
Institutional	3 customers (1% of customers)
Industrial	2 customers (1% of customers)
Total	359 customers
Change in number / % of customers over previous years	305 customers in 2006 (+18%)
MWh sold	
Residential	796 MWh (9% of all MWh sold in 2007)
Commercial	6823 MWh (80% of all MWh sold in 2007)

Institutional	84 MWh (1% of all MWh sold in 2007)
Industrial	808 MWh (9% of all MWh sold in 2007
Total	8411 MWh sold in 2007
Subscriber retention rate	
Residential	n/a – the program has changed in structure. Previously customers would purchase green power in MWh denomination. After early 2007, the program was re-structured to only sell green power for computers over a fixed amount of time (3 years). The programs are not comparable.
Commercial	n/a as per above
Institutional	n/a as per above
Industrial	n/a as per above
Total	n/a as per above

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	Environmental Choice Eco Logo

Green Power Programs in Canada – 2007

SaskPower Alternative Farm Energy Program

Identification

Company offering Program	SaskPower
Province	Saskatchewan
Name of Program	Alternative Farm Energy Program http://www.saskpower.com/yourfarm/fs/doc2.shtml
Contact person (Name, email, phone)	SaskPower Planning, Environment and Regulatory Affairs 6th Floor - 2025 Victoria Ave Regina, SK S4P 0S1 Phone: (306) 566-2853 1-800-667-4749 (toll-free in Saskatchewan)

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	SaskPower offers a grant of 50% of costs above $500, to a maximum of $500**,** toward the purchase and installation of a complete solar or wind-powered water pumping system for farm livestock watering facilities. Solar or wind-powered water pump systems must be purchased from a Saskatchewan-based supplier to qualify for the grant.
Type and source of certification (note: more on this below)	None

Program proponent characteristics	
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Water is a major concern when raising livestock, and getting water where it's needed can be costly. Solar or wind-powered water pumps can offer an economical, safe, reliable and environmentally friendly alternative to bringing power lines to remote wells, dug-outs or streams.

Certification

Green power certification / standards comparison characteristics	
Product criteria	Must be purchased from a Saskatchewan-based supplier

Green Power Programs in Canada – 2007

SaskPower Green Power Portfolio Procurement

Identification

Company offering Program	SaskPower
Province	Saskatchewan
Name of Program	Green Power Portfolio (procurement beyond Green Power certificates) http://www.saskpower.com/poweringyourfuture/tomorrow/strategies.shtml
Contact person (Name, email, phone)	

Program characteristics

Program characteristics	
Eligible technology / size	In the Spring of 2003, SaskPower announced its Green Power Portfolio strategy, which ensures that Saskatchewan's electricity needs through 2010 will be met by environmentally responsible sources that avoid any increase in SaskPower's total greenhouse gas emissions. Environmentally preferred technologies include wind, low impact hydro, biomass, biogas, flare gas, heat recovery from an existing heat source and solar.
Type and source of certification (note: more on this below)	SaskPower defined http://www.saskpower.com/poweringyourfuture/tomorrow/pubs/eppoverviewp2.pdf
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	Reducing greenhouse gas emissions

Program characteristics	
Specific sources and vintages of generation	Currently the Green Power Portfolio consists of SaskPower's 150MW Centennial Wind Power facility (commissioned in March 2006), a series of solicitations over three years to obtain up to 45 MW of Environmentally Preferred Power (EPP) through competitive bids, and customer-based energy efficiency and conservation initiatives.
Perceived barriers	None.

Marketing (performance indicators)

Program performance indicators	
Year (indicate calendar or fiscal)	2007
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	Centennial (150 MW)
Biomass	
Solar	
Small Hydro	
Other	5 MW heat recovery plant
Total generation to date (at end of 2007) (MWh)	
Wind	557,000 MWh
Biomass	
Solar	

Small Hydro	
Other	

Environmental Eligibility Criteria

Project Type	Minimum Environmental Requirements
Wind Power	Little or no new land use; no natural (native) habitat impact; for structures/facility and access trails • Structure/facility siting is not located in an area with legislated environmental protection status (including but not limited to Wildlife Habitat Protection Act (WHPA) land, Parks, Protected Areas, Wildlife Reserves, Representative Area Network (RAN) sites • No impact to species at risk • Little or no impact to common flora/fauna species, including migratory birds and bats • Little impact to known heritage sites; mitigation plan developed to address impact to previously unrecorded heritage sites • No fisheries impact
Low Impact Hydroelectric	• Minimal new land use for generating facility(ies), including access roads • Minimal requirements for new electrical infrastructure • Facility is sited in an area which does not have legislated environmental status (including but not limited to WHPA land, Park, Protected Area, RAN site, Heritage River) • Facility presents no impediment to fish migration and spawning • Facility maintains historic water levels and flow regimes • Facility maintains existing species population and composition (all aquatic and riparian species natural to the ecosystem) • Facility construction and operation results in no release of material hazardous or harmful to fish and fish habitat (neither upstream nor downstream) • No alteration of regional or local watershed(s) is required to build or operate the facility • Minimal alteration to adjoining natural, upland habitat for construction and operation of facility

	• Little or no alteration of an existing facility to accommodate the new facility
Biomass/Biogas (Note: this category promotes projects utilizing waste streams including forestry, agricultural waste, landfill gas, sewage, etc.)	• Minimal new land use for new facility • Facility is sited in an area which does not have legislated environmental status (including but not limited to Parks, Protected Area, WHPA land, Wildlife Refuge, RAN site) • Little or no fisheries, species at risk, wildlife habitat or heritage site impact • Minimal requirements for new electrical infrastructure • Fuel must be a waste product consisting of organic matter, that has no other commercial use and/or would otherwise be disposed of, and the new facility would neither require nor necessitate additional resource consumption • If added to an existing facility, the existing facility would not be substantially altered to facilitate energy production • In the course of processing organic waste, no other emissions or by-products accrue which would require special handling or permitting • Maintenance of regional air quality; net reduction desirable • Low to nil operational risk regarding noxious and hazardous substance release; contingency and containment plans acceptable to regulatory authorities • No increase in Greenhouse Gas (GHG) emissions; GHG emission reduction desirable • In order to allow for conditions such as start-up, combustion stabilization and low combustion zone temperatures be generated in a manner such that supplementary, non-renewable fuels are used in no more than 5% of fuel heat input • The combustion technology must not exceed the upper limit (6) for total load points as described in the Environmental Choice December 8, 2001 Draft "Guidelines on Renewable Low-Impact Electricity"
Flare Gas	• Minimal new land use for new facility • Facility is sited in an area which does not have legislated environmental status (including but not limited to Park, Protected Area, WHPA land, Wildlife Refuge, RAN site) • Little or no fisheries, species at risk, wildlife habitat or heritage site impact • Minimal requirements for new electrical infrastructure • New facility would neither require nor necessitate additional resource consumption to maintain or enhance the facility

	• If added to an existing facility, the existing facility would not be substantially altered to allow the new development to operate • Low to nil operational risk regarding noxious and hazardous substance release; contingency and containment plans acceptable to regulatory authorities • Maintenance of regional air quality; net reduction desirable • No increase in GHG emissions; GHG emission reduction desirable • The combustion technology must not exceed the upper limit (6) for total load points as described in the Environmental Choice December 8, 2001 Draft "Guidelines on Renewable Low-Impact Electricity"
Heat Recovery Systems (Note: this category includes heat capture for the purpose of electricity generation)	• Minimal new land use for new facility • Facility is sited in an area which does not have legislated environmental status (including but not limited to Park, Protected Area, WHPA land, Wildlife Refuge, RAN site) • Little or no fisheries, species at risk, wildlife habitat or heritage site impact • Minimal requirements for new electrical infrastructure • New facility would neither require nor necessitate additional resource consumption to maintain or enhance the facility • If added to an existing facility, the existing facility would not be substantially altered to allow the new development to operate • Low to nil operational risk regarding noxious and hazardous substance release; contingency and containment plans acceptable to regulatory authorities • Maintenance of regional air quality; net reduction desirable • No increase in GHG emissions; GHG emission reduction desirable • In order to allow for conditions such as start-up, combustion stabilization and low combustion zone temperatures be generated in a manner such that supplementary, non-renewable fuels are used in no more than 5% of fuel heat input
Solar	• Minimal new land use for new facility • Facility is sited in an area which does not have legislated environmental status (including but not limited to Park, Protected Area, WHPA land, Wildlife Refuge, RAN site) • Little or no fisheries, species at risk, wildlife habitat or heritage site impact

Green Power Programs in Canada – 2007

SaskPower GreenPower

Identification

Company offering Program	SaskPower
Province	Saskatchewan
Name of Program	GreenPower
Contact person (Name, email, phone)	Daryl Reinson

Marketing (program proponent characteristics)

Program proponent characteristics	
Type and source of certification	EcoLogo
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Customer demand, some business demand driven by ability to gain LEED points through Green Power purchases
Perceived barriers	None
Specific sources and vintages of generation	GreenPower is 100 per cent supplied by two wind power facilities located near Gull Lake, Saskatchewan, in southwestern Saskatchewan. Sunbridge is an 11-megawatt, 17-wind turbine facility was officially opened in June 2003. Cypress Wind power facility was built in 2002 and has 16 turbines with a peak capacity of 11 megawatts.
Ownership of environmental	Follow EcoLogo guidelines.

Program proponent characteristics	
attributes	

Marketing (program customer characteristics)

Program customer characteristics	
Perceived barriers	None.
Price premium over regular rates / cost recovery	GreenPower is offered in blocks of $2.50 (plus GST) to support 100 kWhs of green electricity. Large purchases – negotiable.
Customer sectors affected	GreenPower was launched in March 2002 to business customers and on Earth Day, April 2002, to residential and farm customers.
Key customers	GreenPower customers are from all customer segments. A few of the large customers include the Governments of Canada and Saskatchewan, SaskTel and University of Regina. SaskPower also purchases GreenPower to operate its offices.

Marketing (performance indicators)

Program performance indicators	
Year (indicate calendar or fiscal)	2007
Number / % of customers enrolled	
Total	At the end of 2007, the GreenPower product received support from about 1,100 customers.
MWh sold	
Total	Over the last year, GreenPower customers have supported about 69 million kWhs going into the electrical

	system.
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	Approximately 22 MWs

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	EcoLogo

Green Power Programs in Canada – 2007

SaskPower Net Metering

Identification

Company offering Program	SaskPower, funding assistance through Government of Saskatchewan, office of energy conservation
Province	Saskatchewan
Name of Program	Net Metering
Contact person (Name, email, phone)	http://www.saskpower.com/poweringyourfuture/opportunities/net_metering.shtml

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	Only environmentally responsible electricity sources are eligible for the net metering program. These technologies include wind, low impact hydro, biomass, flare gas, solar and heat recovery systems.
Type and source of certification (note: more on this below)	http://www.saskpower.com/poweringyourfuture/pdfs/SaskPowerNetMeteringPolicy.pdf
Impetus for program (e.g. customer demand, financial opportunity, etc.)	SaskPower has had several inquiries from customers who have expressed interest in a net metering program and we have implemented this program in response to customer demand.
Program objectives (e.g. GHG reduction, CAC reduction, branding, etc.)	"the intent of the net metering policy is to provide for the safe installation of generation by customers for the purpose of netting off energy that is produced by the customer against the energy, which that customer consumes over a specific time period." http://www.saskpower.com/poweringyourfuture/pdfs/SaskPowerNetMeteringPolicy.pdf

Program proponent characteristics	
Perceived barriers	
Specific sources and vintages of generation	
Ownership of environmental attributes	SaskPower (emission credits)

Marketing (program customer characteristics)

Program customer characteristics	
Price premium over regular rates / cost recovery	SaskPower will not be paying for any excess electricity through the net metering program. If a net metering customer generates more power than they actually use, that excess electricity is fed back to SaskPower's electricity system, which is then "banked" for a defined period of time and used to offset that customer's future electricity use. *Additional Financing from Government of Saskatchewan* The Saskatchewan Research Council's net metering program will pay a one-time fee equivalent to 25 per cent of eligible costs up to a maximum of $100,000 (i.e., maximum $25,000).

Certification

Green power certification / standards comparison characteristics

Eligible product categories (can disaggregate into technology categories if easier?)	a) the generating facility must meet SaskPower's interconnection requirements for safety, protection, and power quality as outlined in the Non Utility Generation Interconnection Requirements at voltages 34.5 kV and below b) the generating facility's design and equipment must meet all requirements of the Electric Service Requirements, as well as any and all other standards, approvals and certifications and it will be subject to possible inspection by the Electrical Inspection Branch including all necessary inspection permits and charges. c) the net metering customer will be responsible for all interconnection costs including interconnection studies, appropriate metering to record the energy flow in both directions and any facilities that SaskPower may have to provide or install, as well as any upgrades necessary to allow the interconnection of the generating unit. d) it will be necessary for the net metering customer to enter into the Interconnection Agreement for Small Generators (100 kW max) contract with SaskPower e) an operating agreement will be required with SaskPower. f) it will be necessary for the net metering customer to supply the excess energy at one of SaskPower's standard supply voltages. g) Any emissions credits would be granted to SaskPower.

Green Power Programs in Canada – 2007

SaskPower Small Power Producers

Identification

Company offering Program	SaskPower
Province	Saskatchewan
Name of Program	Small Power Producers http://www.saskpower.com/poweringyourfuture/opportunities/smallpp.shtml
Contact person (Name, email, phone)	SaskPower Planning, Environment and Regulatory Affairs 6th Floor - 2025 Victoria Ave Regina, SK S4P 0S1 Phone: (306) 566-2853 1-800-667-4749 (toll-free in Saskatchewan) Email: Independent Power Producers

Program characteristics)

Program characteristics	
Eligible technology / size	Up to 100 kilowatts (kW) , wind and solar-powered facilities, as well as other viable generating sources.
Price premium over regular rates / cost recovery	SaskPower will purchase any excess energy provided to the grid at a firm price of 6.26 ¢/kW·h. This price is based on SaskPower's variable cost of electricity from all other sources and is calculated annually from information taken from SaskPower's Annual Report. This price will be

Program characteristics	
	reviewed and updated on an annual basis when SaskPower issues its Annual Report;

Certification

Green power certification / standards comparison characteristics	
Product criteria	The generating facility's design and equipment must meet CSA standards, and will be subject to inspection by the Electrical Inspection Branch including all necessary inspection permits and charges; Two-way metering will be required to separately measure energy provided to the grid from the generator and the energy provided by SaskPower to the customer;

Green Power Programs in Canada – 2007

SelectPower SelectWind

Identification

Company offering program	SelectPower (Guelph Hydro subsidiary)
Province	Ontario
Name of program	SelectWind
Start date	July 2003
Notes	Closed in September, 2006 along with SelectPower – whether customers were folded into another green power marketing program remains unclear "In making the announcement, Mr. Truex noted that GHI [Guelph Hydro Inc.] recently conducted a strategic review of all its business opportunities and investment requirements and this lead to the decision to concentrate on its core business of safe and reliable delivery of electricity. "Selectpower has developed an excellent reputation and track record in Ontario's energy sector, but it no longer fits with our current and future business models", said Truex." - http://www.guelphhydro.com/GuelphHydroWeb/NewsOct052006.htm

Marketing

Program proponent characteristics	
Type and source of certification	EcoLogo (product and source)
Specific sources and vintages of generation	Like the Green Tags Ontario program (Section 2.3.9), the Selectwind program is based on green power purchased from Sky Generation's Ferndale wind turbine (1.8 MW, installed in November 2002)

Program proponent characteristics	
Program customer characteristics	
Acquisition and marketing strategy	"Advertising and Marketing" (previous Green Power report)
Program / product design	SelectWind will inject green electricity supply into the Ontario generation system (marketing program – 3 or 5 year contract).
Price premium over regular rates / cost recovery	Purchase options: $ 6.53 / month This ensures that 75 kwh of green power go into the Ontario electricity pool each month for your choice of 3 or 5 years $ 13.06 / month This ensures that 150 kwh of green power go into the Ontario electricity pool each month for your choice of 3 or 5 years

Green Power Programs in Canada – 2007

TransAlta Green Energy and Renewable Energy Certificates

Identification

Company offering Program	TransAlta Utilities
Province	Alberta
Name of Program	Green Energy ® (bundled electricity and environmental attributes) Renewable Energy Certificates (RECs – stand-alone environmental attributes)
Contact person (Name, email, phone)	Jason Edworthy

Marketing (program proponent characteristics)

Program proponent characteristics	
Eligible technology / size	Large wind RECs sold across Canada and in the States
Type and source of certification	Facilities are EcoLogo and Green-E Castle River includes some Type I generation Increase in cost of EcoLogo certification may be prohibitive EcoLogo certification may be irrelevant, particularly in a merchant market like Alberta
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Mostly wholesale City of Calgary's *Ride the Wind* program is a major procurer (ensure not double-counting with

Program proponent characteristics	
	Enmax)
Perceived barriers	The market for RECs is not very strong in Alberta
Specific sources and vintages of generation	Summerhill, Castle Rivers, McBride wind farms

Marketing (program customer characteristics)

Program customer characteristics	
Price premium over regular rates / cost recovery	Not disclosed
Key customers	City of Calgary *Ride the Wind* Other customers are confidential

Marketing (performance indicators)

Program performance indicators	
Year (indicate calendar or fiscal)	F2007 Sold no new RECs in 2007; Not willing to disclose amount of sales
Number / % of customers enrolled	
Residential	0
Commercial	~10 Some corporations, one City, some through ENMAX

Total	~10
Change in number / % of customers over previous years	All 2007 contracts were legacy (both Green Energy and RECs)
MWh sold	
Residential	
Commercial	Not disclosed
Institutional	only Green Energy bundle Ride the Wind 26,000 MWh
Industrial	
Total	Not disclosed
Subscriber retention rate	
Total	Not disclosed
Additional resources installed during 2007 under the program (MW)	
Wind	Nothing new installed in 2007
Biomass	Nothing new installed in 2007
Solar	Nothing new installed in 2007
Small Hydro	Nothing new installed in 2007
Other	Nothing new installed in 2007
Total resources installed by the end of 2007 under the program (cumulative – indicate start date) (MW)	
Wind	185 MW

	70 MW Summerview (EcoLogo and Green-E) 75 MW McBride (EcoLogo and Green-E) 30 MW Castle Rivers (EcoLogo certified, some Type I and Type II) 96 MW Kent Hills (not in 2007)
Biomass	None
Solar	None
Small Hydro	None
Other	None
Total generation during 2007 (MWh)	
Wind	550,000 MWh
Biomass	None
Solar	None
Small Hydro	None
Other	None
Change in total generation from previous year(s) (MWh)	Not disclosed
Total generation to date (at end of 2007) (MWh)	
Wind	Not available
Biomass	None
Solar	None

Small Hydro	None
Other	None

Certification

Green power certification / standards comparison characteristics	
Program authority (licensing body)	EcoLogo and Green-E Green-E for US-customers with facilities in Canada

Green Power Programs in Canada – 2007

Yukon Wind Feasibility Pilot Program

Identification

Organization / agency offering program	Yukon Energy
Province	Yukon
Name of Program	Wind feasibility pilot program
Contact person (Name, email, phone)	Hector Campbell, Director Resource Planning and Regulatory Affairs Yukon Energy Corporation 867-393-5331

Program characteristics

Program characteristics	
Description	Wind feasibility pilot program Wind monitoring assessment program Community residential wind assessment program with 7 portable wind monitoring stations
Date enacted / implemented	First unit in pilot (150 kW) built in 1993; second Vestas 660 kW built in 2000 Wind monitoring assessment program in late 1990s
Impetus for program (e.g. customer demand, financial opportunity, etc.)	Demonstration project

Performance Indicators / Results

Performance indicators / results			
Year (indicate calendar or fiscal)	2007 Calendar		
General response from affected parties			
Total resources installed by the end of 2007 under the program (cumulative – indicate start date)			
Wind	$ 3,000,000 total	MW	Comments:
Bioenergy (biogas, biomass)	$	MW	Comments:
Solar	$	MW	Comments:
Small Hydro	$	MW	Comments:
Other	$	MW	Comments:
Total generation during 2007 (MWh)			
Wind	371 MWh		
Biomass			
Solar			
Small Hydro			
Other			
Change in total generation from			

Performance indicators / results	
previous year(s) (MWh)	
Total generation to date (at end of 2007) (MWh)	
Wind	7.3 GWh
Biomass	
Solar	
Small Hydro	
Other	