

Taking action on Climate Change

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Building on Success

Climate Change Action Fund (CCAF)

2001-2002 Annual Report



Government
of Canada

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Executive Summary

The Government of Canada established the Climate Change Action Fund (CCAF) in the 1998 federal budget, allocating \$150 million over three years to help develop a national implementation strategy and support early actions to respond to climate change. The second three-year phase was announced in Budget 2000, with a further \$150 million in funding.

Building on Success, The Climate Change Action Fund 2001-2002 Annual Report, is designed to provide information on results and activities for the fiscal year ending in March 2002, and portray the way in which CCAF has built on the accomplishments of its first mandate. CCAF operates on the basis of principles that include building, where possible, on existing initiatives and mechanisms; leveraging and sharing costs with provinces/territories and the private sector; ensuring there are concrete milestones and demonstrable results; and establishing transparent processes that engage all federal departments, as well as agencies and external stakeholders.

Progress made during 2001-2002 includes effective operation and management of the **national process** that brings together jurisdictions and the climate change policy development process. Not only was there significant focus on the analytical and policy work needed to inform the decision on Kyoto Protocol ratification, the *National Climate Change Business Plan 2002* was developed, with a progress report issued on the first Business Plan. Broad options were developed for a potential Domestic Emissions Trading system, including assessment of potential economic impacts. The analytical and modelling activities have also contributed to evaluating the economic and environmental consequences of climate change policy initiatives.

CCAF supported the activities needed to ensure that Canada meets its current and ongoing **reporting obligations**, and is positioned to meet new obligations required under the Kyoto Protocol. In addition, there were important improvements to the current information systems and data on forest carbon sources and sinks, needed to meet existing and future international reporting requirements.

CCAF ensured Canada's voice was heard through policy input to **international negotiations** on all subject matters. A developing country engagement strategy now encourages more than fifty developing countries to better understand Canada's positions on climate change negotiations. As a Francophone country, Canada led in engagement activities with developing countries, including the Francophone Group. Instrumental in launching the debate on future global climate change regimes in the Annex 1 Expert Group of the OECD, Canada helped further the goal of bringing more developing countries to participate in this global challenge.

Canadians are becoming more aware of climate change. Results of polling conducted by Environment Canada, Natural Resources Canada and the Climate Change Secretariat indicate **public awareness** of climate change has increased since 1999, while other awareness results show that many Canadians have some understanding of the principal sources of climate change, and

demonstrate some knowledge of how Canada and its citizens may be affected. However, there is considerable room for enhancing public understanding of the issue. A network of **outreach “hubs”** is well underway, bringing together provincial and territorial governments, business, environmental, academic, municipal, and other relevant stakeholders in an effort to coordinate and extend the reach of climate change outreach programs at the provincial/territorial and local levels. Thirty-three additional partnered public education and outreach projects were initiated, adding to successful initiatives supporting Canadian communities in reducing greenhouse gas emissions, completing a portfolio of major museum displays, assisting the production of a major climate change television documentary, and engaging business and educating youth by supporting the incorporation of climate change education materials into the k-12 curriculum.

In the area of **science**, accomplishments included wrapping up the first three-year phase of CCAF and establishing priorities for the second three years. Accomplishments in the first phase included a national plan for climate system monitoring, establishment of a climate impacts scenarios facility, research to improve climate models and improve our understanding of the role of forests and agricultural lands in climate and carbon balance, further studies in the Arctic, and others on extreme weather. Priorities for the second phase are climate system processes, climate modelling, and climate impact scenarios.

Projects funded by the **impacts and adaptation** section are helping to increase understanding of Canada's vulnerability to climate change, and to provide information for decision makers facing near-term adaptation decisions. Research reports from the first phase were the highlights of the past fiscal year, including important findings on winter recreation impacts in Ontario's lakelands tourism region, agriculture adaptation, and health-related issues in Nunavut and Labrador through the use of traditional knowledge.

Technology Early Action Measures (TEAM) continues to be one of the primary tools for implementing federal climate change policy. There were 18 new projects launched, and \$287 million in total investments leveraged, based on \$19 million from TEAM and \$8.5 million from other federal sources. A key activity was the design of SMART (System of Measurement and Reporting to TEAM) to provide a clear and accurate evaluation of the technical performance and impacts of TEAM funded projects, as well as benefits to both project proponents and government programs.

Under the **CCAF Reserve**, funding has helped 32 research projects under the Prairie Adaptation Research Collaborative which span topics such as communities, health, agriculture, forestry and water resources. The Baseline Protection Initiative has been established to address possible disincentives to reducing greenhouse gas emissions by ensuring those organizations acting early to reduce greenhouse gas emissions will not be disadvantaged if there is implementation of climate change policies based on emission levels.

Climate Change Action Fund: History and Mandate

Recognizing that climate change is among the most serious environmental challenges of our time, and further recognizing such serious challenges require a variety of actions and approaches, the Government of Canada established the Climate Change Action Fund (CCAF) in the 1998 federal budget.

Under the CCAF, \$150 million was allocated over three years to help develop a national implementation strategy and to support early actions to respond to climate change. Meeting these goals involved building on existing programs, and establishing partnerships on climate change with provinces, territories, stakeholders and others.

During the 1998-2001 period, CCAF had four integrated components: Foundation Building, Technology Early Action Measures (TEAM), Science, Impacts and Adaptation (SIA) and Public Education and Outreach (PEO).

There were a number of accomplishments in the first three years, such as:

- The development and launch of the National Implementation Strategy, the First National Climate Change Business Plan and the Government of Canada Action Plan 2000 on Climate Change;
- Analysis and modelling to evaluate the economic and environmental implications, for Canada, of various approaches to achieving the Kyoto target and to assist in the development of a future course of action;
- Practical and visible demonstrations of climate change technologies that support sustainable economic development through TEAM, where an initial investment of \$60 million leveraged an additional \$500 million from private sector partners;
- Funding of cost-shared climate science, impacts and adaptation research that engaged scientists and stakeholders while significantly increasing the knowledge base on climate system functions, potential impacts and adaptation techniques; and
- Reaching over two million Canadians to increase awareness of the issue.

Recognizing the success of the first three years, the Government of Canada moved to a second phase of CCAF in Budget 2000 with \$150 million in funding in a three-year mandate that ends in fiscal year 2003-2004.

Details on results and activities during the first year of the new mandate are provided in this report: *Building on Success, The Climate Change Action Fund 2001-2002 Annual Report*.

CCAF Structure and Administration

The central administration of the Climate Change Action Fund is undertaken by the federal Climate Change Secretariat. There are lead departments for each component, and some components have different sub-categories involving a large number of federal departments.

Environment Canada and Natural Resources Canada are overall lead departments for the CCAF. Substantial contributions are made, and resources committed, by Transport Canada, Agriculture and Agri-Food Canada, Statistics Canada, Department of Finance, Health Canada, Industry Canada, the Department of Foreign Affairs and International Trade, Fisheries and Oceans Canada, the Canadian International Development Agency and Indian and Northern Affairs Canada.

The CCAF operates on the basis of the following principles: to build, where possible, on existing initiatives and mechanisms; to leverage and share costs with provinces/territories and the private sector; to ensure there are concrete milestones and demonstrable results; and to establish transparent processes that engage all federal departments, as well as agencies and external stakeholders.

These operating principles underscore the five components for the 2001-2004 period:

Building for the Future: Building for the Future is designed to support domestic efforts across sectors, governments and society to address climate change, to position Canada to take future policy decisions on approaches and options for achieving climate change commitments, and to assist in meeting international reporting obligations on greenhouse gas emissions. In this component, there is support to both the federal coordination and the national climate change processes; investments are made in data gathering, analysis, modeling and policy development; and there are public consultations and communications activities.

International Policy and Related Activities: The International component helps Canada maximize its ability to meet Kyoto commitments at the lowest cost through aggressive pursuit of Kyoto mechanisms, helps to secure favorable terms for sinks and other measures, contributes to global climate change objectives, ensures a level playing field with Canada's competitors by maximizing participation of key developed and developing economies in the Kyoto Protocol, and maximizes opportunities for Canadian business in international projects and initiatives on climate change.

Public Education and Outreach: Public Education and Outreach (PEO) is designed to raise Canadians' awareness of climate change, and promote action in each province and territory. It funds a variety of projects, such as Internet sites, museum displays and classroom materials. Within this component are the Hub Network (provincial/territorial centres of PEO information and coordination) and project funding. The partnered projects are in four streams: Communities (to encourage municipal action and community greenhouse gas reduction strategies); Youth and Educators (to increase teaching of climate change in kindergarten through grade 12, and to engage the energy and values of youth as a catalyst for action); Business and Industry (to encourage management and employees to reduce greenhouse gas emissions); and the Public (to increase Canadians' understanding of climate change and take individual action).

Science, Impacts and Adaptation: Science, Impacts and Adaptation is designed to assist in advancing knowledge of the magnitude, rate and regional distribution of climate change and its impact on Canada, and to increase the country's capacity to adapt. Examples of activities are global and regional-scale climate modelling; climate scenarios for impacts and adaptation researchers; research on the key climate system processes of importance to Canada; assessment, evaluation, coordination and communication of climate system science; impacts and adaptation research to provide new insights on Canada's vulnerability to climate change in areas such as water resources, health, and food supply in all regions of the country; and contributing to the development of adaptation strategies. The latter is especially important in regions and sectors where impacts are currently being felt, and where decisions taken now have long term implications.

Technology Early Action Measures (TEAM): TEAM offers support to federal programs that fund technology projects to reduce greenhouse gas emissions nationally and internationally, while sustaining economic and social development. TEAM brings together partners from all levels of government, industry and communities. Eligible projects demonstrate innovation in transportation, energy, agriculture and various industrial sectors, involving Canadian industry to reduce greenhouse gas emissions, supporting community-based reduction technologies and transferring technologies to other countries (particularly developing nations).

In addition to the five components, the CCAF Reserve is used to fund projects that fall beyond the scope or budgets of the five core areas.

Report on 2001-2002 CCAF Activities and Results

Activities and results are presented by CCAF components, and include a brief explanation of the component, an overview of the past year and some highlights of specific activities.

Building for the Future

Building for the Future supports the National Climate Change Process and the development of federal policies to address climate change...

Building for the Future provides the primary source of support for the National Climate Change Process. This support for national and coordinated federal policy development work informs Canada's decisions on approaches and options for achieving climate change objectives, including the decision on ratification of the Kyoto Protocol; it supports greenhouse gas emissions inventory and reporting activities required to meet international reporting obligations; and includes broad climate change communications activities.

National Climate Change Process

Following through on the 1997 commitment of First Ministers, the National Climate Change Process was established in 1998 to build an inclusive and collaborative Canadian response to climate change and to examine the consequences of the Kyoto Protocol for Canada. Managed jointly by federal, provincial and territorial governments, this ongoing national process involves all levels of government, industry, environmental groups, communities, individuals and other stakeholders.

The federal government's contribution to the national process and resulting national climate change approach is accomplished through a variety of activities funded by CCAF, aimed at the effective operation and management of national process mechanisms, institutions and working groups. The following working groups are an integral part of this contribution: Analysis and Modelling, Domestic Emissions Trading, Impacts and Adaptation, Targeted Measures and Technology; and steering/decision-making bodies such as the National Air Issues Coordinating Committee - Climate Change (NAICC-CC), the deputy minister level National Air Issues Steering Committee (NAISC) and the Joint Meeting of Ministers (JMM) - a committee of federal-provincial-territorial energy and environment ministers. The federal contribution also involves development and coordination of federal positions in the national process, and provision of analysis, modelling and policy development expertise.

During 2001-2002, progress continued in developing and implementing key elements of the national response to climate change. Highlights include:

- three Joint Meetings of Ministers (JMMs) during the year ensured ongoing jurisdictional engagement, with a focus on the analytical and policy work necessary to inform a decision on ratification of the Kyoto Protocol;
- the *Progress Report on Canada's First National Climate Change Business Plan* released at the September 2001 JMM;
- *Canada's National Climate Change Business Plan 2002* development, engaging the private sector, municipalities and other public organizations, and subsequently released in May 2002;

- results of analysis, modelling and policy work by various national working groups that continued to inform next steps for business plans and strategy development (results of specific groups are addressed under “policy development, modelling and analysis” later in this report);
- engagement on an ongoing basis of provincial/territorial governments, industry, environmental groups and other stakeholders through formal and informal means, with preparations for national stakeholder sessions subsequently held in June 2002.

Federal Policy and Coordination

A number of federal departments and agencies have climate change and related responsibilities, and work collaboratively in the development of federal climate change strategies. Coordination of these federal efforts is done through the Climate Change Secretariat, where there is also support for policy development and central management of horizontal and other climate change initiatives.

Key accomplishments in 2001-2002 included:

- implementation of the renewed CCAF program following Treasury Board approval in May 2001;
- implementation of *the Government of Canada's Action Plan 2000 on Climate Change* following final Treasury Board approval in October 2001, with establishment of fully operational horizontal management structures; and
- management and coordination of weekly interdepartmental Climate Change Management Committee meetings, the central forum for federal climate change policy development.

Domestic Emissions Trading (DET)

Major economic instruments have been viewed as leading potential components of a cost-effective strategy to achieve climate change objectives. “Domestic Emissions Trading” (DET) approaches appear to be the most promising major instrument; work on design and analysis of DET options that could cover from 40% to up to 80% of total greenhouse gas emissions was a significant element of national and federal policy development activity in 2001-02.

Building on the largely conceptual work on DET options in Canada over the past three years, and based on ongoing engagement with industry stakeholders, the 2001-2002 effort resulted in:

- development of more detailed options for a DET system, including options for coverage of sectors of the economy; allocation of permits to those sectors; use of credits or offsets from uncovered sectors; and possibilities for interim measures to facilitate transition from the current status of no constraints on emissions to a mandatory, permit-based DET system by 2008;
- assessment of the potential economic impacts of alternative DET options;
- development and review of potential approaches to the implementation and governance of a DET system; and
- analysis of the potential international linkages between a future DET system and the Kyoto Mechanisms, and development of options to deal with possible constraints for both domestic and international emissions trading that could arise from differences in rules and administrative arrangements.

Targeted Measures

Targeted measures are aimed at consumers or particular sectors to encourage the use of best technologies and practices to reduce greenhouse gas emissions. They could be implemented as alternatives or to complement other options such as a domestic emissions trading (DET) system.

Work has also focused on developing and analyzing “targeted measures” policy options, such as incentives, regulations and, possibly, fiscal measures. Drawing on the results of the national Issue Tables process completed in late 1999, and subsequent analysis and studies by the national Analysis and Modelling Group and others, key accomplishments in 2001-2002 included:

- input to federal options for achieving Canada's climate change objectives in the form of a catalogue of promising targeted measures, including those proposed in Canada by stakeholders as well as those in place or under consideration in other countries; and
- progress towards development of a package of targeted measures on a sectoral basis that could be used in conjunction with a DET system.

Analysis and Modelling

Understanding the impacts of policy design and implementation of potential options to address Canada's climate change objectives was further advanced through work under the federal-provincial-territorial Analysis and Modelling Group (AMG), and by federal departments working to develop a federal climate change plan.

Responding to analytic priorities established by Joint Ministers and relevant to a decision on ratification of the Kyoto Protocol, the AMG undertook three major projects in 2001-2002:

- intensive analysis of two policy options involving domestic emission trading systems with different levels of coverage, and targeted measures for the balance of the economy. Results were presented to Joint Ministers in May 2002 and formed the foundation for the federal discussion paper, *Canada's Contribution to Addressing Climate Change*, also issued in May 2002;
- detailed review and consultation on the competitiveness impacts for the 10 industries assessed as being most affected by climate change policies, resulting in a better understanding of the impact of these policies from an industry perspective. In addition, analysis was undertaken for those industries that may benefit from climate change;
- the Main Drivers study, a series of reports assessing the implications of climate change policy for the development strategies of each province and territory;
- disaggregation of the modeling structure to reflect more clearly the economies of the Atlantic provinces and the territories;
- release of two “cost curve” studies to facilitate understanding the cost-effectiveness of various actions to reduce emissions; and
- a workshop to determine the plausible range of international carbon prices.

In addition to supporting the work of the AMG, federal analysis and modelling activities have focused on enhancing the integrated modelling capacity needed to analyze and evaluate the economic and environmental consequences of climate change policy initiatives. Highlights of work undertaken by the four federal departments involved in 2001-2002 include:

- substantial progress by Natural Resources Canada to enhance its analytic capability through conversion of the U.S. National Energy Modelling System (NEMS) for Canada, with completion

expected in early 2003. The new model will be used for subsequent energy and emissions projections and will provide the integrated framework for policy analysis;

- enhancements to Environment Canada's analytic capacity to assess a range of policy issues in support of climate change and clean air objectives, including acquisition of the Energy 2020 model to help guide development of alternative strategies for achieving climate change objectives;
- further development of Environment Canada's capacity to assess environmental (non-health) co-benefits of emissions reductions, resulting in improved ability to predict the impact on visibility from reductions in particulate matter and to examine how actions on climate change might avoid direct costs of reducing air pollutants;
- improvements to energy statistics provided by Statistics Canada, resulting in enhanced monitoring and reporting of energy and related greenhouse gas emissions data; and
- provision by Agriculture and Agri-Food Canada of more detailed and policy relevant information on agricultural greenhouse gas emissions and sinks for incorporation in international reporting mechanisms and policy development modelling. Significant progress has also been made in the capacity to assess environmental co-benefits of GHG mitigation strategies in the agriculture sector.

Northern Strategies

The CCAF also provides cost-shared support to initiatives aimed at developing strategies and options to address climate change in Canada's north, the results of which provide input to the national climate change plan business cycle. Three multi-year initiatives, one in each of the territories, have been funded over the past few years. Highlights from 2001-2002 include:

- publication of the *Nunavut Climate Change Strategy and First Business Plan*;
- completion of extensive public consultations on the draft *Northwest Territories Greenhouse Gas Strategy*; and
- ongoing operation of the Northern Climate Exchange (NCE), established to develop shared understanding and promote action on climate change in the Yukon and circumpolar north.

International Reporting Obligations

As a party to the *United Nations Framework Convention on Climate Change* (UNFCCC), Canada must meet international reporting obligations related to greenhouse gas emissions inventories, and carbon sources and sinks. Additional, more robust reporting requirements will come into force under the Kyoto Protocol. CCAF-supported activities ensure that Canada can continue to meet its current and ongoing reporting obligations, and is positioned to meet new obligations that would be required under the Kyoto Protocol.

Greenhouse Gas Inventories

The national greenhouse gas inventory is the ultimate measure against which a country will be judged in reporting under the UNFCCC and under the Kyoto Protocol in the future. Progress will be measured through the use of a set of inventory methodologies and reporting guidelines agreed to by Framework participants.

As an interim step towards a reporting system under the Kyoto Protocol, enhanced reporting requirements have been agreed to under the UNFCCC. Annex 1 Parties are now required to report and publish an annual National Communication, consisting of an inventory of gas emissions and removals, as well as a national inventory report that includes sectoral trends analysis. In addition, there is a requirement to submit and publish an annual inventory report on Good Practice activities. These include quality assurance and control, internal verification procedures, uncertainty analyses, key source identification and trends correlation.

Efforts funded in 2001-2002 build on previously funded CCAF activities and deal with scientific and technical work related to methods development, policy development, capacity building, international and domestic reporting obligations, and provision of guidance in the areas of sources and sinks of greenhouse gases. Key accomplishments included:

- progress towards the development of a national greenhouse gas emissions inventory system capable of meeting increased international reporting obligations required by the Kyoto Protocol;
- publication of key documents required under the UNFCCC, including the *National Inventory Report and Trends Fact Sheet Series*;
- ongoing expert representation in international negotiations, promoting Canada's position through submissions on key issues such as forest products, sinks and guidelines for greenhouse gas inventories; and
- establishment of the Greenhouse Gas (GHG) Verification Centre to strengthen voluntary action across all sectors of the economy, with work underway to develop protocols, standards and methodologies on quantification, monitoring and verification of emissions and removals of greenhouse gases.

Forest Carbon Stocks Measuring and Monitoring

Improvements to Canada's current information systems and data on forest carbon sources and sinks are needed to meet existing and future international reporting requirements. To this end, CCAF funds are directed towards: developing a framework and methodologies for Forest Carbon Measurement; establishing cost-sharing partnerships with provinces, territories and industry; data collection; identification of science gaps; and ensuring consistency in international reporting requirements.

The main components of the forest carbon stocks monitoring and measuring framework include: an upgraded Carbon Budget Model of the Canadian forest sector; development of methods to monitor and track forest changes; and a new National Forest Inventory to provide consistent assessment of the extent, state and sustainable development of Canada's forests.

Key accomplishments during 2001-2002:

- establishment of the Carbon Accounting Office in Victoria, British Columbia, with a node in Edmonton, Alberta, to coordinate various activities associated with the carbon budget modelling component;
- progress on forest carbon budget modelling and accounting protocols for land use changes between forestry and agriculture;
- support to the National Forest Sinks Committee members (all provinces and territories) in development of jurisdictional contributions to the national managed forest analysis of forest carbon budgets;

- various projects aimed at developing a range of methods and systems to detect changes in the forest, with pilot studies in the Prince George area of British Columbia, the Abitibi region of Quebec/Ontario, and others under development in Ontario and the prairie fringe area; and
- establishment of pilot projects with provinces to test and assess their approaches to the new National Forest Inventory standards and to prepare for implementation.

Communications

CCAF communications aims to broaden public awareness on domestic action to address climate change, as well as international progress. Equally important are communications activities that help Canadians understand the role they can play in reducing greenhouse gas emissions.

Highlights of 2001-2002 include:

- public opinion polling to provide a better understanding of the level of knowledge on climate change among different audiences in order to develop effective communications products, as well as gauge reaction to Canada's position on climate change; and
- placement of a newspaper supplement on climate change that included general information, examples of Government of Canada and private sector action, and useful tips for individual action. Six million copies of the supplement were distributed via 127 national newspapers; follow-up surveys showed that 22 percent of recipients read the supplement while another seven percent retained it for future reference. A further 11,000 copies of the supplement were requested through 1-800-O-Canada.

International Policy and Related Activities

The International component helps Canada maximize its ability to meet Kyoto commitments... contributes to global climate change objectives...and maximizes opportunities for Canadian business in international projects and initiatives on climate change...

International Policy and Related Activities in climate change are delivered by the Department of Foreign Affairs and International Trade, the Canadian International Development Agency, Environment Canada, Natural Resources Canada, Industry Canada, and Agriculture and Agri-Food Canada. Each has a special area of expertise and set of deliverables.

Full time staff funded through the CCAF ensured that Canada's voice was heard through policy input to international negotiations on all subject matters; for instance, the technical and methodological issues related to developing countries in the areas of engagement, capacity building, adaptation to climate change, response measures, technological transfer and non-Annex I national communications, as well as compliance and Kyoto Mechanisms.

A developing country engagement strategy now encourages more than fifty developing countries to better understand and support Canada's positions on Climate Change negotiations. Through the quality of its analytical work, Canada has developed a substantial influence in the negotiation process beyond its actual financial commitments.

Funding was provided at CoP 6 bis and CoP 7 for a delegate from the Council of Yukon First Nations, as well as supporting the participation of Kazakhstan in the Umbrella Group intra sessions meeting, helping this country in joining Annex B countries.

Canada, as a Francophone country, was asked by the Moroccan government to provide support in French to the Moroccan presidency of CoP 7. CCAF funding also assisted in engagement activities with developing countries, including the Francophone Group. Canada also contributed directly to the UNFCCC negotiation process by lending support to the UNFCCC Secretariat for travel costs of developing country negotiators, and the costs for organizing meetings, workshops and contact group sessions directly related to CoP decisions under negotiations. This burden was shared with other Annex II Parties. Such contributions support Canada's position that addressing climate change is a global issue requiring the engagement of all countries, including developing countries.

Canada was instrumental in launching the debate on future global climate change regimes in the Annex I Expert Group of the OECD that aims to generate a common approach among OECD countries on addressing the greenhouse gas mitigation question in the Second Commitment period of the Kyoto Protocol (2013-2018). The goal is to have developing countries participate in this global challenge.

The successful outcome of the CoPs was the result of extensive participation in workshops and meetings leading up to the key sessions. The results were that Canada was able to both maintain and increase its presence and role in the negotiation process, and to promote and protect its interests. Canada has assumed a leadership role in the Umbrella Group negotiating block, measured by the outcome of negotiations in Cop 6 bis (Bonn Agreement) and CoP 7 (Marrakech Accords).

Promoting the Canadian Government's programs and private sector capabilities related to climate change was an important accomplishment, along with close involvement in International Sinks analysis for negotiating positions, and Sinks promotion activities. A National Forest Sinks Committee was a key accomplishment in the collaboration on improving forest sinks estimates and developing options for optimizing the use of sinks under the Marrakech Accords. Work in soil sinks, and designing scenarios for use with a carbon credit trading process that can be endorsed by the international community, were also significant contributions during the year. This involved stakeholder endorsement from farm and soil conservation organizations. As well, in the same promotional vein, NRCan provided presentations on our technology partnerships and activities to an international audience at two UN technology transfer workshops in Beijing and Seoul.

Public Education and Outreach (PEO)

Public Education and Outreach helps raise Canadians' awareness of climate change, and promotes action in each province and territory...

Government of Canada-led Awareness

The Public Education and Outreach (PEO) activities help increase awareness and understanding of climate change among Canadians.

Results of polling conducted by Environment Canada, Natural Resources Canada and the Climate Change Secretariat indicate public awareness of climate change has increased a modest amount since 1999. The term "climate change" is now recognized by nearly 7 in 10 Canadians. Other awareness results show that many Canadians have some understanding of the principal sources of climate change, and demonstrate some knowledge of how Canada and its citizens may be affected.

There is limited public understanding of the issue, however, and significant misconceptions remain.

Highlights of efforts to increase awareness from 2001-2002:

- An updated version of the four page climate change tabloid called "*Think Climate Change*" was produced, providing an overview of climate change impacts for Canada, what the Government of Canada and businesses are doing, community action projects, and what individuals can do. The tabloid was inserted in 127 newspapers as part of the CCAF communications workplan. The tabloid was also distributed to Environment Canada regional offices and Hubs, and is part of the climate change information kit. There was also distribution through CCAF-funded proponents.
- A climate change partners' toolkit of materials was developed for use by provincial climate change hubs and their partner organizations. The toolkit includes a range of materials based on a common look and feel, and the signature line "Climate change. Are you doing your bit?" ("Changements climatiques. Donnez un coup de pouce à la planète!") Elements of the partners' toolkit have been adapted for use in the Government of Canada climate change information kit, and used as a response for requests for information from 1-800 calls and the Government of Canada climate change website.
- Over 20,000 people were drawn to a climate change PEO booth at major exhibits and conferences across Canada, including three exhibition events with Communication Canada's program (Pacific National Exhibition, Canadian National Exhibition and the Maritime Fall Fair) and a booth at the Policy Research Initiative conference in Ottawa. Visitors were able to try a quiz on climate change and answer a survey on the booth. Over 80 per cent of the people who took the quiz said they enjoyed it and learned something new about climate change.
- More than 1700 conference delegates from around the world, involved in the business of the environment, convened from March 13-15, 2002 at Globe 2002. They discussed major developments in corporate sustainability, energy policy and climate change. The climate change theme in the agenda included issues such as corporate climate change risk, and new policy instruments of interest to delegates, technology developers and marketing representatives. Sessions were held on how corporations and governments are reacting to changing business drivers resulting from climate change issues. Strategically positioned prior to the Earth Summit in Johannesburg, Globe 2002 served as a platform for government and business to come together to interact on key business and environmental issues in advance of the Summit itself. CCAF sponsorship highlighted the government's continued commitment to the climate change agenda.

Hubs

The *First National Business Plan* recognized that the 'Enhancing Awareness and Understanding' theme would be implemented primarily through a network of outreach "Hubs." These are centres, regionally piloted, that bring together provincial, business, environmental, academic, municipal, and other relevant stakeholders in an effort to coordinate and extend the reach of climate change

outreach programs at the provincial/territorial and local levels. The Hub network continues to complement all other aspects of the CCAF, and provides a strong local delivery approach to support objectives.

The Hubs are linked nationally through the Hub Pilot Advisory Team, where there is opportunity to share best practices and lessons learned about climate change outreach. Representation on the Team includes the Hubs, and participants from national organizations such as Aboriginal groups, environmental organizations, business and industry and environmental education.

Among accomplishments in this area:

- Hub pilots are in place and active in Alberta, Yukon, New Brunswick, Saskatchewan, Nova Scotia, and the Northwest Territories;
- Hub pilots are under development in Newfoundland & Labrador, British Columbia, Manitoba, and Prince Edward Island. The Hub opportunity is still under discussion with Ontario, Quebec, and Nunavut;
- Hub Pilot extensions beyond the initial 18-month period are being examined for feasibility, and next steps have been determined for partnerships with the remaining provinces/territories.

Funded Projects

There were 31 projects funded under Public Education and Outreach. There were 18 projects funded in communities, three focused on youth and educators, and ten were aimed at the general public. Results from the projects are reported on varying timelines.

Examples of the projects are:

- The *20/20 Way to Clean Air Campaign* that encourages people to reduce home energy use and personal vehicle travel by 20 per cent in Toronto.
- The *Community-Based Climate Change Education for First Nations* project that reaches communities in northern Canada with information about climate change issues.
- The *Home, Health and Climate Change* project in Newfoundland and Labrador that involves youth in climate change and human health public education and outreach.
- The *Climate Change School Bus*, a fully converted school bus powered by vegetable oil with solar panels and a wind generator will be offering interactive displays and activities throughout the Maritimes
- "Spaceship Earth: Who's at the Climate Controls?" is a 40-minute planetarium show at the H.R. MacMillan Space Centre which offers an examination of climate change from a universal perspective. It is accompanied by a 20-minute interactive science presentation in the Ground Station Canada multi-media theater.
- Students from grade 1 through grade 12 will learn more about climate change as it relates to the science and social studies curriculum in Saskatchewan. They will be encouraged to engage youth in community based activities to reduce greenhouse gas emissions.
- The *North Meets South* program that groups students and teachers from northern and southern Manitoba to visit the Fort Whyte Centre; share climate change impacts for their region; continue dialogue among participants and take action on climate change within each community.

Science, Impacts and Adaptation (SIA)

Science, Impacts and Adaptation is designed to assist in advancing knowledge of the magnitude, rate and regional distribution of climate change and its impact on Canada, and to increase the country's capacity to adapt...

Science, Impacts and Adaptation is divided into two sections. The Science section is led by Environment Canada, while Impacts and Adaptation is led by Natural Resources Canada. CCAF projects and activities were funded in both areas.

Science

The fiscal year 2001/02 was a wrap-up period for the first 3-year phase of the CCAF, and the initial year of the second phase. The first phase supported 79 projects, approximately 60 of which involved original scientific research. Over half of the 60 were joint government / university and/or private sector projects, with a total of 24 Canadian universities engaged. Six workshops were held to review and assess the accomplishments of the first phase of the CCAF. These events also helped to identify research priorities for the second round. Accomplishments under the first phase included:

- A national plan for climate system monitoring to help address gaps in Canada's climate monitoring network, and a series of analytical studies funded to address issues such as monitoring network design and data management and archiving.
- The participation of some 30 Canadian scientists from universities and government in the work of the Intergovernmental Panel on Climate Change, whose assessments and special reports provide the scientific and technological foundation used by policymakers and international negotiators.
- Research studies in climate model improvements focused on better representing the way some key components and processes are portrayed in computer-based models of the climate system, for example, processes relating to sea ice and clouds.
- Under the theme of terrestrial/biological sources and sinks of greenhouse gases, the focus of research was on forests and agricultural lands, as well as freshwater and wetlands. One study found that year-to-year variations in temperature caused significant differences in the carbon balance of some boreal forest research sites.
- Projects under Arctic research and monitoring included assessments of present knowledge of the climate system; rescuing, protecting and making available vulnerable climate-related data sets; and assessments of climate model projections. One study, for example, looked at the effects of unusual warmth in the Canadian Arctic during the summer of 1998. These included extremes in the extent of seasonal sea ice melt, the amount of glacial ice melt, and the depth of ground thaw penetration.
- A national climate impacts scenarios facility was established to provide impacts and adaptation researchers with tailored climate model output information. As well, there were several projects dealing with climate scenarios (tailored climate model output) such as those related to forests, fish, and sea level rise in the Bay of Fundy.
- Research on extreme climate and weather events focused on observed data, proxy data, and modeling aspects.

For the second phase of the CCAF, the priority areas for research are climate system processes, climate modelling, and climate scenarios. An open call for proposals on the theme of climate system processes was issued. To hasten improvements to climate models the addition of experts to the Canadian Centre for Climate Modelling and Analysis in Victoria was begun. The Canadian Climate Impacts Scenarios Facility expanded its range of products and the list of users was at 450 and growing. Support to BIOCAP Canada was also initiated to further enhance research on biological sources and sinks of greenhouse gases.

Impacts and Adaptation

Reducing vulnerability to climate change, or capitalizing on benefits, requires knowledge of future impacts and the processes and means by which Canadians will adapt. It also requires an understanding of the roles for individuals, the private sector and government. Projects funded by the Impacts and Adaptation section were designed to increase understanding of Canada's vulnerability to climate change, and to provide information for decision makers facing near-term adaptation decisions. In this phase of the CCAF, additional focus will be placed on understanding the process of adaptation.

A recent review of the activities funded in the first three years of the Impacts and Adaptation component shows projects involved a total of 385 researchers and contributed to the training of 117 students, mostly in multi-disciplinary research teams. Stakeholders were engaged in about 90 per cent of the projects.

Many of the projects funded in the first three years of the CCAF are now producing scientific and technical papers that report the results of the work, making it available for use by other researchers and decision-makers. Examples include:

- The report “*Vulnerability of Winter Recreation to Climate Change in Ontario's Lakelands Tourism Region*” published by the University of Waterloo Department of Geography (Occasional Paper Number 18). The study was the first in Canada to examine the vulnerability of winter recreation industries such as Nordic skiing, snowmobiling and ice fishing. The report also highlights the importance of current and future adaptations that have already reduced and can continue to reduce, vulnerability to climate variability and change in the Lakelands Region downhill ski industry. There was significant participation by industry representatives in the study.
- A paper “*Adaptation Options in Agriculture to Climate Change: a Typology*”, published in the journal *Mitigation and Adaptation Strategies for Global Change* (2002) provides for the first time, a synthesis of adaptation options that groups them according to agent, intent, timing, duration, form, type, and relationship to processes already in place to cope with the risks associated with climate stresses. Four main categories of options were identified: technological developments, government programs and insurance, farm production practices and farm financial management. The paper also points out that in order for there to be successful implementation of future adaptations, there needs to be a better understanding of the relationship between the options and the existing decision making processes.

- The CCAF-funded projects to document impacts of a changing climate at Sachs Harbour look at health related issues in Nunavik and Labrador through the use of traditional knowledge. The results include a number of research papers, as well as further activities by northern First Nations, Inuit and other Aboriginal communities, to refine the methodology used and examine the issue in a wider range of communities.

In 2001-02, the Impacts and Adaptation component also issued two calls for proposals which resulted in funding for 19 projects focussed on Water Resources and Food Supply. Support was also provided to BIOCAP to enhance research on forest management processes, the results of which will contribute to adaptation planning.

Technology Early Action Measures (TEAM)

Technology Early Action Measures...TEAM.. offers support to federal programs that fund technology projects to reduce greenhouse gas emissions nationally and internationally and brings together partners from all levels of government, industry and communities...

TEAM continues to be one of the primary tools for implementing federal climate change policy. The program's unique approach, built on incremental financing and extensive networking, has brought together industry, community and international partners to encourage additional investment in innovative technology that reduces greenhouse gas emissions. TEAM operates under the leadership of Natural Resources Canada, Environment Canada and Industry Canada, with the participation of several other federal government departments.

In fiscal year 2001/02, TEAM continued to implement its mission to provide early action on climate change technologies through:

- The evaluation and launch of 18 new projects: 12 industry, three community, and three international projects in the transportation, buildings, electricity, industry and agriculture sectors.
- New leveraging of \$287 million in total investments, based on \$19 million from TEAM and \$8.5 million from other federal sources.
- New project-based greenhouse gas reductions estimated at almost 500,000 tonnes of carbon-dioxide-equivalent with an even greater potential through commercialization and replication.
- Regional diversification and international cooperation, with a network that includes seven provinces, 17 Canadian cities, and four countries.
- The engagement of 86 private companies and organizations, 31 government agencies and research institutions, in Canada and abroad. TEAM has developed a suite of international projects, developed partnerships with Canadian companies and linked technology to private and public sector partners in a growing number of developing countries. These efforts demonstrate that greenhouse gas emission reduction and economic development can be achieved together, and on an international scale.

- Improvements in reporting through the establishment of numerous links with various programs and gathering a wide range of experience with greenhouse gas verification. One result was the design of the SMART (System of Measurement and Reporting to TEAM) to provide a clear and accurate evaluation of the technical performance and impacts of TEAM funded projects, as well as benefits to both project proponents and government programs.
- Making the links in co-benefits of climate change and air quality action – several TEAM projects have resulted in increased energy efficiency and domestic sources of renewable energy that will improve urban air quality and provide stability to the continental energy supply. Smog and air pollution will also be addressed through TEAM's transportation related projects, such as Montreal electric vehicles, and those supporting a hydrogen economy.

Highlights of technical results for 2001/2002

- Demonstration of innovative technologies for the refurbishment of small hydro turbines, resulting in a 20 per cent increase in capacity for a facility on the Ottawa River (Ottawa Energy).
- Demonstration of cryogenic liquefaction of landfill gas into value-added products, resulting in the lead company positioning themselves to undertake full-scale commercial landfill gas utilization projects. (CFS Alternative Fuels Inc.).
- Completion of community energy systems in Sudbury, Ontario; Fort McPherson, Northwest Territories; and Arviat, Nunavut. The initial estimate of additional savings from heat recovery in Fort McPherson alone was about 400 MWh/year, equivalent to saving 58,000 liters of heating fuel. Success of these projects has resulted in replication in other Canadian cities
- Certification of the first lightweight fuel storage system for automotive hydrogen gas applications for use with specific service pressures (Dynetek Industries Ltd.).
- Use of electric vehicles in Montreal that traveled a combined 93,463 kilometers over the 27-month study period and avoided the release of 20.3 tonnes of carbon dioxide.
- Demonstration in Collingwood, Ontario of a highly efficient and cost effective membrane water treatment technology resulting in low turbidity, pathogen-free water and power savings of up to 16,100 kWh/month (Zenon Environmental Inc.).
- Development and commercialization of high performance residential heating/ventilation systems to cut electricity costs by 50 per cent and provide consumers with a saving of about \$200 on an annual electricity bill (eKOCOMFORT™).
- Replacement of diesel fuel with natural gas for stationary applications in Grande Prairie, Alberta to reduce emissions of nitrogen oxides by 85 per cent and carbon dioxide by up to 20 per cent (Westport Innovations Inc.)

CCAF Reserve

The CCAF Reserve was established to fund projects that fall outside the scope or budgets of the core areas.

Prairie Adaptation Research Collaborative (PARC) was established in 1999 to facilitate networking and research to advance knowledge of the vulnerability to climate change in Alberta, Saskatchewan and Manitoba. PARC is supported in part by the Climate Change Action Fund, with contributions from Western Economic Diversification, the province of Saskatchewan, University of Regina and government and university research agencies across the Prairies. Thirty-two PARC-supported research projects came to a close in 2001, spanning topics such as communities, health, agriculture, forestry and water resources. Results were presented and discussed by researchers and stakeholders at a two day workshop in March 2002. A call for proposals is planned for 2002-03.

The Baseline Protection Initiative (BPI) was devised by Canada's Joint Ministers of Energy and Environment to address possible disincentives to reducing greenhouse gas emissions. The BPI is a federal/provincial/territorial program designed to ensure that organizations that act early to reduce their greenhouse gas emissions will not be disadvantaged if climate change policies based on emission levels are implemented.

Agriculture and Agri-Food Canada – Prairie Farm Rehabilitation Administration (PFRA) is now in a partnership with the Canadian Federation of Agriculture, the Canadian Cattlemen's Association, the Eastern Canadian Soil and Water Conservation Centre, and the Soil Conservation Council of Canada. The partnership is developing an understanding of agricultural sources of greenhouse gases and management practices that could mitigate effects. Among the results are an Environmental Farm Planning Workshop held in the Maritimes, a conference delivered on Agro-Forestry and climate change, two issues of newsletter "Climatimes" developed and widely circulated, a catalogue of Extension Materials related to greenhouse gases for industry groups, academia and extension agencies, on-farm demonstrations in all provinces and a greenhouse gas calculator for cattle producers.

Canada's efforts to put the issue of credit for cleaner energy exports on the official international agenda involved an informal workshop hosted by Canada in October 2001, to investigate the role of cleaner or less emitting energy in meeting objectives of the Convention. Canada used the informal meeting to discuss possible disincentives to trade in the so-called "cleaner energy exports" that might arise after the Kyoto Protocol comes into force. This led to an official workshop on the issue and the ability to pursue it through future discussion by the Parties to the Convention on Climate Change.

Appendix A

CCAF Expenditures 2001-2002

CCAF Block/Program/Activity	Actual Expenditures		
	Operating \$K	Contributions \$K	Total \$K
Building for the Future			
- Federal Coordination	2325	30	2355
- F/P/T Coordination and Consultations	1456	0	1456
- Communications	2992	0	2992
- Development/Analysis/Modelling - DET	3096	40	3136
- Development/Analysis - Other Policy Options	1365	128	1493
- International Reporting Obligations	1082	192	1274
Subtotal	12316	390	12706
International Policy and Related Activities			
Subtotal	2433	605	3038
Public Education and Outreach			
Subtotal	1750	3250	5000
Science, Impacts and Adaptation			
- Science	489	400	889
- Impacts and Adaptation	152	83	235
Subtotal	641	483	1124
Technology Early Action Measures			
Subtotal	3553	13645	17198
Reserve			
- PARC	33	200	233
- BPI	1	50	51
- PFRA Awareness Initiative	85	191	276
- Cleaner Energy Meeting 2001	110	0	110
- GLOBE 2002	0	300	300
- CoP6bis/7	395	0	395
Subtotal	624	741	1365
Total	21317	19114	40431