

ENVIRONMENTAL TECHNOLOGY SUPPORT PROGRAMS IN CANADA

A SURVEY

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A SURVEY**

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ENVIRONMENTAL TECHNOLOGY SUPPORT PROGRAMS IN CANADA:
A SURVEY

1. INTRODUCTION

Traditional concepts of the relationship between environmental protection and economic development have emphasized the negative economic effects of enhanced environmental standards. This has been especially true in Canada where, historically, economic development policies have stressed the intensive development and exploitation of natural resources.¹ In this context, pollution and other negative environmental effects resulting from these activities were seen as natural and inevitable products of the application of ingenuity and knowledge to serve human wants.² As such, they were seen as being capable of being absorbed by the natural environment's infinite carrying capacity. These considerations led to a general unwillingness on the part of Canadian governments to adopt strong environmental protection measures, for fear of imposing unnecessary constraints on economic activity.

However, since the late 1970s, a growing number of analysts have challenged this view. Instead, it has been argued that the relationship between environmental regulation and economic considerations may be substantially more complex than the traditional outlook indicates. The most important component of this new position has been the contention that strong environmental protection measures result in significant avoided costs to future generations by limiting the environmental damage caused by contemporary economic activity.

This element is central to the sustainable development principle of "ensuring that the needs of present generations are met without compromising the ability of future generations to meet their needs,"³ articulated by the World Commission on Environment and Development in its 1987 report Our Common Future. The long-term results of failing to take steps to protect environmental quality have become particularly apparent, as evidence of the consequences of decades of environmental neglect in Eastern Europe has accumulated over the past few years.⁴

In a more immediate context, in recent years, increased environmental protection standards have been widely recognized as leading to economic opportunities in the field of environmental protection services and technologies. In many cases, products and services developed in response to new domestic requirements have been found to have considerable export potential as well. Indeed, the environmental protection services industry has emerged as the

fastest growing sector of the Ontario economy over the past two years.⁵ The total world market for environmental products in 1991 was estimated at over \$200 billion and is expected to exceed \$300 billion by the year 2000.⁶

More broadly, it has begun to be argued that strict environmental standards may actually directly enhance the competitive position of the affected firms. The contention that environmental regulation might initiate innovation and efficiency in industrial processes is being articulated with increasing frequency.⁷ This position is based on the observation that rising environmental standards introduce an important change into a firm's operating environment.

Firms may respond to such a development in a number of ways. The traditional approach has been to install end-of-line ("add-on") pollution control systems with no changes to the production process. Alternatively, a firm may make internal alterations to its production system, enabling waste materials to be reused or recycled. A third possibility is that a firm might undertake changes in its manufacturing process to reduce the amounts of waste produced. This is sometimes referred to as the "pollution prevention" approach.

The first approach suffers from a number of serious economic drawbacks, while its capacity to produce substantial net gains in environmental quality over the long run is limited. In an environmental sense, it is widely acknowledged that end-of-pipe pollution control systems typically have the effect of reproducing the same environmental problem under a different name. A plant operator might, for example, add a water pollution control system to its facility. This may reduce the direct discharge of pollutants to the receiving water body. However, the operator often is then left with a large quantity of sludge from the treatment plant, which still requires disposal. Incineration or landfilling, the most likely options for sludge disposal, have significant negative environmental effects of their own. As a result, the long-term net gain in environmental quality may actually be quite small.

In terms of its economic impact, it has been observed that the adoption of end-of-line treatment processes in response to new environmental standards results in higher costs, lower profits, and consequently, fewer resources for innovation. At the same time, the use of such technologies may increase a firm's technological rigidity, thereby reducing its long-term capacity for technological change. Furthermore, the employment of end of process technologies, which are typically acquired outside of the firm, places it in a position of technological dependence.⁹

Given these environmental and economic considerations, firms affected by rising environmental standards have strong incentives to explore the second and third options for reducing pollution.

"Pollution prevention" approaches of this nature require an examination of the firm's entire industrial process. Means by which the use of scarce or toxic resources can be decreased, and by-products which previously have been treated as waste can be recycled, will have to be investigated and developed. The adoption of such new technologies often results not only in reduced pollution, but also improved production processes, accompanied by savings in energy and raw materials.

These considerations have led to the observation that:

"Strict environmental regulations do not inevitably hinder competitive advantage against foreign rivals; indeed, they often enhance it. Tough standards trigger innovation and upgrading.

...the nations with the most rigorous requirements often lead in exports of the affected products."¹⁰

The Organization for Economic Cooperation and Development (OECD) reached a similar conclusion, noting that:

"when the environmental constraint entails a change in productive processes, the technological and economic balance is usually positive."¹¹

This possibility is illustrated by the experiences of a large number of firms. In 1988 Northern Telecom Ltd. of Mississauga, for example, used over 1,000 tonnes of CFCs in its 42 plants. Since then the company has eliminated their use altogether through the development of a new procedure to manufacture electronic circuit boards. The research and development of the new process cost \$1 million. It is estimated to save the company \$50 million by the year 2000.¹² Other companies, such as Bell Canada,¹³ the Quaker Oats Company¹⁴ and Consumers Gas have realized substantial economic gains through innovations and process changes induced by environmental considerations.¹⁵

However, a number of barriers have been identified which may limit the capacity of individual firms to adopt preventative responses to new environmental requirements. Beyond the existence of attitudinal barriers in the form of resistance to change,¹⁶ small- and medium-sized firms have been identified as facing a number of additional challenges. In particular, access to capital to finance process changes may be a serious problem.¹⁷ Furthermore, most small- and medium-sized firms have only a modest in-house research and development capacity, and their ability to gather technical information may be limited.¹⁸

There are a number of ways in which governments might attempt to address these obstacles. They may include support for the in-house development of environmental technologies and services by

individual firms themselves. Alternatively, the development of new processes by specialized firms in the environmental services sector might be promoted. These firms might play a role as components of "clusters" of firms in a given sector, enabling them to, in effect, pool their capital and research and development resources in the development of new technologies and techniques.¹⁹

Over the past decade, a number of other industrialized jurisdictions in Western Europe,²⁰ as well as Japan²¹ and some U.S. states,²² have introduced programs to develop these potential linkages of this nature between industrial and environmental policy. This has support for the development of technologies and services with export potential, and assistance to domestic firms in adopting innovative and efficient responses to rising environmental standards. Canadian governments are now beginning to follow this pattern. Over the past three years a wide range of programs have been introduced by the federal government and most provinces to facilitate the development of environmental technologies and environmental industry sectors.

The purpose of this report is to provide an overview survey of these Canadian environmental technology support programs. This will include an assessment of current trends in the targeting and scope of support programs, as well as the range of policy instruments and funding mechanisms employed in their delivery. The primary focus of this survey has been programs operated by government departments. Programs operated by energy utilities, such as provincial crown corporations, have not been included.

A Note on Methodology

The data for this report was gathered through a survey of the federal government, the ten provinces and the two territories. Letters of enquiry regarding environmental technology support programs were sent to Departments of the Environment, Energy, Industry, Economic Development, and Technology in November 1992. This review reflects the responses received from governments to those enquiries. In some cases telephone interviews were conducted to gather more detailed information on specific programs and projects.

2. PROGRAM REVIEW

2.1 OVERVIEW

Over the past three years general environmental technology and industry sector support programs have been introduced by the federal government and a number of the provinces. These programs are targeted at a broad range of environmental technology applications and at the development of viable environmental industry sectors in the sponsoring jurisdictions. Environmental technology components have also been added to a number of comprehensive industrial research and development programs. Several government operated or sponsored research councils and centres provide assistance to industry either through direct technology research and development activities, or by acting as information clearinghouses to support the diffusion of new environmental technologies.

A number of more targeted programs have also been introduced. A small group are specifically directed at promoting the development of pollution prevention technologies by industry. A wider range are focussed on industrial waste reduction, reuse, recycling and recovery. Several provinces have introduced programs intended to address the recycling of problem waste materials such as tires and lead-acid batteries. A limited number of programs support the development and adoption of energy efficient or alternative energy technologies. There are several major joint federal-provincial programs dedicated to the development of remedial technologies to clean-up contaminated sites, such as abandoned industrial facilities and mines. Accelerated Capital Cost Allowances (ACCA) for pollution control equipment exist through federal and some provincial tax legislation.

Environmental technology support programs employ a number of funding mechanisms. There is a growing trend among the provinces to dedication of the revenues from "environmental" taxes, such as tire and battery taxes, to designated environmental funds. Other provinces continue to fund programs through their general revenues.

2.2 GENERAL ENVIRONMENTAL TECHNOLOGY SUPPORT PROGRAMS

2.2.1 General Environmental Technology Support Programs

2.2.1.1 Federal

In October 1991, the federal government announced a six-year, \$100 million Green Plan initiative entitled Technology for Environmental Solutions, to assist firms in the development of environmental technologies. The program has three components: \$80 million designated as grants to facilitate the development and commercialization of technologies; \$18 million to provide federal services to assist firms in locating, assessing, transferring and promoting environmental technologies; and \$2 million to establish an environmental technology network linking federal, provincial and university centres of environmental technology.

The Environmental Innovation Program is a \$20 million, six-year grant program announced in November 1991 in support of innovative research and development proposals for new environmental products, processes, or services. The program has as its objectives the strengthening of Canada's environmental science and technology and the promotion of environmental innovation outside of government. Groups eligible for grants include: Canadian industry; universities; native groups; non-government organizations; and interested individuals.

An Environmental Industries and Products Division was established within Industry, Science and Technology Canada in 1990. A Technology Development Branch exists within Environment Canada.

2.2.1.2 Alberta

The April 1991 Industry and Market Development Initiative of the Alberta Department of Economic Development and Trade includes financial support for market intelligence studies for environmental products, services and technologies. In addition, support is available for the development of new products, product enhancements or prototypes, new production processes and new process technologies. The budget for the initiative was \$2 million for the 1991-92 fiscal year.

2.2.1.3 Saskatchewan

In March 1992 Saskatchewan introduced a five-year, \$1.5 million Environmental Technology Development Program to promote research, demonstration and prototype development of new technologies. The program is administered cooperatively by the Departments of Diversification and Trade and of the Environment and Public Safety.

2.2.1.4 Manitoba

Manitoba established an Environmental Innovation Fund to provide support for the development, implementation and promotion of environmental innovation projects in 1990. Manitoba Industry, Trade and Tourism administers the Environmental Industrial Development Initiative, a five-year \$1 million program financed through the fund, which was launched in August 1991. The program targets firms pursuing commercial market opportunities for environmental products or services, and funds market studies, and the research and development of new products or processes.

2.2.1.5 Ontario

A Green Industry Strategy was announced as part of the Ontario government's July 1992 Industrial Policy Framework for Ontario. This includes the development of strong green industries in Ontario and the greening of existing industries. A Green Industry Unit was established within the Ministry of Energy (Now the Ministry of Environment and Energy). In addition, an Environmental Business Development Unit was created within the Ministry of the Environment in the fall of 1992.

Two major technology support programs are operated by the Research and Technology Branch of the Ministry of the Environment. The Environmental Research Program, established in 1977, supports research projects at universities, private laboratories and public agencies in the following areas: air quality; water quality; liquid and solid waste management; analytical methods and instrument development; environmental socio-economic analysis; and multimedia contaminants and biotechnology. The program is focused on the Ministry's long-term research needs.

The Environmental Technologies Program focuses on the latter stages of technological innovation - the development, refinement and commercialization of innovative environmental products or processes - in order to stimulate the development of internationally competitive technology that can be marketed by Ontario firms. It was launched in March 1990 with a \$30 million budget over five years. The program includes projects in the areas of: tire recycling; 3Rs technologies; waste management; analytical instrumentation; air pollution control; water and sewage; and socio-economic analysis. The program has recently been renamed the Applied Pollution Prevention Program and is to be refocused on pollution prevention technology development.

2.2.1.6 Quebec

The Quebec Ministère de l'Environnement administers a five-year, \$50 million program in support of the development of new

environmental processes, products and technologies and the emergence of an environmental industries sector. Le fonds de recherche et de développement technologique en environnement funds both exploratory research in environmental protection and the development of innovative environmental technologies.

2.2.1.7 Nova Scotia

The Canada/Nova Scotia Cooperation Agreement on Sustainable Economic Development signed in March 1991, is a five-year, \$15 million agreement designed to foster environmental initiatives and the research and development of new environmental technologies. The program is cost-shared 60-40 between the federal and provincial governments.

The agreement has four components:

- 1) The Environmental Assistance Program has \$5.8 million in funds to assist small to medium-sized firms or industry associations in the secondary manufacturing, primary resource, and fishing sectors.
- 2) The \$2.35 million Centres of Excellence Program, is designed to foster academic-industry partnerships.
- 3) The Demonstration Projects Program provides grants to businesses of any size, institutions, government and individuals for the demonstration of environmental processes, products or technologies.
- 4) The remainder the funds are allocated for Program Development and Implementation.

2.2.1.8 Yukon Territory

The Renewable Resources Sub-agreement of the Canada/Yukon Economic Development Agreement provides \$9 million to support the growth and diversification of resource-based businesses and enterprises. Activities eligible for funding include technology transfer, pilot and demonstration projects, environmental mitigation initiatives, establishment of environmental businesses, and feasibility and market studies.

The Yukon Conservation Strategy Demonstration Program Fund was established in 1989 as part of the Yukon Conservation Strategy. The program seeks to demonstrate sound conservation practices in connection with development projects by providing financial assistance to projects that show or encourage conservation. The fund has an annual budget of \$100,000, and is open to all non-profit organizations, businesses, municipalities, government

agencies and Indian bands. Projects funded under this program have included recycling, composting, alternative energy, and educational projects.

2.2.2 General Industrial Technology Development Programs with Environmental Components

2.2.2.1 British Columbia

In April 1990, the Ministry of Advanced Education, Training and Technology established a Science and Technology Fund to support scientific research and technological innovation. The fund, operating with a \$420 million budget over five years, includes in its objectives the encouragement of new technologies that promote a clean environment and improve the quality of life.

The Technology Assistance Program (TAP), supported through the Science and Technology Fund, is intended to encourage small and medium-sized B.C. businesses to enhance their productivity, develop new products and processes, and to improve their profitability through the application of technology. TAP provides up to 50% of fees of the technical personnel, specialized services and research equipment used in Research and Development projects, for a maximum of \$20,000 per project. In 1991/92, TAP provided \$99,156 towards 20 projects in the area of environmental technology, whose total research and development budget was \$254,329.

The B.C. Research Corporation, under the Targeted Research and Development Program, carries out research in strategically important sectors to increase the competitiveness of British Columbia industry. Its annual budget of \$1 million is supported in part through the Science and Technology Fund, of the Ministry of Advanced Education, Training and Technology. In the area of waste management, research being carried out includes studies in the dechlorination of pulp mill waste, removal of toxic acids, use of engineered marshes to remove pollutants from stormwater runoff, biological phosphorous removal, and composting technology.

2.2.2.2 Ontario

Innovation Ontario is a provincial crown corporation associated with the Ministry of Industry, Trade and Technology, which provides financial assistance to young, technology-based businesses. The assistance is in the form of equity investments, which is divested when the firms can attract private sector investment sufficient to ensure sustained growth and profitability. Innovation Ontario will invest in firms involved in the development of innovative environmental and energy technologies.

The Ontario Technology Fund, administered by the Ministry of

Industry, Trade and Technology, seeks to encourage greater collaboration and cooperation between industry, labour, universities and governments in scientific areas strategically important to Ontario. It is to facilitate the development and export of advanced, high-value products and services, and fostering the development of highly skilled researchers and technicians. One of its components is the Centres of Excellence Program, through which seven research centres in Ontario receive funding, including the Waterloo Centre of Groundwater Research (see below).

2.2.2.3 Federal-Provincial Cooperation Agreements for Industrial Development

The New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and the Yukon and Northwest Territories all have signed Industrial Cooperation Agreements with the federal government. These are economic development programs that are cost-shared, usually 70/30 between the Canadian government and the provincial or territorial government. The projects eligible for funding under these programs include applied research and development, technology acquisition, market studies, and demonstration and diversifications projects. All projects funded under these Cooperation Agreements must be environmentally sound.

2.2.3 Research Councils and Environmental Research Centres

2.2.3.1. Federal

The Wastewater Technology Centre (WTC) was established in 1971 by Environment Canada as a research and development laboratory. On July 2, 1991, WTC became a GOCO (government-owned, contractor operated facility) under the contractual supervision of RockCliffe Research Management. The Centre offers technology assessment, development and demonstration services for governments and commercial clients. Its mandate also includes the commercialization of innovative technologies and services. The WTC has carried out a number of projects in support of the federal government's Green Plan, such as the ongoing Automotive Manufacturing Pollution Prevention Project. During 1991/92, WTC performed over \$8 million of research and program development activity for the federal government.

A Great Lakes Pollution Prevention Centre was established in May 1992. The Centre was set up for the purpose of providing up-to-date information, and workshops and conferences to the public and stakeholders on the latest pollution prevention strategies, new technologies and procedures. The Centre is a component of the Green Plan Great Lakes Action Plan.

The National Research Council operates an Industrial Research

Assistance Program (IRAP). The IRAP program provides small- and medium-size firms in Canada with technical information, industrial engineering expertise and access to Canadian and foreign technology. This includes new processes and environmental technologies.

2.2.3.2 British Columbia

The Science Council of British Columbia, administers the Technology BC program, which is designed to stimulate the development and application of science and technology for the economic benefit of the province. The program is intended to support applied research and development rather than basic research. Proposals are evaluated on the basis of scientific and technical merit, industrial relevance, and economic potential. The Technology BC program includes support for the development of environmental technologies.

2.2.3.3 Alberta

The Alberta Environment Centre provides research and analytical services for the Alberta government and the private sector. The Centre was established in 1981, and operates with a budget of \$12 million. The Centre receive its funding from the provincial government and fees from contracts. Examples of research, service and technology development carried out (at the request of clients) at the Centre include a study of air quality in and around Drayton Valley; reclamation studies of soils compacted by heavy machinery; demonstration of the capability of white rot fungi to degrade PCBs; demonstration of the feasibility of containing organic contaminants using treated clays; and the testing of commercially available small-scale ozone water treatment systems.

The Alberta Office of Coal Research and Technology has supported research and development relating to clean-coal technologies since 1984, through the provision of funding to researchers, training to carry out and implement the findings of research, and through the compilation, assessment and dissemination of technical information.

2.2.3.4 Saskatchewan

The Saskatchewan Research Council, a provincial crown corporation, conducts research and provides services under contract for industry and government agencies. The Council receives funding through fees for contracts and government grants. Research and services provided span a wide range of scientific, engineering and technical areas, including environmental technologies. The Environmental Technologies Division provides research and services in aquatic biology, water quality, applied plant ecology, climatology, atmospheric sciences, and air quality. The Process

Development Division conducts research into the development of new processes for the petroleum and mineral industries and for other industries that require environmental engineering research.

2.2.3.5 Ontario

ORTECH International provides technical services in product design and development, analysis, testing and evaluation, on a contract basis to private and public sector organizations. It is a private, non-profit research organization associated with the Ontario Ministry of Industry, Trade and Technology, which provides 13 percent of ORTECH's \$25 million operating budget. The portfolio of technical services provided emphasizes environmental, energy, waste management, materials and transportation technologies. Ownership of technologies developed at ORTECH remains in the hands of the sponsoring company. ORTECH also operates the Ontario Waste Exchange.

The Waterloo Centre for Groundwater Research, a Centre of Excellence receiving funding from Ontario Technology Fund, carries out advanced research in groundwater as a cooperative venture between University of Waterloo and industry. The Centre maintains a close association with industry through: the sponsorship of research by national and multi-national companies in the chemical, manufacturing, petroleum and mining sectors; short courses at the Centre, providing companies the use of the Centre's facilities and; the marketing of instruments developed at the Centre.

2.3 TARGETED PROGRAMS

2.3.1 Pollution Prevention

2.3.1.1 Federal

The Great Lakes/St. Lawrence River Pollution Prevention Initiative is a \$25 million Green Plan program to restore water quality in the St. Lawrence River and the Great Lakes basin. The initiative includes regulatory programs, development of alternative technologies, voluntary programs with industry and other sectors, and outreach and education. As part of this initiative, the Great Lakes Pollution Prevention Centre was officially opened May 1992.

The automobile industry is a key industrial sector within the Great Lakes Basin. The Automotive Pollution Prevention Program is a cooperative effort between governments and industry to reduce the use and release of chemicals in automobile manufacturing processes. There are currently two projects underway.

The Technology for the Automotive Parts Manufacturing Sector is a project designed to ensure that automotive parts manufacturers have access to "state-of-the-art" technology to virtually eliminate persistent toxic substances from their wastewater effluent. The Automotive Manufacturing Pollution Prevention Project (MVMA Project) is a cooperative effort between government and industry to produce a verifiable reduction of the persistent toxic substances released in the automobile manufacturing process.

In addition to the Great Lakes/St. Lawrence Pollution Prevention Initiative, a National Office of Pollution Prevention has been established within Environment Canada. The Office's mandate is to ensure that government and industry make the transition from a reactive to a preventative approach in protecting the environment. The Office is to: promote sustainable development practices; develop a coordinated national pollution prevention strategic framework and a federal action plan; and encourage voluntary industry action to reduce pollutants and wastes.

2.3.1.2 Ontario

The Ontario Ministry of the Environment has recently indicated its intention to rename the Environmental Technologies Program the Applied Pollution Prevention Program. The program is to be refocussed from pollution control technologies to pollution prevention.

A Pollution Prevention Office was established within the Ministry of the Environment in April 1992. Its mandate includes:

- policy development for the ministry's strategy for preventing pollution;
- coordination of specific pollution prevention initiatives
- integration of pollution prevention into all Ministry activities; and
- outreach to encourage responsible and concerned individuals and organizations to make pollution prevention a means of achieving their priorities.

A Pollution Prevention Pledge Program was announced in October 1992. This award program is intended to encourage companies to adopt pollution prevention approaches to the reduction of persistent toxic chemical use and to publicize success stories.

2.3.2 Industrial Waste Reduction/Reuse/Recycling

2.3.2.1 Alberta

Support for waste minimization and recycling projects by Alberta firms is provided through the Industry and Market Development Program of the Department of Economic Development and Trade. Assistance is available for both market intelligence studies and the development of new products and process technologies. The total budget for the program in 1991-92 was \$2 million.

The Industrial Waste Action Initiative of the Alberta Action on Waste Program was announced in April 1991. It is to include the development of inventories of industrial waste generation to provide the basis for long-term waste minimization and recycling strategies. Waste minimization assessment manuals are to be developed to enable small- and medium-sized businesses to formulate their own waste minimization plans.

The Alberta Special Waste Management Corporation, has recently indicated its intention to actively promote and facilitate industrial waste reduction, reuse, recycling and recovery as part of its program to manage hazardous wastes in Alberta. It is focusing its 4Rs efforts on small and medium sized business sectors.

2.3.2.2 Manitoba

The Waste Minimization Initiative of the Manitoba Environmental Innovations Fund is administered by Manitoba Environment. The initiative is to promote:

- the development of new waste minimization programs within the public and private sectors;
- public education and information about waste minimization;
- community involvement; and

- environmental businesses which contribute to waste minimization;

The budget for the Waste Minimization Initiative for 1990-91 was \$700,000.

The Manitoba Hazardous Waste Management Corporation offers a Generator Services Program which includes free consultation and technical advice services on industrial hazardous waste reduction, reuse, recycling and recovery, analytical services and assistance with waste exchanges.

2.3.2.3 Ontario

The Industrial Waste Diversion Program in Ontario is an on-going initiative of the Ministry of the Environment, as part of the province's effort to reach its goal of a reduction in solid waste by at least 25 percent by 1992 and 50 percent by 2000. The current (1992-93) budget is \$7 million. The program provides funding to private sector industries, commercial operations and institutions for projects designed to divert hazardous and non-hazardous industrial wastes from disposal through reduction, reuse and recycling.

The Ontario Waste Management Corporation's Direct Assistance Program provides waste reduction audit and technical assistance programs to hazardous waste generators. The program is targeted at providing assistance to larger waste generating firms.

2.3.2.4 Quebec

Recyc-Québec is a crown corporation created in 1990 to manage the province's waste reduction, recovery, reuse, and recycling initiatives. Part of its mandate is to research, develop and maintain markets for recycled materials and products. Recyc-Québec is also responsible for operating recycling and collection systems.

2.3.2.5 Prince Edward Island

A component of Prince Edward Island's Waste Reduction Strategy provides "seed money" to community groups, municipalities, businesses and individuals for projects implementing innovative waste reduction programs. The program was launched in November 1990, and its operating budget for 1992-93 is \$20,000. The maximum amount awarded per project is \$3,000.

2.3.3 Problem Material Reuse and Recycling

2.3.3.1 Tires

2.3.3.1.1 British Columbia

A \$3 tax was been imposed on all new tires sold in British Columbia in July 1990. The revenues from the tax are placed in a Sustainable Environment Fund (SEF). The fund is used to support the Financial Incentives for Recycling Scrap Tires (FIRST) program, introduced in June 1991. The First program has three components. A Transportation Credit is paid to the processor for the costs of transporting scrap tires from around the province to a processing plant. An End-User Credit is paid to the manufacturer for using processed tire products. The credit is \$1.50 per tire for use of whole tires or tire-derived products, and \$1.00 for use as fuel.

The third component of the FIRST program is the Recycling Research Demonstration and Development (R2D2) Fund. The fund offers R&D grants to B.C. companies to develop new products from recycled tires or new technologies for processing scrap tires. \$1 million in grants were awarded in 1991-92, for projects such as use of scrap tires or crumb rubber in roofing shingles, rubber membrane, and outdoor floor surfaces, and new technologies for cutting used tires. The total budget for the FIRST program for 1991-92 was \$6.5 million.

2.3.3.1.2 Alberta

In September 1992, a \$4 Advance Disposal Surcharge was imposed on the purchase of all new tires for vehicles licensed in Alberta. The revenue from the surcharge goes into the Tire Recycling Fund. It will be used by the Tire Recycling Management Board, a non-governmental stakeholder committee formed in July 1992, to award contracts for tire collection, transportation and recycling.

2.3.3.1.3 Ontario

Ontario imposed a \$5 tire tax in 1989 to promote recycling and proper disposal. In March 1990 \$16 million, to be spent over five years, was committed to the Ontario Scrap Tire Program. Under this program support is provided through the Ministry of the Environment's Research and Technology Branch's Environmental Technology Program for the private sector development of new technologies products or processes related to scrap tire recycling.

In addition, as part of the Scrap Tire Program, the Industrial Waste Diversion Program of the Waste Management Branch of the Environment Ministry funds projects for the development and implementation of tire processing technologies, the collection and handling of used tires, and rubberized asphalt demonstration

projects.

2.3.3.2 Lead-Acid Batteries

2.3.3.2.1 British Columbia

In July 1990, British Columbia imposed a \$5 green levy on lead-acid batteries. These funds are assigned to the SEF and employed to support the Lead-Acid Battery Collection, Reuse and Recycling Program. This program administers a varying Transportation Incentive for the collection of batteries from retailers and hauling them to processors in order to stabilize the supply and demand for the batteries. The incentive is paid to the processor, who breaks down the batteries into component parts then sells them. As of June 1, 1991, retailers of lead-acid batteries are required to accept at least one used battery for each one sold.

2.3.4 Industrial Energy Efficiency and Renewable Energy Programs

2.3.4.1 Federal

Energy Mines and Resources Canada's Energy Innovators Ventures program was announced in May 1992. The program is operated through the Energy Innovator Office. The office is to work with national organizations to encourage them to make significant energy efficiency investments and to reduce emissions related to energy use in their operations across Canada.

An Industrial Energy Efficiency Initiative was announced by Energy Mines and Resources Canada at the same time as the Energy Innovators Ventures Program. The Industrial Energy Efficiency Initiative consists for the formation of a Minister's National Advisory Council on Industrial Energy Efficiency, and the establishment of industry-based task forces to design, develop and implement cooperative energy efficiency initiatives. The Initiative is to build on the Canadian Industry Program for Energy Conservation (CIPEC), established in 1975.

The Development and Demonstration of Resource & Energy Conservation Technology (D-RECT) Program is a funding program that encourages innovative new technologies that reduce pollution and recover energy from municipal and industrial wastes. Eligible projects are those that demonstrate the commercial viability of new methods, procedures, processes or equipment. The program does not provide funds for research. The main aim of the technology must be energy-savings - especially energy derived from non-renewable resources.

The program operates by contracting with the corporation,

agency or municipal authority to carry out the demonstration of the commercial viability of the new technology. D-RECT covers up to 50 percent of the total costs for equipment, buildings, installation, engineering and consulting services, and report preparation, for a maximum of \$200,000 per year. The contractor keeps all technical data, equipment, designs and patents from the project but must undertake to make any resulting patents and technology available to all interested parties in Canada.

The D-RECT Program was established in 1978 under Environment Canada and Energy, Mines and Resources Canada, and currently operates with an annual budget of \$1 million.

2.3.4.2 British Columbia

The British Columbia Science and Technology Fund is cost sharing two joint federal/provincial projects that utilize a solid polymer fuel cell developed by a B.C. company, Ballard Power Systems. The first project involves integrating fuel cells into a commercial bus chassis to produce a vehicle capable of meeting zero emission standards while operating on standard bus routes. The S&T Fund is providing \$3.84 million of the total project cost of \$4.84 million.

The second project utilizes the Ballard fuel cell in electrical power generators which will be used as a source of distributed power for utilities and large industrial users. The Province, through the Science and Technology Fund will contribute \$5.35 million, the federal Western Economic Diversification Fund will contribute \$5.35 million, and Ballard will contribute \$3.22 million towards this three-year project.

2.3.4.3 Alberta

The Southwest Alberta Renewable Energy Initiative, a three-year, \$3 million program, announced in December 1989, provides financial and technical assistance to private investors for the field testing of renewable energy initiatives.

2.3.4.4 Ontario

The Ontario Ministry of Energy's EnerSearch program supports the development of innovative energy technologies to assist industries in becoming more competitive by increasing their energy efficiency, and to provide new energy-related business opportunities in Ontario. The program's budget for 1992/93 was \$2.9 million

The Industrial Energy Services Program provides free comprehensive site energy audits of equipment and processes. Feasibility analysis grants and engineering grants are also available to assist in the provision of technical and economic

information required to determine implementation plans for audit recommendations. The program's total budget for 1992/93 was \$2.4 million.

The Industrial Process Equipment Demonstration Program shares the cost of initial demonstrations to prove the performance, energy impact, and other benefits of energy efficient technologies in new process applications and to encourage their adoption by other companies. The program will provide up to 30% of eligible project costs. For projects involving only monitoring and information transfer, 75% of eligible costs may be covered up to a maximum of \$50,000.

The Market Entry of Energy-Efficient Technology Program awards incentive grants to reduce the risk to first-time industrial buyers of new energy efficiency products. Grants to cover 50% of the buyer's eligible costs, up to \$500,000, are available.

The Industrial Retrofits Grants Program provides grants to apply engineered systems that improve the energy efficiency of processes and equipment. The program provides capital grants up to the lesser amount of: 30% of total project costs; or \$300,000; or the amount necessary to reduce the simple project payback period to 1.5 years.

The total budget for these five programs was \$11.9 million for 1992/93.

2.3.4.5 Nova Scotia

The Energy Efficiency and Diversity Program operated by the Department of Natural Resources is designed to encourage Nova Scotians to reduce the energy use of conventional fuels in the province. The program has an annual budget of \$120,000 to assist energy efficiency, energy conservation and alternative energy projects in partnership with the private sector and other levels of government. Projects eligible for funding include technology and information transfer, applied research and development, and planning and feasibility studies within the industrial, commercial, institutional, residential and transportation sectors.

2.3.5 Environmental Remediation Technologies

2.3.5.1 The National Contaminated Sites Remediation Program

The National Contaminated Sites Remediation Program is a \$250 million effort to clean up high-risk contaminated sites and to work with industry to stimulate the development of innovative clean-up technologies. The cost of the program is shared equally by federal and provincial/territorial governments, and is administered through

bilateral agreements between Environment Canada and the provincial/territorial governments. This is a five-year program launched by the Canadian Council of Ministers of the Environment (CCME) in 1990-91.

Of the total \$250 million, \$200 million is allocated for the clean-up of orphan sites - high-risk contaminated sites where the responsible parties cannot be identified or otherwise cannot pay for clean-up. Approximately 5 percent, or 50 of the estimated 1,000 identified contaminated sites in Canada are defined as "orphaned" and would be eligible for funding under this program. The clean-up of the other 95 percent of Canada's contaminated sites, at an estimated cost of \$3 to \$5 billion, would be at the expense of the responsible party, as consistent with the polluter-pays principle.

The second component of the National Contaminated Sites Remediation Program is the Development and Demonstration of Site Remediation Technology (DESRT) program, which has \$50 million designated for the development and demonstration of new and innovative remediation technologies in partnership with industry. Grants are awarded for projects that will develop new technologies, processes, methods and procedures that enhance: site characterization, assessment, and remediation; compliance monitoring of contaminated sites; and increase the scientific knowledge base in Canada.

The aim of the DESRT program is to develop innovative technologies that are applicable in Canada, commercially viable and that can be marketed internationally. Funding preference will be given to applicants that are, or are working in close collaboration with, the owner(s) of contaminated sites or parties designated responsible for the remediation of the contaminated sites. The cost for this program is shared 50-50 between the federal and the provincial/territorial governments. In order for the private sector to be able to apply for funding, individual agreements must be drawn up between Canada and each of the provinces.

As of January 1993 Federal/provincial agreements for abandoned site clean-up and remedial technology support had been signed between the federal government and all of the provincial and territorial governments except for Manitoba and Saskatchewan.

2.3.5.2 Mine Environment Neutral Drainage Program

The Mine Environment Neutral Drainage Program (MEND) is a cooperative research program financed and administered by the Canadian mining industry, the federal government, and the provinces of British Columbia, Manitoba, Quebec, Ontario and New Brunswick to mitigate acid production from mining sites and to prevent damage to large areas of the aquatic and terrestrial environment. The program

funds research and development in the following areas:

- predictive techniques to determine the nature, mechanisms and extent of acid production in various environments;
- methodologies to prevent and control acid mine drainage from tailings, waste rock and workings;
- passive treatment systems to obviate the need for continuous monitoring and maintenance; and
- methodologies to monitor operating, rehabilitated and abandoned acid generating sites

Approximately 50 percent of the work is performed by the participants, and the rest by contractors.

It is predicted that research required to achieve MEND program objectives will take at least five years and cost \$12.5 million. Between the start of the program in 1988 and December 1991, a total of \$6.2 million has been spent or committed: 42.2 percent from the mining industry, 39.2 percent from the federal government, and 18.6 percent from the five provinces.

For the 1992-93 fiscal year the following amounts have been committed to MEND: \$300,000 from Energy and Mines (CANMET), \$200,000 from Environment Canada, and \$100,000 from the Department of Indian and Northern Affairs. Quebec will contribute \$400,000 and Ontario has committed \$150,000 through its Abandoned Mines Program.

2.3.5.3 Great Lakes Clean-up Fund

The Great Lakes Clean-up Fund is a component of the federal government's Green Plan Great Lakes Action Plan to aid the restoration of water quality in the Great Lakes. Seventeen of the 43 Areas of Concern identified by The International Joint Commission as major sources of pollutants to the Great Lakes basin are in Canada. Part of the \$55 million fund has been allocated to help develop and demonstrate clean-up and pollution prevention technologies. To be eligible for funding projects must be innovative technologies that address: the assessment, removal and treatment of contaminated sediments; wastewater treatment technologies; habitat rehabilitation; or non-point sources of pollution.

2.3.6 Accelerated Capital Cost Allowances for Pollution Control Equipment

The federal government provides an accelerated capital cost allowance for water and air pollution control equipment installed at sites which have been in operation since before 1974 (Identified

in income tax regulations as class 24 and 27). Some energy conservation equipment also qualifies for accelerated capital cost allowances (Class 34). Eligible assets of this nature currently include certain equipment used for the generation of electricity and the production or distribution of heat. These include active solar equipment, small-scale hydro-electric projects and wind turbine generator installations.

Quebec and Alberta, the two of the three provinces which do not participate in the federal/provincial corporate tax collection agreements, follow the federal government's treatment of pollution control equipment for ACCA purposes. Reductions claimed under the class 24 and 27 allowances for water and air pollution control equipment between 1983 and 1987 totalled \$410 million.²³

Ontario is the third provincial government which does not participate in federal/provincial corporate tax collection agreements. In its 1992 budget Ontario removed the limitation of the Accelerated Capital Cost Allowance to pre-1974 plants. All plants installing new pollution control equipment in Ontario are now eligible for the allowance.

2.4 FUNDING MECHANISMS

In the past, Canadian governments have been reluctant to earmark funds for particular programs. Ontario continues this policy. The \$120 million raised to date through taxes on Tires, fuel-inefficient cars and alcohol containers are added to the general government revenue, and environmental programs are allocated funds through the normal budget estimates process.

Many of the other provincial governments have established designated funds for environmental purposes. British Columbia has a Sustainable Environment Fund (SEF) which holds the funds collected from the \$5 levy on lead-acid batteries and the \$3 tire tax. The SEF finances the province's Lead-Acid Battery Collection, Reuse and Recycling Program and the Financial Incentives for Recycling Scrap Tires Program (FIRST)

Alberta imposes a \$4 Advance Disposal Surcharge on each new tire for a vehicle licensed in the province. The revenue from this levy goes into the Tire Recycling Fund, which is administered by a board of industry stakeholders (not the government). The funds are to be used to operate a tire collection, transportation and recycling program.

The Environmental Protection Fund in Saskatchewan contains monies from refundable deposits for beverage containers not returned for recycling. It is designated for environmental purposes and finances programs such as the Environment Technology Development Program.

Manitoba has imposed Environmental Protection Tax of \$.10 on non-deposit liquor containers, withdrawal of the provincial sales tax exemption on disposable diapers, and a \$3 tire tax. Although the tax is not formally linked to the Environmental Innovations Fund, the government has expressed a commitment to use its revenues to support the fund.

The Environmental Trust Fund in New Brunswick was set up to cover the costs associated with environmental protection initiatives. The Fund has two sources of income: the environmental levies imposed on beverage containers; and the first \$10 million of net profits from video games.

Nova Scotia has also established an Environmental Trust Fund to finance environmental projects. The Fund receives its revenue through private donations.

3. CONCLUSIONS

The wide range of environmental technology programs described in this report are a very recent development in Canadian environmental and industrial policy. Prior to 1990 the most significant programs which existed were the Environmental Research and Industrial Waste Diversion programs operated by the Ontario Ministry of the Environment and Energy Efficiency Programs of Ontario Ministry of Energy. A limited number of smaller programs were operated by the federal government, most notably the CIPEC and D-RECT programs, and the National Research Council's Industrial Research Assistance Program (IRAP).

Since 1990 environmental industry sectoral development programs have been introduced by the federal government, and by the governments of Alberta, Saskatchewan, Manitoba, Ontario, Quebec and Nova Scotia. These programs support a wide range of research and development activities in a variety of fields. In some cases they also include support for market research and business plan development. Commitments under these programs over the next five years total approximately \$220 million.

Furthermore, in Ontario and British Columbia, environmental components have been added to general industrial research and development support programs. The Ontario government has been the most active province in promoting the environmental industry sector. It has explicitly included the development of a "green" industry sector and the "greening" of established industries in its 1992 Industrial Policy Framework.

A range of more targeted programs, intended to assist in the "greening" of existing industries, or to address specific programs have also been introduced in the past three years. Programs explicitly intended to promote pollution prevention approaches by industry to environmental protection have been introduced by the federal government in the Great Lakes - St Lawrence River watershed, and by Ontario government. However, these programs are at a preliminary stage, and their precise direction is evolving. Several of the broad sectoral programs introduced by other provinces also include process changes or waste reduction as one of the types of projects for which they will provide support.

Industrial waste diversion programs were introduced in Alberta and Manitoba in 1991, joining the existing program in Ontario. These undertakings target both hazardous and solid wastes, from the industrial, commercial and institutional (IC&I) sectors. The Ontario program places an emphasis on waste reduction, while the Alberta and Manitoba programs are more general in focus.

In the aftermath of the February 1990 Hagersville tire fire,

programs to support scrap tire recycling and reuse have been introduced in British Columbia, Alberta, Manitoba, and Ontario. British Columbia has also introduced a program of incentives to promote the recycling of Lead-Acid Batteries.

The most elaborate and comprehensive system of programs to promote industrial energy efficiency is operated by the Ontario Ministry of Energy (now the Ministry of the Environment and Energy). These programs support technology development, energy use auditing and the introduction of process changes. Very modest programs to provide direct financial support for industrial energy efficiency measures are operated by the federal government and the government of Nova Scotia. The federal Department of Energy, Mines and Resources has also recently introduced a number of programs to promote energy efficiency initiatives by industry. Small alternative energy programs have been launched by the British Columbia and Alberta governments.

The first major site remediation technology development program to be introduced was the Mine Environmental Neutral Drainage (MEND) program, begun in 1988. It is operated by the federal government and five provinces. More recently, the National Contaminated Sites Remediation Program (NCSRP) was initiated by the Canadian Council of Ministers of the Environment in 1990. The DESRT program component of the NCSRP explicitly includes the support of the development remediation technologies with export potential. A total of \$62 million has been committed for remediation technology development under these two programs.

Accelerated Capital Cost Allowances (ACCA) for pollution control equipment are offered by the federal government and the three provinces which do not participate in the federal-provincial corporate tax collection agreements, Alberta, Ontario, and Quebec. Ontario expanded the scope of its allowance to include equipment added to plants built after 1974 in its 1992 budget. Expenditures under the ACCA for air and water pollution control equipment are estimated at approximately \$100 million per year between 1983 and 1987.²⁴ Assuming that this level of expenditure has continued, the ACCA program would constitute, by a wide margin, Canadian governments' largest single expenditure program on environmental technologies.

The effectiveness of ACCAs for pollution control equipment has been questioned by a number of sources. It has been suggested that they have, at best, a symbolic, rather than practical impact.²⁵ In addition, ACCA's for pollution control equipment, as they are presently structured, provide a positive incentive to adopt "end-of-pipe" pollution control approaches over process change, "pollution prevention" technologies.

A number of provinces have chosen to fund their environmental technology support programs through the employment of dedicated

funds based on "environmental" taxes, such as tire taxes. Funds of this nature have been established in British Columbia, Alberta Saskatchewan, Manitoba, and New Brunswick. The federal government and the remaining provinces continue to support environmental technology programs through general tax revenues.

The array of new programs identified by this review which have been introduced over the past three years indicates that most Canadian governments have begun to make important connections between environmental and industrial policy. Given the recent nature of these programs, it is difficult to provide an assessment of the impact and effectiveness of these efforts to date. However, it is clear that while Canadian governments have identified an economic potential in the environmental services sector, they have yet to develop a clear vision of the strategic role which the sector should play in the Canadian economy, in both domestic and international terms. This should include its role in the restructuring of the domestic economy for environmental and economic sustainability, environmental restoration, and the promotion of sustainable development in the rest of the world.

This suggests that the generally focussed system of programs now in existence may need to be refined and targeted more specifically, perhaps along the lines of the Ontario government's waste diversion and energy efficiency programs. Further, as noted in the introduction, a number of other industrialized nations have established linkages between industrial and environmental policy of this nature over the past decade. Canada might do well to examine their experiences in some detail as it formulates its own environment-industry programs.

ENDNOTES

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16. "Industry's Response," Environmental Policy and Technological Change, p. 61.

17. Ibid., p. 59.

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APPENDIX I
Environmental Technology Programs in Canada:
A Compendium

FEDERAL GOVERNMENT

1. INTRODUCTION

In December 1990, the federal government announced its Green Plan, a five-year sustainable development strategy with \$3 billion in new funding for environmental initiatives. This plan was the result of an extensive, national multi-stakeholder consultation process that began in March 1990. Although the Green Plan spans a wide range of environmental initiatives, many of the programs target environmental technology development, such as the Technology for Environmental Solutions Program, and remedial action. A number of programs relating to environmental technologies were in existence prior to the Green Plan strategy, and some of these have been expanded and brought under the Green Plan umbrella.

2. GENERAL ENVIRONMENTAL TECHNOLOGY SUPPORT PROGRAMS

2.1 General Environmental Technology Programs

2.1.1 Technology for Environmental Solutions Program

The Technology for Environmental Solutions Program is a \$100 million initiative to develop, transfer, commercialize and implement technologies to prevent and clean up pollution. The program seeks to speed the acquisition, demonstration and commercialization of leading-edge environmental technologies in the following areas:

- * clean process technologies;
- * waste reduction and recycling;
- * air and water pollution prevention and control; and
- * water conservation.

The program has three components: an Environmental Technology Commercialization Program; a Technology Transfer Program; and an Environmental Technology Network.

2.1.1.1 The Environmental Technology Commercialization Program

The Environmental Technology Commercialization Program gives direct financial assistance to industry alliances, partnerships, joint ventures and consortia for projects consisting of first-time demonstrations of new environmental technologies. The federal government has committed \$80 million over six years to this element of the program. It is expected to attract \$150 million from the private sector. The program is intended to facilitate the development and commercialization of innovative environmental technologies, enhance industrial competitiveness, foster the

development of partnerships, and capitalize on domestic and international market opportunities.

The Environmental Technology Commercialization Program is specifically targeted at small- to medium-size firms. The program seeks to assist these firms in pooling their resources by helping Canadian firms establish relationships with other companies, universities or research institutes. Eligibility is limited to "for profit" companies and partnership operations in Canada with the capability to conduct and exploit the results of commercially viable research, development and demonstration projects related to environmental technologies.

The program will provide up to 50 percent of eligible costs, for a maximum of \$5 million, of projects that demonstrate for the first time the use of new environmental products or processes having reasonable prospects of commercialization. In addition, the program will contribute up to 75 percent of costs, up to a maximum of \$50,000, associated with projects and studies dealing with the formation of alliances, the preparation of business plans to implement projects, and the investigation of the feasibility of the technical aspects of a project.

Proposals for demonstration projects will be judged on the following criteria:

- strategic importance of the technology to Canadian industry;
- selection of alliance partners to ensure that the project is accelerated through the commercial phase;
- potential to create linkages for diffusion within Canada of the technologies and know-how generated by the alliance;
- domestic and export market potential, high technological or market risk, and impact on the industry;
- intellectual property - the extent to which the technology can be protected by patent, trade secret or other means;
- effect on Canada's industrial infrastructure and the international competitiveness of Canadian technology-based firms; and
- benefits to small and medium-size firms.

Costs eligible for assistance under the Environmental Technology Commercialization Program include the following:

- salaries of scientists, engineers, analysts, programmers and technical staff conducting the project;
- a portion of management and administrative staff salaries directly attributable to the project;
- technical services related to engineering, design etc.;
- costs of materials, supplies and components;
- testing and evaluation of prototype, and demonstration costs;
- equipment dismantling and clean-up;
- project insurance on assets as well as liability, including

- damage to the environment;
- travel and communication expenses;
- subcontract costs;
- North American patent filing costs;
- special-purpose machinery and equipment;
- feasibility, technical or implementation studies; and
- project economic assessment and report preparation.

The maximum level of assistance, including taxation credits, from federal, provincial and municipal governments is 75 percent of eligible project costs.

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2.1.1.2 Technology Transfer Program

Environment Canada has designated \$18 million of the Technology for Environmental Solutions program for the Technology Transfer Program, to provide federal services to assist Canadian firms in locating, assessing, transferring, and promoting environmental technologies.

The following are examples of services which will be supported by the program:

- technical reviews;
- regulatory and legal assistance;
- advice on alternative funding sources; and
- determination of the status of intellectual property.

Under this program, Environment Canada has called for expressions of interest for the establishment of environmental technologies commercialization facilities to address the need for

the greater commercialization of technologies developed in Canada. A decision regarding proposals is expected to be announced early in 1993.

2.1.1.3 Environmental Technology Network

The third component of the Technology for Environmental Solutions Program is \$2 million allocated to the establishment of an Environmental Technology Network among existing federal, provincial and university centres of environmental technology. The network is designed to promote greater awareness of the latest research and development efforts in environmental technology and to increase communication and cooperation among researchers.

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Tel: (819) 953-9364

2.1.2 Environmental Innovation Program (EIP)

The Environmental Innovation Program is a \$20 million, six-year grant program announced in November 1991 in support of innovative research and development proposals for new environmental products, processes, or services. The program has the objectives of the strengthening of Canada's environmental science and technology and promoting environmental innovation outside of government.

Groups eligible for grants are the following: Canadian industry, universities, native groups, non-government organizations and interested individuals. Project proposals should be in the areas of the natural, social, or human health sciences. Each project must be sponsored by a federal government department. Contracts are managed by Environment Canada and administered by the Science and Professional Services Directorate of Supply and Services Canada.

Proposals will be judged on the following criteria:

- relevance to the objectives of the Green Plan;
- uniqueness;
- environmental scientific merit and technical feasibility;
- sponsorship (the proposal must be sponsored by a federal government department or agency); and

- funding (there must be funding from sources other than the EIP program).

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2.2 Research Councils and Centres

2.2.1 Wastewater Technology Centre

The Wastewater Technology Centre was established in 1971 by Environment Canada as a research and development laboratory. On July 2, 1991, WTC became a GOCO (government-owned, contractor operated facility) under the contractual supervision of RockCliffe Research Management. The Centre offers technology assessment, development and demonstration services for governments and commercial clients. Part of its mandate is also to commercialize innovative technology and services. The WTC has carried out a number of projects in support of the federal government's Green Plan, such as the ongoing Automotive Manufacturing Pollution Prevention Project. During 1991/92, WTC performed over \$8 million of research and program development activity for the federal government.

Work at the Centre has focussed on technologies to treat contaminated groundwater, soil and sediment and, until recently, end-of-pipe technologies. Current research centres on optimization treatment systems, which seek to recover high-value inputs and residues from processes given the existing technological infrastructure within a particular plant. The direction of technologies developed has tended towards the application of existing technologies, and not the development of innovative processes. Examples include oil-from-sludge technology and the application of freeze-thaw technology to wastewater treatment. The focus on the application of existing technology is rationalized in the following way:

"Over the long term, it will be necessary to develop and implement new manufacturing techniques which eliminate the generation of pollutants. In the immediate future

however, extensive use of recovery and recycling technologies for at-source containment of products and by-products will be required to achieve industrial pollution prevention" (Annual Report, p. 13).

Contacts: Wastewater Technology Centre
RockCliffe Research Management Inc.
867 Lakeshore Road
P.O. Box 5068
Burlington, Ontario
L7R 4L7
Tel: (416) 336-4855
Fax: (416) 336-4765

2.2.2 Great Lakes Pollution Prevention Centre

A Great Lakes Pollution Prevention Centre was established in May 1992. The was set up for the purpose of providing up-to-date information, workshops and conferences to the public and stakeholders on the latest pollution prevention strategies, new technologies and procedures. The Centre is a component of the Green Plan Great Lakes Action Plan.

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Tel: (519)-337-3423
1-800-667-9790
Fax: (519)-337-3486

2.2.3 National Research Council

The National Research Council operates an Industrial Research Assistance Program (IRAP). The IRAP program provides small and medium-size firms in Canada with technical information, industrial engineering expertise and access to Canadian and foreign technology. This includes new processes and environmental technologies.

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2.3 TARGETED PROGRAMS

2.3.1 Pollution Prevention

2.3.1.1 Great Lakes/St. Lawrence River Pollution Prevention Program

The Great Lakes/St. Lawrence River Pollution Prevention Initiative is a \$25 million Green Plan program to restore water quality in the St. Lawrence River and the Great Lakes basin. The initiative includes regulatory programs, The development of alternative technologies, voluntary programs with industry and other sectors, and outreach and education. As part of this initiative, the Great Lakes Pollution Prevention Centre was officially opened May 1992.

The automobile industry is a major industrial sector within the Great Lakes Basin. The Automotive Pollution Prevention Program is a cooperative effort between governments and industry to reduce the use and release of chemicals in automobile manufacturing processes. There are currently two projects underway: Technology for the Automotive Parts Manufacturing Sector; and an Automotive Manufacturing Pollution Prevention Project.

The Technology for the Automotive Parts Manufacturing Sector program is a project designed to ensure that automotive parts manufacturers have access to "state-of-the-art" technology to virtually eliminate persistent toxic substances from their wastewater effluent. Research is being carried out at the Wastewater Technology Centre in conjunction with the Automotive Parts Manufacturers' Association (APMA) to develop new metal-finishing and waste oil recovery technologies. Technologies being investigated include use of ultra-filtration methods to pump waste oil through a membrane to concentrate the oil, and recycling used metal-working fluids in machine-processing for cooling and lubrication.

Research is carried out using the facilities at the Wastewater Research Centre. Funding comes from Environment Canada, Pollution Prevention Office of the Ontario Ministry of the Environment, and the APMA. Two companies will carry out a demonstration of the technologies, and if successful, RockCliffe Research will make the technologies available to firms in the automotive parts manufacturing industry.

The Automotive Manufacturing Pollution Prevention Project (MVMA Project) is a cooperative effort between government and industry to produce a verifiable reduction of the persistent toxic substances released in the automobile manufacturing process. In May 1992, the federal government signed a Memorandum of

Understanding with the "Big Three automakers" (Ford, GM and Chrysler) which aims at a voluntary reduction in use, generation and release of toxic substances from automotive manufacturing facilities in the Great Lakes Basin.

The project will be undertaken by the Motor Vehicles Manufacturers' Association and its participating member companies in cooperation with Environment Canada and Ontario Ministry of Environment. A task force of representatives from each of the participants has been set up to set a list of substances to be targeted for reduction. The emphasis will be on process change or processes enhancement to achieve reduction at the source. The auto companies will implement plans to reduce the use, generation and release of toxic substances and will put forward pollution prevention programs within the automotive manufacturing sector through technical assistance, information sharing, and technology transfer.

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Brian LeClair, Supervisor Sewer Use
Water Resources Branch

Ontario Ministry of the Environment
1 St. Clair Avenue West, 7th Floor
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2.3.1.2 The National Office of Pollution Prevention

A National Office of Pollution Prevention has been established within Environment Canada. The Office's mandate is to ensure that government and industry make the transition from a reactive to a preventative approach in protecting the environment. The Office is to: promote sustainable development practices; develop a coordinated national pollution prevention strategic framework and a federal action plan; and encourage voluntary industry action to reduce pollutants and wastes.

Contact: National Office of Pollution Prevention
Conservation and Protection
Environment Canada
Ottawa, Ontario
K1A 0H3
Tel: (613)-994-3505

2.3.2 Energy Efficiency and Alternative Energy

2.3.2.1 Energy Innovators Ventures

Energy Mines and Resources Canada's Energy Innovators Ventures program was announced in May 1992. The program is operated through the Energy Innovator Office. The office is to work with national organizations to encourage them to make significant energy efficiency investments and to reduce emissions related to energy use in their operations across Canada.

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Chief Innovators Program
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Ottawa, Ontario
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Fax: 613-952-8169

2.3.2.2 Industrial Energy Efficiency Initiative

An Industrial Energy Efficiency Initiative was also announced

by Energy Mines and Resources Canada in May 1992. The Industrial Energy Efficiency Initiative consists for the formation of a Minister's National Advisory Council on Industrial Energy Efficiency, and the establishment of industry-based task forces to design, develop and implement cooperative energy efficiency initiatives. The Initiative is to build on the Canadian Industry Program for Energy Conservation (CIPEC), established in 1975.

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2.3.2.3 Development and Demonstration of Resource and Energy Conservation Technology Program (D-RECT)

D-RECT is a funding program that encourages innovative new technologies that reduce pollution and recover energy from municipal and industrial wastes. Eligible projects are those that demonstrate the commercial viability of new methods, procedures, processes or equipment; the program does not provide funds for research. The main aim of the technology must be energy-savings - especially energy derived from non-renewable resources.

The program operates by contracting with the corporation, agency or municipal authority to carry out the demonstration of the commercial viability of the new technology. D-RECT covers up to 50 percent of the total costs for equipment, buildings, installation, engineering and consulting services, and report preparation, for a maximum of \$200,00 per year. The contractor keeps all technical data, equipment, designs and patents from the project but must undertake to make any resulting patents and technology available to all interested parties in Canada.

The D-RECT Program was established in 1978 under Environment Canada and Energy, Mines and Resources Canada, and currently operates with an annual budget of \$1 million.

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Industry Incentives Division, Technology Development
Branch
Conservation and Protection

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2.3.3 Remedial Technologies

2.3.3 Great Lakes Clean-up Fund

The Great Lakes Clean-up Fund is a component of the federal government's Green Plan Great Lakes Action Plan to aid the restoration of water quality in the Great Lakes. Seventeen of the 43 Areas of Concern identified by The International Joint Commission as major sources of pollutants to the Great Lakes basin are in Canada. Part of the \$55 million Fund has been allocated assist the development and demonstration of clean-up and pollution prevention technologies. To be eligible for funding projects must involve innovative technologies that address: the assessment, removal and treatment of contaminated sediments; wastewater treatment technologies; habitat rehabilitation; or non-point sources of pollution.

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2.4 Accelerated Capital Cost Allowances for Pollution Control Equipment

The federal government provides an accelerated capital cost allowance for water and air pollution control equipment installed at sites which have been in operation since before 1974 (Identified in income tax regulations as class 24 and 27). Some energy conservation equipment also qualifies for accelerated capital cost allowances (Class 34). Eligible assets of this nature currently include certain equipment used for the generation of electricity and the production or distribution of heat. These include active solar equipment, small-scale hydro-electric projects and wind turbine generator installations.

Quebec and Alberta, the two of the three provinces which do not participate in the federal/provincial corporate tax collection agreements, follow the federal government's treatment of pollution

control equipment for ACCA purposes. Reductions claimed under the class 24 and 27 allowances for water and air pollution control equipment between 1983 and 1987 totalled \$410 million.

Ontario is the third provincial government which does not participate in federal/provincial corporate tax collection agreements. In its 1992 budget Ontario removed the limitation of the Accelerated Capital Cost Allowance to pre-1974 plants. All plants installing new pollution control equipment in Ontario are now eligible for the allowance.

JOINT FEDERAL-PROVINCIAL PROGRAMS

1. REMEDIAL TECHNOLOGIES

1.1 National Contaminated Sites Remediation Program

The National Contaminated Sites Remediation Program is a \$250 million effort to clean up high-risk contaminated sites and to work with industry to stimulate the development of innovative clean-up technology. The cost of the program is shared equally by federal and provincial/territorial governments, and is administered through bilateral agreements between Environment Canada and the provincial/territorial governments. This five-year program was launched by the Canadian Council of Ministers of the Environment (CCME) in 1990-91.

Of the total \$250 million, \$200 million is allocated for the clean-up of orphan sites - high-risk contaminated sites where the responsible parties cannot be identified or otherwise cannot pay for clean-up. Approximately 5 percent, or 50 of the estimated 1,000 identified contaminated sites in Canada are defined as "orphaned" and would be eligible for funding under this program. The clean-up of the other 95 percent of Canada's contaminated sites, at an estimated \$3 to \$5 billion, would be at the expense of the responsible party, as consistent with the polluter-pays principle. The federal portion of the funds (\$100 million) is allocated to the provinces in proportion to their population, according to the 1989 Census.

1.1.1. Development and Demonstration of Site Remediation Technology (DESRT)

The second component of the National Contaminated Sites Remediation Program is the Development and Demonstration of Site Remediation Technology (DESRT) program, which has \$50 million designated for the development and demonstration of new and innovative remediation technologies in partnership with industry. The primary objective of the program is to stimulate the development of new and innovative technologies, processes, methods and procedures that enhance site characterization, assessment, remediation, and compliance monitoring of contaminated sites. Secondary objectives are to increase the scientific knowledge base in Canada and to enhance Canada's position to market internationally its technology and expertise in site remediation.

Two types of projects are given financial assistance:

- demonstration of new technology at pilot or prototype scale;
- and

- research and development of technologies through the laboratory stage.

Criteria for project selection include:

- project consistency with DESRT priorities and needs;
- the technology's commercialization potential;
- amount of private sector participation;
- anticipated time frame for full-scale application of the technology;
- potential impact on clean-up of contaminated sites;
- degree of uniqueness and technological risk;
- potentially negative aspects of the proposed development; and
- Canadian content.

Funding preference will be given to applicants that are, or working in close collaboration with, the owner(s) of a contaminated site or parties designated responsible for the remediation of the contaminated sites. Ownership of the technology and results of the project are negotiated on a case-by-case basis. In cases where ownership rights are granted to the contractor, the contractor must make the technology available to interested parties within Canada at reasonable cost.

The cost for this program is shared 50-50 between the federal and the provincial/territorial governments. In order for the private sector to be able apply for funding, individual agreements must be drawn up between Canada and each of the provinces, and approvals for individual projects must be given at both levels of government. All provinces excepting Manitoba and Saskatchewan have signed agreements with the federal government to date. As of January 1993, approximately fifteen projects have been completed or are underway.

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DESRT
David Hutchison
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Environment Canada
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241 Cité des Jeunes Blvd.
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1.2 Mine Environment Neutral Drainage Program (MEND)

The Mine Environment Neutral Drainage Program (MEND) is a cooperative research program financed and administered by the Canadian mining industry, the federal government, and the provinces of British Columbia, Manitoba, Quebec, Ontario and New Brunswick to mitigate acid production from mining sites to prevent damage to large areas of the aquatic and terrestrial environment.

The program funds research and development in the following areas:

- predictive techniques to determine the nature, mechanisms and extent of acid production in various environments;
- methodologies to prevent and control acid mine drainage from tailings, waste rock and workings;
- passive treatment systems to obviate the need for continuous monitoring and maintenance; and
- methodologies to monitor operating, rehabilitated and abandoned acid generating sites.

Approximately 50 percent of the work is performed by the participants, and the rest by contractors.

It is predicted that research required to achieve MEND program objectives will take at least five years and cost \$12.5 million. Between the start of the program in 1988 and December 1991, a total of 6.2 million has been spent or committed: 42.2 percent from the mining industry, 39.2 percent from the federal government, and 18.6 percent from the five provinces. For the 1992-93 fiscal year, the following amounts have been committed to MEND: \$300,000 from Energy and Mines (CANMET), \$200,000 from Environment Canada, and \$100,000 from the Department of Indian and Northern Affairs. Quebec will contribute \$400,000 and Ontario has committed \$150,000 through its Abandoned Mines Program.

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**THE WESTERN PROVINCES
JOINT PROJECTS**

British Columbia, Alberta, Saskatchewan and Manitoba have cooperated on a number of environmental initiatives. Since 1990, the economic development departments of the four Western provinces have been working jointly with the federal Department of Industry, Science and Technology and the Western Economic Diversification Office to conduct the Western Provinces Environmental Industries Development Study.

This cooperative venture has led to a joint proposal for Green Plan funding (under the \$18 million technology transfer component of the Technology for Environmental Solutions Program) to establish an environmental technologies commercialization centre in the Western region, called the Canadian Environmental Technology Advancement Corporation (CETAC). In addition, a Western Canada Scrap Tire Task Force was established in 1989.

BRITISH COLUMBIA

1. INTRODUCTION

There are no programs targeted specifically to assist in the development of environmental industries. The provincial government suspended all business development programs in April 1991 in accordance with fiscal restraint measures initiated by the Premier's office. However, the Science and Technology Fund of the Ministry of Advanced Education, Training and Technology continues to support scientific research and technology development, and to assist in the building of links between industry and research institutions.

Two major waste reduction programs in British Columbia are the Financial Incentives For Recycling Scrap Tires (FIRST) Program and the Lead-Acid Battery Collection, Reuse and Recycling Program, aimed at reducing the 2.5 million used tires and 80,000 batteries discarded annually in the province.

A strategic plan for the environment industry in British Columbia entitled Creating the Future was prepared under the Strategic Planning for Applied Research and Knowledge program of the British Columbia Research Council in 1991.

2. GENERAL INDUSTRIAL TECHNOLOGY DEVELOPMENT PROGRAMS WITH ENVIRONMENTAL COMPONENTS

2.1 Science and Technology Fund

In April 1990, the Ministry of Advanced Education, Training and Technology established a Science and Technology Fund to support scientific research and technological innovation. The fund, operating with a \$420 million budget over five years has the following objectives:

- to assist in economic diversification;
- to enhance productivity and industrial competitiveness in new technologies and traditional industries;
- to help create new export industries; and
- to encourage new technologies that promote a clean environment and improve the quality of life

2.1.1 Technology Assistance Program (TAP)

The Technology Assistance Program of the Science and Technology Fund is intended to encourage small and medium-sized B.C. businesses to enhance their productivity, develop new products and processes, and to improve their profitability through the

application of technology. TAP provides up to 50% of fees of the technical personnel, specialized services and research equipment used in R&D projects, for a maximum of \$20,000 per project. In 1991/92, TAP funded \$99,156 towards 20 projects in the area of environmental technology, whose total Research and development budget was \$254,329. As of October of fiscal year 1992-93, the corresponding figures are \$63,576 committed towards 10 projects with a total Research and development budget of \$156,000.

2.1.2 Targeted Research and Development Program

The Targeted Research and Development Program is aimed at using applied research in strategically important sectors to increase the competitiveness of British Columbia industry. The research is carried out by BC Research Corporation with an annual budget of \$1 million, supported in part through the Science and Technology Fund of the Ministry of Advanced Education, Training and Technology.

In the area of waste management, the research being carried out includes studies of: the dechlorination of pulp mill waste; the removal of toxic acids; the use of engineered marshes to remove pollutants from stormwater runoff; biological phosphorous removal; and composting technology. The budget for these activities was \$275,000 in 1991-92, and is \$385,000 in 1992-93.

2.2 Research Councils and Centres

2.2.1 The Science Council of British Columbia

The Science Council of British Columbia, administers Technology BC, a program designed to stimulate the development and application of science and technology for the economic benefit of the province. The program is intended to support applied research and development rather than basic research. Proposals are evaluated on the basis of scientific and technical merit, industrial relevance, and economic potential.

Specific sectors of the economy are targeted for support including: agriculture and food; aquatic resources; biotechnology; computers and computing; electronics and communications; energy; environmental technology; forestry; forest products; health technology; manufacturing and machinery; and mining, minerals and metals. Since November 1989, a total of \$2,489,000 has been provided for 32 projects in the Environmental Technologies sector, representing 5% of the total funding available (as of November 1992). The Council also administers the Recycling Research Demonstration and Development Fund for scrap tires.

3. TARGETED PROGRAMS

3.1 Problem Materials

3.1.1 Financial Incentives for Recycling Scrap Tires Program (FIRST)

The Financial Incentives for Recycling Scrap Tires Program (FIRST) came about as a result of a 1989 survey of municipalities which identified scrap tires as one of many "hard-to-dispose-of" materials. B.C. Environment estimated that only 15 percent of 2.5 million tires discarded annually in the Province were being recycled. The goal of B.C.'s tire program is to recycle more than 90 percent of total number of used tires discarded in the province each year.

Since July 1990, a \$3 levy has been added to the price of each new tire over \$30 sold in BC, with the funds going into the Sustainable Environment Fund (SEF). For fiscal year 1991/92, \$6.5 million was allocated from the SEF to finance the FIRST program. The FIRST program, introduced in June 1, 1991 has three components:

- 1) End-User Credits;
- 2) Transportation Credits; and
- 3) The Recycling Research Demonstration and Development (R2D2) Fund.

The End-User Credit is paid to the manufacturer for using processed tire products, such as crumb rubber. To be eligible for the credit, the manufacturer must buy the rubber from a registered processor. The credit is at the rate of up to \$1.50 per tire, or \$183/tonne for use of whole tires or Tire-Derived Product (TDP); and up to \$1.00 for use as fuel, or \$122/tonne.

The Transportation Credit is paid to the processor (who then pays the transporter) for the costs of transporting used tires to a processing plant. The amount of credit is based on the weight of the tire loads, the distance hauled, and a cost factor which ensures tires can be profitably hauled to processors from anywhere in the province. Both of these components of the program are administered by Coopers and Lybrand, a consulting firm.

The third component, the Recycling Research Demonstration and Development Fund (R2D2) offers R&D grants to B.C. companies which develop new products from recycled rubber or new technologies for the more efficient processing of tires. The objective of the program is to find uses for the more than 2 million used tires disposed of annually in the province, and to support projects which produce products which utilize a significant number of used tires and a significant portion of each tire. The program is administered by the British Columbia Science Council, and has a

budget of \$1 million. To be eligible for a grant, the applicants must represent a B.C. company, and must carry out the proposed research or development activity within the province.

Eligible activities include:

- proof-of-concept research;
- development of new products and/or processes;
- prototype evaluation;
- development or use of new or existing technology from an external source which involves technical risk in its implementation in B.C.; and
- market assessment studies.

Assessment of project proposals will be based on:

- volume of scrap tires utilized per month;
- the percentage of each tire used in the process;
- disposal of waste products/unutilized portion of tire;
- environmental impact of the process;
- technical innovativeness;
- commercial viability;
- significance to industry; and
- economic potential.

Two sets of grants have been awarded from the R2D2 Fund. In November 1991, six projects, for a total of \$740,000 were granted funding, and four grants were awarded in March 1992, for a total of \$322,500. Projects funded include road crack sealant developed from recycled rubber and tall oil pitch, roofing shingles and road mats made from scrap tires, and a new tire-cutting technology through the use of a water jet.

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Science Council of B.C.
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Birthe Levie
B.C. Scrap Tires Program
Coopers and Lybrand
777 Broughton St., 4th Floor
Victoria, BC
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Tel: (604) 384-4131 ext. 84

3.1.2 Lead-Acid Battery Collection Reuse and Recycling Program

Under the Lead-Acid Battery Collection, Reuse and Recycling Program which began June 1, 1991, retailers are required to accept at least one used battery for each new battery purchased. Batteries are collected from the retailers and are either reconditioned or hauled to a processor. The processor breaks down the batteries into lead, acid and plastic and then sells the components to lead smelters, plastic fabricators and other industries. (Most of the batteries collected are transported to Cominco plant in Trail, B.C. where the smelter is located.)

The program is designed to stabilize the supply to processors of lead-acid batteries, which fluctuate according to the commodity price of lead on the world market. The main feature of B.C.'s system is the Transportation Incentive Model, which predicts the incentive needed to balance the costs of collection and handling with the revenues from lead recycling. The model creates a floor price for batteries as a function of the prevailing world lead price, and the distance between the source of the used lead acid batteries from the closest processor. The program is funded directly out of the Sustainable Environment Fund and is administered by NovaTec Consultants. B.C. Environment puts out a quarterly newsletter called Battery News to keep participants informed of the details of the system.

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BC Battery Collection Program, Administration &
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ALBERTA

1. INTRODUCTION

Alberta's major initiative related to the development of environmental industries and technologies is the Industry and Market Development Program launched in April 1991 by Alberta Economic Development and Trade. In 1991-92 \$2 million was committed through this program towards business opportunities in environmental products (administered by Alberta Economic Development and Trade).

2 GENERAL ENVIRONMENTAL TECHNOLOGY SUPPORT PROGRAMS

2.1 Environmental Technology Support

2.1.1 Industry Market Development Program

The Industry and Market Development Program is a program directed at the private sector to encourage the development of new products, and production and process technologies which will contribute to waste minimization and recycling. Alberta Economic Development and Trade will provide up to 50 percent of costs to develop the product or technology, up to a maximum of \$50,000, or 50 percent of the costs (up to a maximum of \$20,000) to identify and evaluate potential markets. Proposals will be evaluated on the basis of their commercial viability, their contribution to the diversification of the Alberta economy, and their contribution to Alberta's waste management goals. The budget for the program in 1991-92 was \$2 million.

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Fax: (403) 422-5120

2.2 Research Councils and Centres

2.2.1 Alberta Environment Centre

The Alberta Environment Centre provides research and analytical services for the Alberta government and the private sector. The Centre was established in 1981, and operates with a budget of \$12 million. The Centre receives its funding from the

provincial government and through fees from contracts. Examples of research, service and technology development activities carried out (at the request of clients) at the Centre include a study of air quality in and around Drayton Valley; reclamation studies of soils compacted by heavy machinery; demonstrations of the capability of white rot fungi to degrade PCBs; demonstrations of the feasibility of containing organic contaminants using treated clays; and the testing of commercially available small-scale ozone water treatment systems.

Contact: Dr. R.S. Weaver, Director
Alberta Environment Centre
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Vegreville, Alberta
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Tel: (403) 632-8400

2.2.2 Alberta Office of Coal Research and Technology

The Alberta Office of Coal Research and Technology has supported research and development relating to clean-coal technologies since 1984, through the provision of funding to researchers, training to carry out and implement the findings of research, and through the compilation, assessment and dissemination of technical information. Some of the research being supported by AOCRT include coal gasification processes, and evaluation of technologies for removing, using, transporting, and disposing of CO₂ produced in power generation plants that use coal and other fossil fuels.

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3. TARGETED PROGRAMS

3.1 Waste Reduction, Reuse and Recycling

3.1.1 Industry and Market Development Program

Support for waste minimization and recycling projects by Alberta firms is provided through the Industry and Market Development Program of the Department of Economic Development and Trade. Assistance is available for both market intelligence studies and new products and process technologies.

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Industry Development Branch
Alberta Economic Development and Trade
10th Floor
Sterling Place
9940 - 106 st.
Edmonton, Alberta
T5K 2P6
Tel: (403)-427-2005

3.1.2 Industrial Waste Action Initiative

The Industrial Waste Action Initiative of Alberta Environment's Action on Waste Program, announced in April 1991, is to include the development of inventories of industrial waste generation to provide the basis for long-term waste minimization and recycling strategies. Waste minimization assessment manuals are to be developed to enable small and medium sized businesses to formulate their own waste minimization plans.

3.1.3 Alberta Special Waste Management Corporation

The Alberta Special Waste Management Corporation, has recently indicated its intention to actively promote and facilitate industrial waste reduction, reuse, recycling and recovery as part of its program to manage hazardous wastes in Alberta. It is focusing its 4Rs efforts on small-and medium-sized business sectors.

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610-10909 Jasper Ave.
Edmonton, Alberta
T5J 3L9
Tel: (403)-428-5029
Fax: (403)-428-9627

3.2 Tire Recycling

Based on the recommendations of the Western Canadian Scrap Tire Task Force, Alberta is implementing an industry-based tire collection and processing program. In July 1992, the Alberta government announced the formation of the Tire Recycling Management Board, comprised of members representing tire dealers, the recycling industry, and other stakeholders, with the mandate to find an effective program to collect and recycle used tires.

On September 1, 1992, a \$4.00 Advance Disposal Surcharge was added to the purchase price of all new tires for a vehicle licensed in Alberta. The revenue from this surcharge goes to the Tire

Recycling Management Board, where it is placed in the Tire Recycling Fund, to be used to offset costs of tire collection and transportation, and to operate programs to research new uses for old tires. The Tire Recycling Management Board is in the process of implementing a system where the Board will issue tenders seeking competitive bids to collect, transport and process scrap tires, and award contracts using funds from the Tire Recycling Fund.

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Fax: (403) 422-5120

3.3 Renewable Energy

3.3.1 Southwest Alberta Renewable Energy Initiative

The Southwest Alberta Renewable Energy Initiative (SWAREI), announced in December 1989, provides financial and technical assistance to private investors for the field testing of renewable energy projects. It is Western Canada's largest renewable energy program and Canada's largest wind energy project. The program has a \$3 million budget over three years, with funds coming from the Alberta Heritage Savings Trust Fund, and is administered by the Alberta Office of Renewable Energy Technology.

To date, a variety of projects have been funded under the SWAREI. The Dutch Valley Produce Wind Farm, currently Canada's largest wind farm with three turbines capable of generating 195 KW of electricity, has been in operation since June 1992. SWAREI funded 50 percent of the total project cost of \$209,000. The Alberta Renewable Energy Test Site at Pincher Creek, relocated from Lethbridge, provides testing services for solar and wind energy equipment manufacturers.

Other projects include development and demonstration of a 9.9 mw windfarm by the Chinook Project Inc. and the Peigan Nation (\$399,798 of the total \$17.5 million will come from SWAREI); demonstration of solar- and wind-powered water pumper to provide water for wildlife habitat near the Oldman River Dam by Canadian Agtechnology Partners (\$221,000 of \$446,000); and testing and demonstration of a wind-powered water pumper made by Maverick Wind Energy Ltd. (\$60,000 of \$132,500).

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SASKATCHEWAN

1. INTRODUCTION

Support for environmental technology development in Saskatchewan is provided through the Environmental Technology Development Program and the Science Council of Saskatchewan.

2. GENERAL ENVIRONMENTAL TECHNOLOGY SUPPORT PROGRAMS

2.1 Environmental Technology Development Program

The Environmental Technology Development Program is a \$1.5 million, five-year grant program to promote research, demonstration and prototype development of new technologies. It has an annual budget of \$300,000, with funds coming from the Environmental Protection Fund. The program is administered by Saskatchewan Economic Diversification and Trade, in cooperation with Saskatchewan Environment and Public Safety.

Grants of up to 50 percent of costs are awarded for:

- the development of innovative products and processes;
- the development and testing of prototypes; and
- field trials to monitor and protect the environment.

Eligible activities include:

- waste reduction, reuse, recycling and recovery;
- hazardous and non-hazardous waste management;
- emission reduction from industrial processes;
- water pollution control and water quality testing and treatment (drinking water management);
- municipal and industrial waste water management;
- sewage and sludge management;
- spill clean-up;
- pollution monitoring and instrumentation technology;
- air quality management;
- farm chemical management;
- resource management; and
- reduction of inputs.

To be eligible for funding, the applicants must be operating in Saskatchewan or be willing to establish in Saskatchewan. In addition, the technology product or process to be developed must be unique and proprietary in nature, and the proposed work must lead to industrial development and commercial exploitation in the province of Saskatchewan.

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2.2 Saskatchewan Research Council

The Saskatchewan Research Council (SRC) is a crown corporation established in 1947 mandated to further "the economic development and diversification of Saskatchewan by providing unique applied scientific, engineering, and technical services." The SRC carries out research under contract and provides technical services for industry and government agencies. Fees from contracts and government grants give it an operating budget of approximately \$17.5 million.

A number of divisions at the Research Council are active in environmental technology development and application. The Environment Technologies Division provides research and services in aquatic biology, water quality, applied plant ecology, climatology, atmospheric sciences, and air quality.

The Technology Services Division delivers services offered under the National Research Council's Industrial Research Assistance Program (IRAP), under a contribution agreement. The program provides financial assistance to Saskatchewan manufacturing and processing firms.

The Process Development Division conducts research into the development of new processes for the petroleum and mineral industries and for other industries that require environmental engineering research. For example, projects in 1990-91 included a scale-up and testing of a new technology at a mine site to produce value-added products from sodium sulphate and a demonstration of compressed natural gas vehicles.

A Technology Commercialization Division is being established

within the Technology Transfer and Business Development Branch to bring to the market place, and add value, to the technology developed by SRC and others.

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15 Innovation Boulevard
Saskatoon, Saskatchewan
S7N 2X8
Tel: (306) 933-5400
Fax: (306) 933-7446

3. FUNDING MECHANISMS

The Environmental Protection Fund, created in 1988, receives revenue from the refundable deposits for beverage containers not returned for recycling. Its use is designated for environmental initiatives.

MANITOBA

1. INTRODUCTION

Environmental protection initiatives in the Province of Manitoba are implemented through a strategic plan under the authority of the Waste Reduction and Prevention (WRAP) Act of August 1990. The WRAP Act created a consultative process with producers and consumers of potential waste products or materials, to achieve the provincial goal of a 50 percent reduction in municipal solid waste by the year 2000. Technology development support is provided through the Environmental Innovations Fund component of the WRAP program. The Fund's revenue comes from the Environmental Protection Tax.

2. GENERAL ENVIRONMENTAL TECHNOLOGY SUPPORT

2.1 Environmental Industrial Development Initiative

The Environmental Industrial Development Initiative, administered by Industry, Trade and Tourism, is designed to assist the commercial development of businesses which preserve, protect or enhance the environment. The Environmental Industrial Development Initiative was started in the autumn of 1991 with a budget of \$1 million, over five years. It is funded through the Environmental Innovations Fund. The program targets individuals, businesses, industry associations, other organizations pursuing commercial market opportunities for environmental products and services to be located in Manitoba.

Projects eligible for funding include the following:

- feasibility studies;
- new products, processes, and technologies;
- financial analysis;
- economic analysis;
- independent consulting studies;
- market research;
- technological or engineering appraisals;
- business plans; and
- directed exploratory missions

Grants will cover up to fifty percent of eligible costs, with a maximum contribution of \$25,000. Applicants will have private and exclusive use of the results for one year, after which the Department of Industry, Trade and Tourism has the right to share the results with other interested parties if the applicant is not implementing the findings.

Sixteen projects were approved for 1992, including a

feasibility study into the viability of establishing an environmental service/contracting business in Manitoba (\$10,000), a feasibility study for alternative uses for the fraction (approx. 25%) of scrap cars which are currently being landfilled, and the preparation of a business plan for a spin-off company of Atomic Energy of Canada to perform a technology transfer function (\$25,000).

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Environmental Industries Development Initiative
Industrial Technology Branch
Industry, Trade and Tourism
500-155 Carlton St.
Winnipeg, Manitoba
R3C 3H8
Tel: (204) 945-7938
Fax: (204) 945-1354

3. TARGETED PROGRAMS

3.1 Industrial Waste Reduction, Reuse, and Recycling

3.1.1 Waste Minimization Initiative

The Waste Minimization Initiative of Environmental Innovation Fund, administered by Manitoba Environment, has the following objectives:

- to promote the development of new waste minimization programs within the public and private sector;
- to promote public education and information about waste minimization;
- to promote community involvement; and
- to promote environmental industries which contributing to waste minimization;

The budget for the Waste Minimization Initiative for 1990-91 is \$700,000. In 1990/91, over 30 projects were funded under the Waste Minimization Initiative, including pilot multi-material collection and recycling projects, a feasibility study of tin can recycling in Winnipeg (\$2,000), construction and operation of a unique dry anaerobic digester to demonstrate anaerobic composting of urban wastes in Portage la Prairie (\$38,000), a toll-free recycling information line at the Recycling Council of Manitoba (\$30,000), and support for the Association for Clean Rural Environment, a non-profit provincial corporation that is responsible for collecting and dealing with agricultural chemical containers in rural Manitoba (\$25,000).

Contact: Karen Warren
Planning and Innovation Division

Manitoba Environment
Building 3 139 Tuxedo Ave.
Winnipeg, Manitoba
R3N 0H6
Tel: 945-3554

3.1.2 Manitoba Hazardous Waste Management Corporation

The Manitoba Hazardous Waste Management Corporation offers a Generator Services Program which includes free consultation and technical advice services on industrial hazardous waste reduction, reuse, recycling and recovery, analytical services and assistance with waste exchanges.

Contact: Manitoba Hazardous Waste Management Corporation
226 - 530 Century St.
Winnipeg, Manitoba
R3H 0Y4
Tel: 945-1844

4. FUNDING MECHANISMS

Environmental Protection Taxes

The Environmental Protection Tax is a "green tax" on several consumer items. The 1989 Provincial Budget introduced a levy of \$.05 on non-deposit liquor bottles, which was increased to \$.10 as of August 1, 1992. This tax on liquor bottles is expected to generate \$1.8 million per year, of which \$1.2 million will go into the EIF. \$600,000 will go to the Department of the Environment for the beverage container recycling program.

The Environmental Protection Tax was also expanded to include sales tax on disposable diapers. The 7 percent provincial sales tax had not previously been applied, as disposable diapers were considered children's clothing. This measure is expected to generate a revenue of \$1.5 million.

The third environmental tax is an additional \$3 added to the purchase price of new tires. This tax is to be phased out by August 1, 1993, and followed up by a more directed measure legislated through the WRAP Act. The tire tax, which is estimated to generate \$3 million in revenue, will go into general government revenues.

Although funds raised through the Environmental Protection Tax are discretionary and are not linked formally to implementing any particular program or project, the government has expressed a commitment to use the revenues for environmental protection or sustainable development projects through the Environmental Innovations Fund.

ONTARIO

1. INTRODUCTION

In June 1992, the government released its industrial strategy paper, An Industrial Policy Framework for Ontario, which emphasized the "importance of environmental issues in economic development" (p.ii). The framework committed the government to promote the development of a strong environmental industries sector and the greening of existing industries through a Green Industry Strategy. Major environmental technology support and energy efficiency programs are provided by the Ministry of the Environment and Energy. In addition, some of the programs operated by the Ministry of Economic Development and Trade include environmental components.

2. GENERAL ENVIRONMENTAL TECHNOLOGY SUPPORT PROGRAMS

2.1 Environmental Technology Support Programs

Two major programs are operated by the Research and Technology Branch of the Ministry of the Environment and Energy, the Environmental Research Program and the Environmental Technology Program.

2.1.1 Environmental Research Program

The Environmental Research Program, established in 1977, supports research projects at universities, private laboratories and public agencies in the following areas:

- air quality;
- water quality;
- liquid and solid waste;
- analytical methods and instrument development;
- environmental socio-economics; and
- multimedia contaminants and biotechnology.

Each year the Research Advisory Committee identifies the Ministry's long-term research priorities which are then published, and researchers are invited to submit applications for grant funding. Grants are awarded on the basis of scientific merit, competence of the researcher, compatibility with the Ministry's needs and priorities, cost relative to anticipated benefits, and the potential for implementation of the results.

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2.1.2 Environmental Technologies Program

The Environmental Technologies Program is designed to support research and development of innovative environmental protection technologies. It was launched in March 1990 with a budget of \$30 million over five years. The program funds both research and experimental development leading to the commercialization of products or processes, including equipment-prototype development and testing, field trials and technical demonstrations, and the initial demonstration of existing technologies used outside Canada to determine their suitability to Ontario conditions. The program focuses on the latter stages of technological innovation - the development, refinement and commercialization of the product or process - in order to stimulate development of internationally competitive technology that can be marketed by Ontario firms.

Projects developed through the Environmental Technologies Program include undertakings in areas of:

- tire recycling;
- 3Rs technologies;
- waste management;
- analytical instrumentation;
- air pollution control;
- water and sewage; and
- socio-economic analysis.

Preference is given to technologies that prevent or reduce pollution at the source, rather than at the end of the pipe or stack.

The Environmental Technologies Program has recently been refocussed and has been renamed the Applied Pollution Prevention Program.

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Fax: (416) 323-4437

2.1.3 Environmental Business Development Unit

In the fall of 1992, the Ontario Ministry of the Environment established an Environmental Business Development Unit (EBDU). This unit is similar to the one set up within Ontario Hydro in winter 1991-92 in response to the Premier's Green Industry Strategy, calling for the development of environmental industries and the greening of industries.

The EBDU is a 3-person unit with an advisory board, that reports to the head of the Research and Technology Branch of the Ministry of the Environment. One member is from Industry, Trade and Technology, and looks after financial details. The EBDU is not a funding program. Its purpose is to facilitate environmental industries and the greening of industry by developing and sharing information on technology, providing business support, assisting in technology transfer and application, facilitating financial assistance, and fostering Ontario and international market development.

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David Reid, Manager
Environmental Business Development Unit
Tel: (416) 323-4219

2.1.4 Green Industries Unit

A Green Industries Unit was operated by the Ontario Ministry of Energy. Its relationship to the EBU in the amalgamation of the Ministries of the Environment and of Energy is still unclear.

2.2 General Industrial Research and Development Programs with Environmental Components

2.2.1 Innovation Ontario

Innovation Ontario is a provincial crown corporation associated with the Ministry of Industry, Trade and Technology, gives financial assistance to young, technology-based businesses. The assistance is in the form of equity investments, which is divested when the firms can attract private sector investment sufficient to ensure sustained growth and profitability. The crown

corporation has invested in a wide range of technologies, including energy and environmental technologies.

To be eligible for investment, a firm must reside in Ontario and offer an innovative technology-based product or service. Investment decisions are based on considerations similar to those of private sector venture capitalists, but with added flexibility appropriate to the phase of development demonstrated by each individual client. These considerations include the technical and commercial viability of the product or service, the financial position of the firm, the quality of the management team, and the divestment viability.

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Toronto, Ontario
M7A 2E7
Tel: (416)-326-1088
Fax: (416)-326-1109

2.2.2 The Ontario Technology Fund

The Ontario Technology Fund, administered by the Ministry of Industry, Trade and Technology, seeks to encourage greater collaboration and cooperation between industry, labour, universities and government in scientific areas strategically important to Ontario, increasing the development and export of advanced, high-value products and services, and fostering the development of highly skilled researchers and technicians. One of its components is the Centres of Excellence Program, through which seven research centres in Ontario receive funding, including the Waterloo Centre of Groundwater Research (see below).

The fund with a budget of \$81 million also includes: an Industry Research Program; a Technical Personnel Program; a University Research Incentive Program; Centres of Entrepreneurship; Technology Adjustment Research Program; the Radarsat program; International Research and Development Agreements; and the Research and Development Super Allowance (tax expenditure). None of these have specific environmental criteria. However, environmental projects are eligible for funding under these programs.

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56 Wellesley St. West, 15th Floor
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Tel: (416) 314-8208

Fax: (416) 314-8224

2.3 Research Councils and Centres

2.3.1 ORTECH International

ORTECH International is a private, non-profit research corporation that provides technical services on a contract basis to private and public sector organizations. Founded in 1928 by the Ontario government and the Canadian Manufacturers' Association as the Ontario Research Foundation, ORTECH was incorporated in 1944. It is associated with the Ontario Ministry of Industry, Trade and Technology, which provides 13 percent of ORTECH's \$25 million operating budget. ORTECH generates more than 75% of its professional service revenue through industrial contracts.

ORTECH provides its clients services in product and process design and development, problem-solving, analysis, testing and evaluation. The portfolio of technical services provided emphasize environmental, energy, waste management, materials and transportation technologies. Technologies developed at ORTECH are proprietary in the sense that ownership of the technology remains in the hands of the sponsoring company.

ORTECH also operates the Ontario Waste Exchange. In 1991, the exchange of more than 70,000 tonnes of waste was arranged.

Contact: ORTECH International
2395 Speakman Dr.
Mississauga, Ontario
L5K 1B3
Phone: (416) 822-4111 ext. 378
Fax: (416) 823-1446

2.3.2 Waterloo Centre for Groundwater Research

There are seven Centres of Excellence receiving funding through the Ontario Technology Fund. The Waterloo Centre for Groundwater Research carries out advanced research in groundwater as a cooperative venture between the University of Waterloo and industry. The Centre was incorporated in 1987 as a not-for-profit corporation, and is managed separately from the university. Research undertaken at the Centre is in the following areas:

- remediation of contaminated groundwater;
- behaviour of organic contaminated groundwater;
- evaluation and development of groundwater resources;
- groundwater protection;
- hydrological aspects of water disposal; and
- mine-environment research.

For 1991-92, the total research budget was \$7.1 million.

The Centre maintains a close association with industry, through the sponsorship of research by national and multi-national companies in the chemical, manufacturing, petroleum and mining sectors, short courses at the Centre which provide companies with the use of the Centre's facilities, and through the marketing of instruments developed at the Centre.

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University of Waterloo
200 University Avenue West
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N2L 3G1
Tel: (519) 885-1211 ext. 2892
Fax: (519) 884-4654

Dr. R. Thomas, Director
Tel: (519) 888-4658
Fax: (519) 725-8720

3. TARGETED PROGRAMS

3.1 Pollution Prevention

The Ontario Ministry of the Environment has recently indicated its intention to rename the Environmental Technologies Program the Applied Pollution Prevention Program. The program is to be refocused from pollution control technologies to pollution prevention.

A Pollution Prevention Office was established within the Ministry of the Environment in April 1992. Its mandate includes:

- policy development for the Ministry's strategy for preventing pollution;
- coordination of specific pollution prevention initiatives
- integration of pollution prevention into all Ministry activities; and
- outreach to encourage responsible and concerned individuals and organizations to make pollution prevention a means of achieving their priorities.

A Pollution Prevention Pledge Program was announced in October 1992. This award program is intended to encourage companies to adopt pollution prevention approaches to the reduction of persistent toxic chemical use and to publicize success stories.

3.2 Industrial Waste Diversion

3.2.1 Industrial Waste Diversion Program

The Industrial Waste Diversion Program is an on-going initiative of the Ministry of the Environment, as part of the province's goal of a reduction in solid waste by at least 25 percent by 1992 and 50 percent by 2000. The current (1992-93) annual budget is \$7 million. The program provides funding to private sector industries, commercial operations and institutions for projects designed to divert hazardous and non-hazardous industrial wastes from disposal through reduction, reuse and recycling.

Projects eligible for funding include:

- new facilities/processes for the reduction, reuse and recycling of industrial, commercial and institutional wastes;
- modifications to existing processes, equipment or operations to divert significant quantities of waste from disposal; and
- demonstrations of technology and pilot/research projects aimed at implementing new waste diversion methods, including process of equipment evaluations.

The Industrial Waste Diversion Program will not fund projects that are not designed to divert waste from land disposal and incineration, including:

- waste treatment or waste conversion with little or no diversion;
- capital or research funding that would normally be part of a municipal recycling project eligible under other programs;
- market/product/economic feasibility studies for specific firms;
- work related to identifying diversion projects and the preparation of associated business plans;
- product development, product market development, or the manufacturing of a specific consumer product; and
- projects directly involved with combustion/energy-from-waste initiatives

Normal funding levels for proposals are 25 percent (maximum 50%) for capital costs of eligible equipment, and 50 percent (maximum 100%) for research and demonstration projects. The technology or process must be innovative and must exhibit the potential for commercial application. Applications are evaluated, and size of grants considered according to the 3Rs hierarchy of waste reduction, reuse, recycle.

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Industrial 3R's Funding Unit
Waste Management Branch
Ministry of the Environment
2 St. Clair Avenue West, 14th Floor

Toronto, Ontario
M4V 1L5
Tel: (416) 323-5182

3.2.2 Ontario Waste Management Corporation

The Ontario Waste Management Corporation's Direct Assistance Program provides technical assistance, waste reduction audit assistance, program development assistance and market development assistance for large generators of hazardous wastes. The OWMC also runs waste minimization workshops, and provides financial assistance to the Ontario Waste Exchange.

Contact: Ontario Waste Management Corporation
11th Floor
2 Bloor St. W.
Toronto, Ontario
M4W 3E2
Tel: (416)-923-2918
Fax: (416)-923 7521

3.3 Tire Recycling Technologies

3.3.1 Ontario Scrap Tire Program

In Ontario, 8.25 million scrap tires are discarded annually, nearly half of which are exported and burned in the U.S., and the rest dumped in landfills. Since June 1989, the government has imposed a \$5 tax on each new tire sold in the province. In March 1990, the Ministry of the Environment announced the Ontario Scrap Tire Program, with a \$16 million budget. The program has the following components:

1) **Technology Research and Development** - private sector research and development of new technologies, products, and processes using materials from scrap tires are funded through the Environmental Technologies Program operated by the Ministry of the Environment and Energy's Research and Technology Branch.

2) **Technology Implementation** - the Industrial Waste Diversion Program operated by the Waste Management Branch of the Ministry funds projects for: the development and implementation of used tire processing and recycling technologies; the collection, handling, sorting of used tires; and the utilization of recycled tires through demonstration of rubberized asphalt projects.

Grants have been given for approximately 22 projects, many of which cover costs for capital equipment. Projects funded under the grant

components of the program include: the design, development, testing and demonstration of a transportable tire shredder; the development of recreational surfaces made from crumb rubber; research on the application of microwave heat to compound rubber crumb and plastic powder; the development of crack sealants and waterproofing membranes; and the use of crumb rubber as a soil amendment.

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3.4 Energy Efficiency and Alternative Energy

3.4.1 EnerSearch

EnerSearch is the Ontario government's only program in support of energy-related R&D. The multi-year grant program was created in 1986 to help industries become more competitive by increasing energy efficiency, and to provide new energy-related business opportunities in Ontario. The program provides funding to companies and professional organizations residing in, and operating in Ontario, for research, development, testing and the initial demonstration of innovative energy-related technologies. Projects must involve some level of technical innovation and technical risk.

The program supports activities that seek to reduce energy demand through the application of innovative technology to achieve the efficient utilization of existing energy-related sources, develop innovative technologies to gain additional supplies from alternative and renewable energy sources, and to encourage the replication and use of new energy processes and innovative technologies among potential users.

Criteria for funding include the following:

- energy benefits to Ontario;
- technological innovation;
- level of technical risk;
- energy impact; and
- project payback and investment potential

EnerSearch will fund up to 50 percent of total project costs, for a maximum of \$500,000. Since January 1986, more than 100 projects have been funded under the program, amounting to total EnerSearch contributions of \$16 million. The EnerSearch working

budget for fiscal year 1992-93 is \$2.9 million.

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EnerSearch Program Officer
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Ministry of Energy
56 Wellesley St. West
Toronto, Ontario
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Tel: (416) 327-1255
Fax: (416) 327-1514
Outside Toronto: 1-800-ENERGY1

3.4.2 Industrial Energy Services Program

The Industrial Energy Services Program provides free comprehensive site energy audits of equipment and processes. Feasibility analysis grants and engineering grants are also available to assist in the provision of technical and economic information required to determine implementation plans for audit recommendations. The program's total budget for 1992/93 was \$2.4 million.

3.4.3 Industrial Process Equipment Demonstration Program

The Industrial Process Equipment Demonstration Program shares the cost of initial demonstrations to prove the performance, energy impact, and other benefits of energy efficient technologies in new process applications and to encourage their adoption by other companies. The program will provide up to 30% of eligible project costs. For projects involving only monitoring and information transfer, 75% of eligible costs may be covered up to a maximum of \$50,000.

3.4.4 Market Entry of Energy-Efficient Technology Program

The Market Entry of Energy-Efficient Technology Program awards incentive grants to reduce the risk to first-time industrial buyers of new energy efficiency products. Grants to cover 50% of the buyer's eligible costs, up to \$500,000 are available.

3.4.5 Industrial Retrofits Grants Program

The Industrial Retrofits Grants Program provides grants to apply engineered systems that improve the energy efficiency of processes and equipment. The program provides capital grants up to the lesser amount of 30% of total project costs; or \$300,000; or the amount necessary to reduce the simple project payback period to

1.5 years.

The total budget for these five programs was \$11.9 million for 1992/93.

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Fax: (416)-327-1514

3.5 Accelerated Capital Cost Allowance For Pollution Control Equipment

In its 1992 budget Ontario removed the limitation of the Accelerated Capital Cost Allowance to pre-1974 plants. All plants installing new pollution control equipment in Ontario are now eligible for the allowance.

4. FUNDING MECHANISMS

Unlike many of the other provinces, Ontario's environmental levies are not earmarked for any specific environmental initiatives, but go into the general government treasury. These funds are substantial: \$30 million annually from the \$5 tire tax; \$25 million from the 10 percent levy on liquor bottles; and \$30 million from the tax on beer cans (\$1.00 per dozen).

In addition, since July 1989, new fuel inefficient passenger cars (i.e. those with highway fuel consumption ratings of 9.5 litres or more per 100 km) have been subject to a tax payable on purchase of at least \$600 and possibly as high as \$3,500. (Where the rating is 9.5 to 12, the tax is \$600; where the rating is 12.1 to 15, the tax is \$1,200, for ratings from 15.1 to 18, the tax is \$2,200, and the tax is \$3,500 for ratings over 18.) The tax is rebated for cars converted to natural gas or propane use within 180 days of purchase but only if the conversion is to a single-use alternative fuel.

QUEBEC

1. INTRODUCTION

Quebec has a variety of technological development assistance programs and fiscal measures to foster research and development, some of which are targeted specifically at environmental technologies. The Quebec government has also committed significant resources to the problem of hazardous wastes, and jointly with the federal government, for the clean-up of the St. Lawrence River through the St. Lawrence River Action Plan of the Green Plan.

2. GENERAL ENVIRONMENTAL TECHNOLOGY SUPPORT PROGRAMS

2.1 Le Fonds de Recherche et de Développement Technologique en Environnement

Le fonds de recherche et de développement technologique en environnement is a grant program administered by the Ministère de l'Environnement designed to support the development of new processes, products, techniques and technologies that protect the environment, and to encourage the emergence of an environmental industries sector. The program, started in 1991, has a \$50 million budget over five years. Research institutes, the private sector, and community groups are eligible for funding. Two types of projects are funded: exploratory research which could be funded up to 100 percent of total project costs; and development of innovative environmental technology projects which are granted 60 to 70 percent of total costs.

Proposals will be judged according to their relevance to three priority themes identified by the Ministry:

- waste management;
- pollution control and restoration; and
- sustainable development.

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Direction de la recherche et des technologies
environnementales
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3^e étage, bureau 03-02
Sainte-Foy (Québec)
G1V 4H2
Téléphone: (418) 643-2073
Télécopieur: (418) 646-9262

3. TARGETED PROGRAMS

3.1 Waste Management

Recyc-Québec is a crown corporation created in 1990 to manage the province's reduce, recover, reuse, and recycle initiatives. Part of its mandate is to research, develop and maintain markets for recycled materials and products. Recyc-Québec is also responsible for operating recycling and collection systems.

Contact: Recyc-Québec
14, place du Commerce, bureau 350
île-des-Soeurs (Québec)
H3E 1T5
Téléphone: (514) 762-3333

NEW BRUNSWICK

1. INTRODUCTION

New Brunswick supports environmental initiatives by the private sector, community groups and government departments and municipalities through the Environmental Trust Fund. There are no programs specifically targeted towards environmental industries or environmental technology development. However, environmental industries are eligible for financial assistance under business development programs administered by the Department of Economic Development. The Canada/New Brunswick Cooperation Agreements, for Economic Development, and for Economic Diversification, have "environmental soundness" as one of the criteria for project funding.

1.2 The Environmental Trust Fund

The Environmental Trust Fund was established as a special fund in June 1990 for the purposes of covering costs incurred for environmental protection and restoration, the conservation of and sustainable use of natural resources, and education on environmental issues.

The Fund receives its revenue from two sources:

- 1) the first \$10 million of net profits from video gaming devices; and
- 2) the environmental levy imposed on beverage containers.

New Brunswick has a deposit-refund scheme on beverage containers. As of June 1991, all distributors are required to use only those beverage containers that they are able to refill or recycle. The deposit for all containers of 500 ml or less is ten cents, for each container or more than 500 ml, the deposit equals twenty cents, and for refillable beer containers, the deposit is one dollar for twelve containers. Refunds equal fifty percent of the amount of the deposit paid on the container.

The difference in the deposit and the refund on the recyclable containers is designated the "environmental fee". Distributors are allowed to keep fifty percent of the environmental fee and any unclaimed deposits on beverage containers to offset the costs of managing their containers, while the other fifty percent will go to the Environmental Trust Fund.

For 1991-1992, the projected revenue from environmental levies is \$3 million, bringing the total funds to \$13 million. Other sources of revenue include contributions from the private sector and donations from individuals.

Community organizations, firms, individuals and government departments are eligible to receive assistance from the Environmental Trust Fund. The Fund also contributes the province's share for projects under the Green Plan and for other joint agreements with the federal government.

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PRINCE EDWARD ISLAND

1. INTRODUCTION

Prince Edward Island gives funding support for sustainable development mainly through three joint programs with the federal government. These are the Cooperations Agreements on Strategic Technology Development, on Industrial Development, and for Sustainable Economic Development. Community groups are given financial assistance under the Waste Reduction Strategy. The province also imposes environmental taxes on two hard-to-dispose materials - used tires and lead-acid batteries.

2. GENERAL ENVIRONMENTAL TECHNOLOGY SUPPORT PROGRAMS

2.1 Canada/Prince Edward Island Cooperation Agreement for Sustainable Economic Development

The Canada/Prince Edward Island Cooperation Agreement for Sustainable Economic Development which became effective April 1992, is a \$9.4 million joint agreement between Canada and Prince Edward Island to further the economic development of the province in a manner that is environmentally sustainable. The Canadian government's contribution is \$6.6 million and the provincial share is \$2.8 million.

The program has three main components:

- 1) Recreational Fisheries Development/Watershed Improvement - for habitat and fisheries improvement.
- 2) Industrial Water Quality and Quantity Development - to assist the development of water supply, water resources and treatment for industrial use.
- 3) Environmental Economy Development - to support the demonstration of the economic potential of resource-based business opportunities.

3. TARGETED PROGRAMS

3.1 Waste Management

3.1.1 Waste Reduction Strategy

One component of Prince Edward Island's Waste Reduction Strategy provides "seed money" to community groups, municipalities, businesses and individuals for projects implementing innovative waste reduction programs. The program was launched in November 1990, and its operating budget for 1992-93 is \$20,000. The maximum

amount awarded per project is \$3,000.

4. FUNDING MECHANISMS

Since April 1991, the government has imposed a \$2 tax on the purchase of all new tires. This tax is estimated to generate \$160,000 in revenue per year. The funds go into general government revenue, and there is no system in place to dispose of used tires.

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NOVA SCOTIA

1. INTRODUCTION

Support for environmental technology development in Nova Scotia is provided principally through the Canada/Nova Scotia Cooperation Agreement on Sustainable Economic Development. The Nova Scotia government also operates a modest Energy Efficiency and Diversity Program.

2. GENERAL ENVIRONMENTAL TECHNOLOGY SUPPORT PROGRAMS

2.1 Canada/Nova Scotia Cooperation Agreement on Sustainable Economic Development

The Canada/Nova Scotia Cooperation Agreement on Sustainable Economic Development, signed in March 1991, is a five-year, \$15 million agreement designed to foster environmental initiatives and research and development of new environmental technologies. The program is cost-shared 60-40 between the federal and provincial governments.

The agreement consists of four programs:

- 1) The Environmental Assistance Program has \$5.8 million in funds to assist small to medium-sized firms or industry associations in the secondary manufacturing, primary resource, and fishing sectors.
- 2) The \$2.35 million Centres of Excellence Program, is designed to foster academic-industry partnerships.
- 3) The Demonstration Projects Program provides grants to businesses of any size, institutions, government and individuals for the demonstration of environmental processes, products or technologies.
- 4) The remainder of the funds are allocated for Program Development and Implementation.

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3. TARGETED PROGRAMS

3.1 Energy Efficiency and Diversity Program

The Energy Efficiency and Diversity Program is designed to

encourage Nova Scotians to reduce the energy use of conventional fuels in the province. The program has an annual budget of \$120,000 to cost share energy efficiency, energy conservation and alternative energy projects with the private sector and other levels of government. Projects eligible for funding include technology and information transfer, applied research and development, and planning and feasibility studies within the industrial, commercial, institutional, residential and transportation sectors.

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4. FUNDING MECHANISMS

Nova Scotia has established an Environmental Trust Fund to finance environmental projects. The Fund receives its revenue through private donations.

NEWFOUNDLAND

1. INTRODUCTION

Newfoundland is currently in the process of forming an environmental strategy. The Round Table on the Environment will produce its report in early 1994. Financial assistance for environmental initiatives is available through the Newfoundland-Canada Cooperation Agreements. At present, however, there are no provincial financial assistance programs to community groups or to industry. New businesses that provide environmental services or products may apply for loans from Enterprise Newfoundland and Labrador. However, the objective of this department is to provide loans for business start-up, and has no environmental criteria.

2. CANADA/NEWFOUNDLAND COOPERATION AGREEMENTS

The Ocean Industry Subsidiary Agreement, a five-year program which expires March 31, 1993, provides up to 75 percent of costs for projects which contribute to the marine industry. Priority is given to the development or adoption of new technologies. The cost is shared 70/30 between the federal and the provincial governments.

Another five-year, cost-shared federal-provincial agreement, the Strategic Investment and Industry Development Cooperation Agreement, was announced in fall 1992 with a budget of \$32 million.

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3. TARGETED PROGRAMS

3.1 Biomass Energy Project

The Biomass Energy program has been in place in Newfoundland for over ten years, administered through the Department of Mines and Energy. Initially, grants were provided to institutions and industries to construct or install woodchip furnaces and turbines, under the federal-provincial Conservation and Renewable Energy Demonstration Agreement (1979-85), the National Energy Audit Agreement (1982-84), and the Memorandum of Understanding on Energy Efficiency (1986-89).

In the late 1980s, the province was able to provide grants of 20 percent of the cost, but at present, no funding is available due to budgetary restraints. The department does, however, continue to provide information and technical services. Under this program, hospitals in Cornerbrook, Gander, and Grand Falls, asphalt plants, and many paper mills, use sawmill waste for heat and steam for their processes. In 1989 Newfoundland Hydro completed its power plant in Roddickton, which uses 50,000 tonnes of wood waste per year to generate electricity. Some smaller-scale projects utilize peat or bog for energy.

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YUKON TERRITORY

1. INTRODUCTION

The Yukon government's environmental initiatives focus on conserving and developing the territory's natural resources. Programs operate under the Federal-Territorial Cooperation Agreement and seek to integrate environmental and economic concerns and diversify the Yukon's resource-based economy.

2. CANADA/YUKON ECONOMIC DEVELOPMENT AGREEMENT

The Canada/Yukon Economic Development Agreement is a five-year, \$37 million agreement intended to stimulate the economic diversification of the Yukon Territory. There are three specific agreements: Small Business Support; Forestry; and Renewable Resources Cooperation. The programs will be administered on a 70/30 cost-shared basis between the federal and territorial governments.

The Renewable Resources Sub-agreement provides \$9 million to support the growth and diversification of resource-based businesses and enterprises. Activities eligible for funding include technology transfer, pilot and demonstration projects, environmental mitigation initiatives, the establishment of environmental businesses, and feasibility and market studies.

Eligible applicants are individuals, private sector businesses, development corporations, Yukon First Nations, community groups and organizations, and all government departments and agencies. The program will fund up to 100 percent of eligible project costs.

3. YUKON CONSERVATION STRATEGY CONSERVATION PROGRAM FUND

The Yukon Conservation Strategy Demonstration Program Fund was established in 1989 as part of the Yukon Conservation Strategy. The program seeks to demonstrate sound conservation practices in connection with development projects by providing financial assistance to projects that show or encourage conservation. The fund has an annual budget of \$100,000, and is open to all non-profit organizations, businesses, municipalities, government agencies and Indian bands. Projects funded under this program have included recycling, composting, alternative energy, and educational projects. This program is being replaced by an Environment Fund of \$2 million from which interest will be allocated for sustainable development/environmental protection projects beginning in 1995.

NORTHWEST TERRITORIES

There was little information provided on the environmental policies of the government of the Northwest Territories. The government of the Northwest Territories signed a Framework Agreement with the federal government in February 1991, which consisted of three Cooperation Agreements: a five-year, \$38.5 million Economic Development Cooperation Agreement; a \$2,714,000 forestry agreement; and another with Industry, Science and Technology Canada. The programs are cost-shared 70-30 by the federal and territorial governments.