



Northern Exposure: An Overview of Canadian Clean Energy Funds

Garrett Fitzgerald, Ryan Wiser, and Mark Bolinger
Lawrence Berkeley National Laboratory

Allison Schumacher, Clean Energy Group

CONTENTS

Introduction	2
GMEF	3
GMIF	4
CCAF	6
SDTC	7
TAF	8
Other Federal Support	8
Provincial Support	9
Lessons Learned	10

June 2004

Download other clean energy
fund case studies from:

<http://eetd.lbl.gov/ea/ems/cases/>

or

www.cleanenergystates.org

CASE SUMMARY

The Canadian federal government is an active proponent of renewable energy and supports a variety of funding mechanisms for clean energy projects and programs. In addition to federal climate change funding aimed at reducing greenhouse gas emissions and other federal, provincial and municipal incentives to finance renewable energy projects, several clean energy funds¹ also exist in Canada.

This case study profiles the activities of the following clean energy funds: the **Green Municipals Funds (GMEF and GMIF)**, the **Climate Change Action Fund (CCAF)**, the **Toronto Atmospheric Fund (TAF)**, and **Sustainable Development Technology Canada (SDTC)**. It

also explores other federal and provincial incentives that have a significant impact on Canada's renewable energy market. While there are numerous energy efficiency programs and funding mechanisms in Canada, the scope of this case is limited to funding for clean energy production technologies in Canada.²

Though they share many similarities to their U.S. counterparts, some of the key distinguishing characteristics of the Canadian funds include:

- Unlike in the United States, the major Canadian clean energy funds tend to operate nationally, with division of responsibility between them lying in the type of projects that they support

¹ It should be noted that many of the funds profiled in this case provide funding for more than clean energy projects and are often referred to as "sustainability" funds or "green" funds. In continuing the focus of this case study series, this paper will use the term "clean energy funds" to describe the renewable energy, hydrogen and fuel cell activities of the various Canadian funds.

² Canada also has a \$12 million Climate Change Development Fund for greenhouse gas reducing technologies in developing countries, and \$6 million allocated through its Clean Development Mechanism and Joint Implementation Office for investments in projects in developed and developing countries that reduce greenhouse gas emissions and generate carbon credits.

(e.g., technology development vs. feasibility studies, vs. investments), rather than along geographic boundaries. Table 1 shows the type of support each fund offers. The national reach of most of the Canadian funds allows them to capitalize on local opportunities and partners in many different areas, yielding a broad cross-section of projects.

- Also unlike in the United States, where clean energy funds have typically been financed by electric ratepayers, the Canadian clean energy funds are endowed with large sums of taxpayer money and other federal revenue sources from the federal or provincial governments, but are

often kept at arms length to prevent reallocating the funds to other governmental priorities.³

- In general, the Canadian funds are driven by broad climate and technology development goals, while U.S. funds typically have a somewhat more narrow focus and consequent range of projects eligible for support.
- Canadian funds rely heavily on projects created through innovative partnerships (e.g., between federal and municipal government, and/or private sector and academic partnerships).

Table 1. Canadian Clean Energy Fund Offerings

Fund	Support for Feasibility Studies	Support for Technology R&D	Support for Technology Implementation	Support for Hydrogen or Fuel Cell Technology	Support for Consumer Education
GMEF	X			X	
GMIF			X	X	
CCAF		X			X
SDTC		X*		X	
TAF	X		X		

* pre-venture capital funding beyond R&D phase.

CASE STUDY DETAILS

Introduction

While the non-hydro renewable energy market in Canada remains small, the Canadian federal government has played a significant role in developing the country's renewable energy market, providing support for research and development, commercialization, and implementation of new technologies. Concern over climate change is a major driver of this

support: Canada has committed to reducing its greenhouse gas emissions by 6 percent below 1990 levels between 2008 and 2012 under the Kyoto Protocol. To achieve these reductions, the federal government has made funding available through various programs and projects, many of which directly support the increased use of qualifying clean energy technologies. Provincial and local governments have further bolstered this assistance through contributions of their own. A significant portion of this support has been provided through nationally and locally operating clean energy funds, each playing a distinct role in the promotion of renewable energy.

Much like their U.S. counterparts, Canadian clean energy funds play an important role in driving the development of renewable energy in Canada. However, they exhibit a set of

³ In March 2004, the federal government announced it would use the proceeds from the sale of federal shares in Petro Canada, to invest approximately \$1 billion in clean energy technologies; \$200 million was allocated at that time to Sustainable Development Technology Canada. The remaining \$800 million has yet to be allocated and could possibly go toward the creation of a nationwide Canadian Clean Energy Trust, pending the outcome of Canada's elections on June 28, 2004. [Note: All monetary units in this document are provided in Canadian dollars. For comparison, the exchange rate between U.S. and Canadian currency is generally between 1.2 and 1.3 Canadian dollars per U.S. dollar.]

interesting differences from U.S. models, including a division of responsibility not based geographically on provincial boundaries, but rather on areas of commercialization support focus such as research and development, feasibility studies, and direct implementation of new technologies. In addition, while clean energy funds in the United States are typically financed through small surcharges on electricity rates, their Canadian counterparts are typically financed through federal or provincial tax dollars, and are often operated at “arms length” to prevent reallocating the funds to other governmental priorities later. This case examines the purpose, structure, and activities of the major Canadian clean energy funds, and seeks to extract lessons applicable to clean energy funds elsewhere.⁴ It then proceeds to discuss other forms of federal and local support from which lessons may also be drawn.

The Federation of Canadian Municipalities Green Municipal Funds

In 2000, the Government of Canada established the Federation of Canadian Municipalities (FCM) Green Municipal Funds to stimulate investment in innovative environmental infrastructure projects among Canadian municipal governments and their public or private-sector partners. The Government of Canada’s initial \$125 million endowment to FCM for the two complementary funds, the Green Municipal Enabling Fund (GMEF which provides grants) and the Green Municipal Investment Fund (GMIF which provides interest-bearing loans, loan guarantees and grants toward larger projects) was doubled to \$250 million in 2001 to encourage projects and studies in more communities. As of April 2004, the FCM Green Municipal Funds have approved support for 320 projects with more than \$154 million invested by FCM, leveraging more

than \$1.15 billion in project investments. Of the 320 projects, approximately 56.5% of grant funding and 36.4% of loans (from GMEF and GMIF combined) have been allocated for energy projects.

Green Municipal Enabling Fund

The \$50 million Green Municipal Enabling Fund offers support to Canadian municipalities and their public- or private-sector partners for feasibility studies and field tests of new renewable energy projects. Studies of the technical, environmental, and/or economic feasibility of proposed municipal projects are eligible for grants covering up to 50 percent of project costs to a maximum of \$350,000 per project. Applications to GMEF are accepted year-round. The fund is slated to expire in March 2007.

Eligible renewable energy projects include:

- on-site energy generation and co-generation technologies;
- landfill gas capture to generate electricity and/or heat, or to produce liquid fuels;
- installation of renewable energy technologies/building elements (e.g., solar walls, solar thermal heating);
- micro-hydro, wind, solar thermal, solar photovoltaic or biomass projects used to meet community energy needs; and,
- community energy planning (for greenhouse gas reductions, sustainable community development, and brownfields redevelopment).

Other project types are also eligible for funding through GMEF, including those with the potential to improve environmental performance in the following areas: energy, water, solid waste management, sustainable transportation services and technologies, and sustainable community planning.

Renewable energy projects receiving support have covered a wide range of technologies (e.g., wind, solar, geothermal, biomass, landfill gas) and applications (e.g., solar water

⁴ For further information on clean energy programs and policies in Canada, see “Low-Impact Renewable Energy Policy in Canada: Strengths, Gaps and a Path Forward,” by Andrew Pape-Salmon et. al, of the Pembina Institute, February 2003.

heating, large-scale grid-connected wind farm).

GMEF will support up to 65 feasibility studies in 2004, and has approved support for a total of 273 projects to date, including 55 studies/field tests/feasibility assessments for renewable energy/supply and 30 studies/field tests/feasibility assessments for sustainable community planning. Examples of previously supported projects include:

- *Wastewater Treatment Plant Biogas Cogeneration Evaluation* – The GMEF provided a grant of \$60,000 to the City of Red Deer, Alberta, to assess the feasibility of installing a cogeneration facility at the city's wastewater treatment plant. The proposed facility would be fueled by biogas produced in digester tanks, eliminating the need to flare off excess digester gas at the plant, and replacing the natural gas currently used to meet process and space heating requirements.
 - *Wind Power Feasibility Study* – Uniterre Resources Limited and the Village of Masset partnered to receive a grant of \$100,000 covering half of the cost of a study to assess the wind resource available and viability of harnessing wind energy on Graham Island, British Columbia. The study will include a review of turbine technology, community consultation, site identification, and an environmental impact assessment. Graham Island is currently served by a polluting and expensive diesel-fueled electricity generating system.
 - *Municipal Solar Swimming Pool Heating Retrofits* – The Greater Vancouver Regional District's Air Quality Department, in partnership with member municipalities, received a grant of \$47,500 to study the potential cost and energy savings and greenhouse gas emission reductions that would result from installing solar-
- thermal heating systems at 19 municipal swimming pools currently heated by natural gas.
 - *Small Wind Farm Feasibility* – The GMEF provided a grant of \$67,570 to the town of Canso, Nova Scotia, covering half the cost of analyzing the technical and economic potential of constructing a wind farm in or near the town. The study, to be carried out by project partner Renewable Energy Services Limited, will include a business plan and a comprehensive community consultation process, as well as consideration of opportunities to market green power locally and through grid sales in the province.
 - *Large Wind Farm Feasibility* – The city of Greater Sudbury, Ontario, received a grant of \$100,000 toward the production of a business plan for the development of a major wind farm with a capacity of at least 50 MW. The study will include consideration of wind turbine technology, long-term economic development potential, and research and development opportunities.
 - *Landfill Gas Evaluation* - The Regional Municipality of Halton, Ontario, received a \$64,500 grant to test the viability of collecting and utilizing the methane gas from its small to medium-sized landfill sites. The study will examine the feasibility of using the collected gas as fuel for nearby industries, or as a fuel source for electricity production.
 - *Ground Source Energy in Municipal Buildings* – GMEF provided a grant of \$85,000 to Iles-de-la-Madeleine, Quebec for a feasibility study of the potential to use ground source heat pumps to replace the use of fuel oils.

Green Municipal Investment Fund

A sister fund to GMEF, the \$200 million Green Municipal Investment Fund is a permanent revolving loan fund that offers

interest-bearing loans, loan guarantees, and grants toward the implementation of a similar range of municipal environmental projects as those funded by GMEF, including projects involving renewable energy technologies. GMIF lends to municipalities at the Government of Canada bond yield minus 1.5% per annum, with terms of four to ten years. The reference bond term matches the loan term (e.g., if the loan is for seven years, GMIF will lend at 1.5% less than the 7-year Government of Canada bond yield). GMIF also lends to private sector partners of municipalities. In these cases, GMIF assumes a high risk debt position, providing subordinated debt, non-recourse loans or structured financing to leverage additional funds from private sector lenders and investors. The interest rate is typically above or equal to the Government of Canada bond yield for private sector loans.

Through GMIF, eligible projects may apply for loans covering up to 15 percent of project costs (25 percent in exceptional cases).

Projects must have an investment return of 10 years or less, except in cases where GMIF provides grant funding for select environmental pilot projects that are highly innovative but that have an investment payback in excess of 10 years. Such pilot projects must have the potential for significant impact and replication on a regional or national basis. In the case of pilot projects, GMIF can provide up to 50 percent of the capital cost of a pilot project as a combination of grant and/or long-term loan (in excess of a 10-year term) or loan guarantees. Applications for financing through GMIF are accepted year-round.

GMIF can also act as a financial advisor or financial arranger for municipalities for large projects with complex financial requirements, or for projects involving private sector partners. Services include flexible repayment options and no brokerage fees, and may be made available free of charge to municipal borrowers.

Supported renewable energy projects cover a similarly wide range of technologies (e.g., wind, solar, geothermal, biomass, landfill gas) and applications (e.g., solar water heating, large-scale grid-connected wind farm) to those supported by GMEF. GMIF also supports integrated community projects, such as community-wide sustainable energy and environmental management projects.

To date, GMIF has approved support for a total of 47 projects, including 12 renewable energy/supply projects or pilots, and 10 energy projects/pilots for buildings or facilities. Examples of supported projects include:

- *Town of Okotoks Solar Seasonal Storage District Heating Project* – GMIF recently approved a grant for approximately \$2.48 million and a loan of \$450,000 for a 74-home subdivision pilot project to demonstrate the concept of solar seasonal storage technology, which will serve as the first demonstration of the technology in North America. Solar collectors will collect heat during the spring, summer and fall and store the thermal energy in underground boreholes for extraction during the winter. A district-heating network will distribute the thermal energy. With approximately 90% of energy consumption provided by solar energy, the project should result in a reduction of 2.4 tons of greenhouse gas emissions per home per year, or 72% below a business-as-usual scenario. The project also includes water conservation measures and an R-2000 standard for home construction, significantly reducing thermal load.
- *Hydroelectric Generation Improvements* – GMIF provided a loan of \$2.6 million covering one-quarter of the cost of upgrades to PowerGen Corporation's hydroelectric facilities in the town of Parry Sound, Ontario. The project will increase the hydroelectric generating

capacity of PowerGen's facilities from 1.2 MW to 2.5MW through the installation of new technologies and structural upgrades. This project will also produce significant performance improvements over the existing facilities, resulting in a product expected to qualify for EcoLogo⁵ certification as "green power." The new generation facility is expected to produce an estimated 11.4 million kWh per year, 15 percent of the total power used by the ratepayers of Parry Sound.

- *Deep Lake Cooling Water* - Enwave and the City of Toronto have received a loan of \$10 million toward a \$176 million project allowing Enwave to make use of cold water from deep within Lake Ontario to offset the need for conventional electric chillers at Enwave's cooling plant. Enwave will then distribute the water to its customers – commercial buildings in Toronto's downtown core – for air conditioning. While providing an equivalent level of cooling to conventional chillers, the Enwave system is projected to reduce the use of electricity and steam by 75 percent.
- *Waste Wood Biomass Utilization* – The City of Revelstoke, British Columbia, received both a loan and a grant, each worth \$1,348,000, covering in aggregate half of the cost of the construction of a new heating plant and district heating system. The plant will feature a state-of-the-art boiler designed to combust approximately 7,000 tons of wood biomass residue annually. The project will displace approximately 1.5 MW of fossil fuel use, primarily propane, using wood waste with no identified alternative use, and is estimated to produce a net 40 to 60 percent process

efficiency improvement (counting energy capture, transmission and delivery).

Climate Change Action Fund

Established by the Canadian federal government in 1998 to help Canada meet its commitments under the Kyoto Protocol, the Climate Change Action Fund (CCAF) has supported a variety of projects that research climate change issues, raise public awareness and understanding, and promote actions to reduce greenhouse gas emissions. Operating from a \$150 million endowment, CCAF has supported a number of projects related to renewable energy (e.g., a green power public awareness campaign and a demonstration of building-integrated photovoltaics), though the vast majority of its support has gone to other climate change-related impact studies and education efforts. CCAF is now in its final year of operation, with no plans at present for any future solicitations.⁶

One distinct component of CCAF continues to offer support to renewable energy projects, however. The Technology Early Action Measures (TEAM) initiative offers investment support to accelerate the demonstration and deployment of new technologies with potential to reduce greenhouse gas emissions. TEAM was launched with \$60 million from CCAF in 1998 and has received an additional \$35 million since to extend its operation through 2008.

Total federal funding for TEAM projects may not exceed 50% of project costs. If TEAM funding is stacked with other federal funding, TEAM support may not exceed 85% of federal funding per project.

Since its inception, TEAM has committed almost \$73 million toward 82 projects with a total cost of \$780 million (through 2001).

⁵ For further information on Canada's EcoLogo program, see www.environmentalchoice.com.

⁶ Additional funding for the program was not announced by the Martin government during the Budget Speech in March 2004, which outlined major fiscal initiatives and policies for the new administration.

Roughly 30 of these projects have involved renewable energy technologies, with TEAM support accounting for approximately \$30 million of their \$260 million total price tag. Renewable energy projects supported by TEAM have ranged from the development of 10kW and 60kW wind turbines to the demonstration of building integrated PV, and have also included an array of research related to fuel cells. TEAM has also provided support to a variety of renewable energy projects located outside of Canada, including the use of PV in China, solar drying in Panama, landfill methane recovery in Egypt, and small hydro development in Nepal. Non-renewable energy projects supported by TEAM have also spanned a variety of market areas, including coal bed methane use, natural gas-powered vehicles, and composting.

Sustainable Development Technology Canada

Sustainable Development Technology Canada (SDTC) is a \$350 million fund for the development, demonstration and pre-commercialization of sustainable development technologies that address climate change and clean air issues in Canada. SDTC was initiated in 2002 as a non-profit corporation with an initial \$100 million endowment from the Canadian government for allocation between 2002 and 2006. The government renewed its commitment to the fund with additional contributions of \$250 million in 2003.⁷

Eligible projects may include energy exploration, production, transmission and distribution, and utilization, as well as waste management, transportation, emissions controls and enabling technologies (e.g., communication software, sensors and controls). Renewable energy and hydrogen technologies are eligible within each stage where applicable.

SDTC increases clean technology deal flow in the Canadian marketplace by providing pre-venture capital funding to entrepreneurs beyond the research and development phase. SDTC does not take an equity position in projects.

SDTC may fund up to 50 percent of eligible costs for a particular project, although they aim to fund approximately 33 percent of project costs across the entire range of projects, with additional funding leveraged through project consortia. If SDTC contributes funding along with other Canadian federal and provincial entities, total federal and provincial support may not exceed 75 percent of project costs.

As of June 2004, 38 projects totaling \$72 million in investment from SDTC had been approved, leveraging \$206 million from project consortia members. SDTC will launch its sixth funding round in July 2004.

SDTC has provided funding to a number of renewable/clean energy projects including:

- ***Biogas Utilization*** - Bio-Terre Systems received support for a series of process improvements designed to more effectively capture and treat methane gas from hog manure and convert it into usable energy to meet site-specific energy demands.
- ***Solar-Powered Lighting*** - Carmanah Technologies is developing low energy consumption, solar powered LED lighting technology for edge-lit signage for commercial mainstream applications.
- ***Solar Thermal Building Technology*** - The Conserval Group received support to continue its work to enable greater utilization of building surfaces for capturing solar energy and converting it to warm air.

⁷ It was announced in March 2004 that SDTC would receive an additional \$200 million in 2004/2005 – increasing the total size of the fund to \$550 million – to expand its mandate to include water and soil quality issues.

- *Fuel Cells* - Hydrogenics and a consortium of technology and end-user partners will develop, demonstrate and pre-commercialize fuel cell-powered forklifts.

Toronto Atmospheric Fund

The Toronto Atmospheric Fund (TAF), established by the Toronto City Council in 1991 with a \$23 million endowment, offers support for projects with the potential to mitigate global climate change and improve Toronto's air quality. City of Toronto agencies and departments, non-profit organizations, registered charities, and public institutions and schools are eligible to apply for grants and loans in the areas of renewable energy, energy conservation and efficiency, and reduced fossil fuel content of energy sources. Individuals, for-profit organizations, and applicants from outside Toronto are not eligible.

In 2003, TAF provided approximately \$526,000 to support 19 projects selected competitively through two separate initiatives. The Business Development Program offers short-term grants that are generally less than \$10,000 each for the development of business plans. The Incubation Program offers support in loans of up to \$100,000 per year for up to three years for projects that mitigate potential climate change and its impacts in Toronto. Recent renewable/clean energy projects supported have included approval in 2003 for \$300,000 in contingent debt financing to the Toronto Renewable Energy Cooperative (TREC) for the Lakewind Power Generation Project (debt will be converted to equity in the project if and when equity becomes available; \$50,000 grant to TREC for the development of North America's first utility-scale urban wind turbine (2000-2001) and a \$495,000 loan for this project (issued in 1998 and repaid as of 2003); \$15,000 for the development of a guide for wind power development in Ontario (2003), and \$15,000 for a fuel cell demonstration project at Toronto's Exhibition Place (2003).

Other Forms of Federal Support

In addition to providing resources through the clean energy funds described above, the Canadian federal government has supported renewable energy technologies in other ways as well. For example, the government is seeking to purchase 20 percent of the electricity used in federal buildings from green power sources. Several other federal programs have also had an impact on Canada's renewable energy market, including:⁸

- Wind Power Production Incentive (WPPI) – The federal WPPI offers support to electric utilities and independent power producers for the construction of new wind projects in Canada. The WPPI, established with \$260 million in 2001, aims to provide support for the installation of 1000 MW of new wind capacity by 2008. Incentive payments decline from 1.2 cents/kWh to 0.8 cents/kWh by 2007, and are available for the first ten years of a project's operating life on a first-constructed, first-served basis. Payments are designed to cover approximately half of the cost premium associated with new wind projects over conventional electricity sources.
- Market Incentive Program (MIP) for Distributors of Emerging Renewable Electricity Sources – The MIP, which is managed by Natural Resources Canada (NRCAN), is designed to encourage electricity distributors to explore new ways of stimulating sales of electricity generated from low-impact renewable sources by offering incentives covering up to 40% of distributors' costs associated with increasing bulk green power sales to residential and small business customers.

⁸ Other larger federal funding programs that can be tapped for clean energy/environmental technologies project funding and R&D include the Natural Sciences and Engineering Research Council, Natural Resources Canada Program of Energy Research and Development (PERD), Office of Infrastructure (demonstration projects) and National Research Council (RD&D). The Canadian Foundation for Innovation (an independent foundation established by the federal government) also provides support for research and technology development.

This program offers \$25 million of funding through March 31, 2006.⁹

- Renewable Energy Technologies Program (RETP) – NRCan's RETP offers support for the development and commercialization of advanced renewable energy technologies. In addition to providing funds for R&D efforts, the RETP has also supported organizations such as the Canadian Wind Energy Association and Canadian Solar Industries Association.
- Community Energy Technology Centre (CETC) – Also managed by Natural Resources Canada, CETC is a revolving fund that supports project feasibility studies. Project developers must pay back the cost of the feasibility study if the project moves forward.
- Renewable Energy Deployment Initiative (REDI) – Begun in 1998, the REDI is a six-year \$24 million program offering incentives toward the installation of renewable energy systems used for space and water heating and cooling. Eligible technologies include solar air- and water-heating systems and small biomass combustion systems. Businesses are eligible for a rebate of up to 25 percent (40 percent in remote communities) of the purchase and installation cost of qualifying systems, up to \$80,000 per project. In 2000, nine businesses received a total of \$119,910 through the REDI.
- Pilot Emission Reductions, Removals and Learnings Initiatives (PERRLI) – Through the PERRLI, the Canadian federal government offers to purchase emissions reduction credits generated from renewable energy projects.
- Technology Partnerships Canada (TPC) – TPC is a program of Industry Canada, a federal agency whose mission is to foster a growing competitive, knowledge-based Canadian economy. TPC manages two programs that fund clean energy

technologies: 1) The TPC R&D program is geared to pre-competitive projects across a wide spectrum of technological development, including environmental technologies, life sciences, information and communications technologies and advanced manufacturing. Support for small to medium-sized companies with projects valued under \$3 million is provided through the TPC Industrial Research Assistance Program; and 2) The H₂ Early Adopters Program (H2EA), a partnership program between Canadian government and industry stakeholders to build a Canadian hydrogen economy. H2EA partnerships are designed to foster the development and early introduction into the market place of hydrogen and hydrogen-compatible technologies, such as fuel cells and those used to produce, store and distribute hydrogen. H2EA is currently reviewing proposals for projects such as Vancouver's Hydrogen Highway, and the Hydrogen Village Partnership proposal for a community model based on the dynamic and synergistic deployment of hydrogen and fuel cell technologies driven by an end-user community within a defined geographic area.¹⁰ As of March 2003, TCP had invested \$357 million in climate-change related projects.

Other Provincial and Municipal Initiatives

Provincial and municipal governments have also played an important role in advancing renewable energy in Canada. Like the federal government, multiple Canadian provincial governments have released their own climate change action plans, and some have directly supported demonstration projects or provided

⁹ While the MIP runs through March 2006, the last round of proposals under this program closed in January 2004.

¹⁰ The Hydrogen Village Partnership is a public-private initiative to accelerate and sustain the application and commercialization of hydrogen and fuel cell technologies in Canada, facilitated by Fuel Cells Canada, an organization with nearly 30 members including end-users, technology providers and technology integrators. The first Hydrogen Village is planned for the Greater Toronto Area in 2004.

other incentives for renewable energy technologies.

- Alberta Climate Change Central (CCC) – Climate Change Central is a not-for-profit corporation supported by public and private funding that provides analysis, engagement and policy advice; promotes innovation through the exchange of knowledge, ideas and best practices and focuses attention on Alberta’s successes in addressing climate change. In 2002, it contributed approximately \$4 million to co-funding projects, leveraging its funding by nearly five to one.
- British Columbia Renewable Energy Technology Program (BCRETP) – Through the BCRETP, the B.C. government provided \$850,000 over three years starting in the fall of 2000 to support a variety of renewable energy projects. Support was provided primarily to research and development and early demonstration projects.
- Manitoba Climate Change Action Fund -- This fund was set up in 2001 to allocate \$1 million over 4 years toward technological innovation (research and commercialization), alternative or "green" energy, projects focusing on public education and outreach, and the scientific understanding of climate change impacts and potential adaptation practices. 37 projects totaling \$732,300 were funded in the first three years of the program.
- Quebec Private Investment and Job Creation Promotion Fund (“FAIRE”) - - Quebec’s Private Investment and Job Creation Promotion Fund was established not to advance clean energy technologies, but rather to promote job creation and economic growth in the province. The fund provides grants, loans and loan guarantees to new projects of various types, requiring each project to involve an investment of at least \$2

million and create at least 50 jobs over its first two years. Quebec’s November 2001 provincial budget made wind power projects eligible for FAIRE support.¹¹

- Yukon Green Power Initiative (YGPI) – The YGPI is a \$3 million pilot project designed to advance research and development, technology implementation, and education and training related to new renewable electricity generating technologies. The GPI includes a production incentive of between two and five cents per kWh for new green power projects.

While these last two initiatives are both technically funds, they differ substantially in size, duration and structure from the major Canadian clean energy funds described in more detail above, and their U.S. counterparts.

Lessons Learned

Several lessons emerge from this summary of the Canadian clean energy funds:

- Many of the clean energy funds in Canada obtain their funds from federal and (to a lesser extent) provincial government tax revenue, while U.S. clean energy funds typically operate at the state level and are funded through surcharges on electricity rates.
- Support from Canadian funds is structured to foster innovative partnerships. The national reach of the various Canadian funds allows them to capitalize on local opportunities and partners in many different locations, yielding a broad cross-section of projects.
- Climate change and greenhouse gas emissions reductions are primary drivers

¹¹ It was announced in March 2004 that FAIRE would be suspended and replaced by a new Strategic Support for Investment Program (PASI), the terms of which have not been established as of publication of this case study. It is not known at this time if the support for wind power will carry through to the new program.

behind government support, as is increased investment in Canadian technology companies.

- Emerging models for community energy systems that integrate city planning with green buildings, renewable energy technologies and other sustainable practices, may provide useful new models for municipal clean energy programs in the U.S. and elsewhere.
- The strength of municipal funding of programs in Canada through the Federation of Canadian Municipalities could potentially be replicated through a U.S. federal endowment to a sister organization in the United States, such as the Conference of Mayors.
- Funds such as SDTC have been inundated with proposals, signaling a potentially large, untapped need for funding sustainable development innovation in Canada.
- The types of projects and funding mechanisms used by the Canadian funds are not very different from those used by their American state counterparts (e.g., grants for feasibility studies and small projects, loans for large projects), though the sources of Canadian funds tend to come from federal budgets rather than from ratepayer funded system benefits charges.
- At present, Canadian clean energy funds have no direct mandate or mechanism to collaborate, resulting in a fragmented policymaking approach that has not yielded a systematic strategy map for clean energy development in Canada. Proposals to create a more robust collaboration among funds are being developed as part of a new Canadian climate action plan to be proposed in fall 2004.

ORGANIZATION AND CONTACT INFORMATION

Michele Allaire and Doug Salloum
Green Municipal Enabling Fund
Green Municipal Investment Fund
Federation of Canadian Municipalities
<http://kn.fcm.ca/ev.php>
greenfunds@fcm.ca
(613) 241-5221

Louise Comeau
Centre for Sustainable Community Development
Federation of Canadian Municipalities
<http://kn.fcm.ca/ev.php>
lcomeau@fcm.ca
(613) 241-5221

Dany Drouin
Climate Change Action Fund
<http://climatechange.gc.ca/english/CCAF/>
dany.drouin@ec.gc.ca
(819) 953-6879

Phil Jessup
Toronto Atmospheric Fund
www.city.toronto.on.ca/taf/
pjessup@tafund.org
(416) 392-0271

Vicki Sharpe
Sustainable Development Technology Canada
www.sdtc.ca
vj.sharpe@sdtc.ca
(416) 253-6588

H2 Early Adopters Program
Technology Partnerships Canada
www.tpc.ic.gc.ca/h2/en
h2ea@ic.gc.ca
(800) 391-3363

INFORMATION SOURCES

Bramley, Matthew, et al. "Green Power Programs in Canada – 2002: Overview of Government Green Power Policies, Utility Green Power Development Programs, Green Power and Certificate Marketing Initiatives, and Their Benefits." Pembina Institute. November 2003.

City of Toronto. "Toronto Atmospheric Fund." <http://www.city.toronto.on.ca/taf/>. Viewed February 2004.

Climate Change Action Fund. "Building on Success: 2001-2002 Annual Report." http://www.climatechange.gc.ca/english/publications/ccaf_200102. Viewed February 2004.

Federation of Canadian Municipalities. "Green Municipal Funds." http://kn.fcm.ca/ev.php?URL_ID=2825&URL_DO=DO_TOPIC&URL_SECTION=201&reload=1043178382. Viewed February 2004.

Government of Canada. "Climate Change Action Fund." <http://www.climatechange.gc.ca/english/CCAF/>. Viewed February 2004.

Government of Canada. "Technology Early Action Measures (TEAM)." http://www.climatechange.gc.ca/english/team_2004/. Viewed February 2004.

Pape-Salmon, Andrew, et al. "Low-Impact Renewable Energy Policy in Canada: Strengths, Gaps and a Path Forward." Pembina Institute. February 2003.

Sharpe, Vicky. "Clean Technology: Challenges and Opportunities." Presentation to the Clean Energy States Alliance. San Francisco, CA. November 2003.

Sustainable Development Technology Canada. "Mandate." <http://www.sdtc.ca/en/mandate/index.htm>. Viewed February 2004.

Personal Communications with Louise Comeau (Centre for Sustainable Community Development), Phil Jessup (Toronto Atmospheric Fund), and Andrée Mongeon (Sustainable Development Technology Canada).

ABOUT THIS CASE STUDY SERIES

A number of U.S. states have recently established clean energy funds to support renewable and clean forms of electricity production. This represents a new trend towards aggressive state support for clean energy, but few efforts have been made to report and share the early experiences of these funds.

This paper is part of a series of clean energy fund case studies prepared by Lawrence Berkeley National Laboratory and the Clean Energy States Alliance. The primary purpose of this case study series is to report on the innovative programs and administrative practices of state (and some international) clean energy funds, to highlight additional sources of information, and to identify contacts. Our hope is that these brief case studies will be useful for clean energy funds and other stakeholders that are interested in learning about the pioneering renewable energy efforts of newly established clean energy funds.

Twenty-five total case studies have now been completed. Additional case studies will be distributed in the future. For copies of all of the case studies, see:

<http://eetd.lbl.gov/ea/ems/cases/> or <http://www.cleanenergystates.org/>

ABOUT THE CLEAN ENERGY STATES ALLIANCE

The Clean Energy States Alliance (CESA) is a non-profit initiative funded by members and foundations to support the state clean energy funds. CESA collects and disseminates information and analysis, conducts original research, and helps to coordinate activities of the state funds. The main purpose of CESA is to help states increase the quality and quantity of clean energy investments and to expand the clean energy market. The Clean Energy Group manages CESA, while Berkeley Lab provides CESA with analytic support.

CONTACT THE MANAGERS OF THE CASE STUDY SERIES

Ryan Wiser

Berkeley Lab
1 Cyclotron Rd., MS90-4000
Berkeley, CA 94720
510-486-5474
rwiser@lbl.gov

Mark Bolinger

Berkeley Lab
105 North Thetford Road
Lyme, NH 03768
603-795-4937
mabolinger@lbl.gov

Lewis Milford

Clean Energy Group
50 State Street
Montpelier, VT 05602
802-223-2554
lmilford@cleanegroup.org

FUNDING ACKNOWLEDGEMENTS

Berkeley Lab's contributions to this case study series are funded by the Clean Energy States Alliance, and by the U.S. Department of Energy (the Assistant Secretary of Energy Efficiency and Renewable Energy, as well as the Office of Electric Transmission and Distribution, Electric Markets Technical Assistance Program) under Contract No. DE-AC03-76SF00098. The Clean Energy Group's efforts in connection with this work and related activities are funded by the Clean Energy States Alliance, and by the Surdna Foundation, the Rockefeller Brothers Fund, the Oak Foundation, the John Merck Fund, and the Emily Hall Tremain Foundation.

DISCLAIMER

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor The Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or The Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof, or The Regents of the University of California.