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**ENVIRONMENTAL INDUSTRY STRATEGY
FOR CANADA**

CONSULTATION PAPER

Industry Canada

Environment Canada

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MESSAGE FROM THE MINISTERS

The Government of Canada recognizes the importance of a world-class environmental industry that can offer Canada new business opportunities, high value-added exports and new jobs while directly tackling environmental challenges. It is committed to aggressively promoting the sector. An effective sustainable development policy which fully integrates the resolution of environmental concerns with sound economic goals depends upon a dynamic domestic environmental industry.

Strengthening the environmental industry requires a public-private sector partnership and the involvement of all federal and provincial departments and agencies that have a role in the promotion of this industry. In order to ensure that the Canadian Environmental Industry Strategy responds to the needs and priorities of the industry, the federal government, under the leadership of Industry Canada and Environment Canada, has initiated a consultation process on future directions. This discussion paper forms the basis for that consultation.

We are seeking your views to ensure that the government provides effective and efficient support to the industry in a fiscally responsible manner.

John Manley
Minister of Industry Canada

Sheila Copps
Minister of Environment Canada

THE GOVERNMENT'S OBJECTIVES

"The environmental sector offers one of the greatest opportunities for technological innovation that the world has ever seen. Canada needs a guiding vision to develop our 'green' industries."

The Right Honourable Jean Chrétien

Environmental technologies present Canada with both opportunities and challenges. Although Canada has a global reputation as an environmental leader, little has been done to benefit economically from this reputation. Canada remains a net importer of environmental equipment, with only a modest number of companies involved in the export market.

The Environmental Industry Initiative was announced by Prime Minister Chrétien during the election campaign. *"If Canada simply maintains the status quo, we will be left behind by other industrial nations such as Japan and Germany who are moving aggressively to capture this market."* In addition, he has stated that the government *"will unite with business, environmentalists and scientists to create a world-class environmental industry."* Key proposals have been made in the Environmental Industry Initiative to:

- ▶ support strategic environmental product standards, policies and programs;
- ▶ direct 25% of new R&D funding towards environmental technologies;
- ▶ increase access to capital for small and medium-sized enterprises;
- ▶ provide leadership in resolving environmental liability issues;
- ▶ consolidate federal programs into a coordinated strategy to strengthen the environmental industry;
- ▶ make the National Environmental Technology Advancement Centres cornerstones of this environmental strategy;
- ▶ support environmental industry development through procurement policies;
- ▶ provide opportunities through export and development assistance programs;
- ▶ support development of strong environmental industry associations; and
- ▶ support diversification of other high-tech industries into the environmental sector.

With the government's objectives in mind, the purpose of this Consultation Paper is to further our collective understanding of what needs to be done by both the public and private sectors to substantially increase Canada's share of the domestic and international environmental industry markets.

INTRODUCTION

A high quality environment and a strong, internationally competitive environmental industry are priorities for action by the federal government. The objectives are complementary and mutually supportive. To achieve a high quality environment there is a need, across all sectors of the economy, for production technologies, products and services which are less harmful to our ecosystems. The development and use of environmentally sound technologies create jobs and economic growth in an environmentally sustainable manner. An effective partnership amongst governments, business, scientists, environmentalists and the public is essential to attaining our goal.

Context

The rapidly expanding world market for environmental technologies presents a major growth opportunity for Canadian companies. However, the domestic industry and market are small by world standards and we face major competitors especially from the USA, Germany and Japan. Canadian firms must deal with several basic realities:

- ▶ The market is intensely and increasingly competitive. There is no global market per se, but rather it is highly fragmented into industrial sub-sectors and into national, regional and local marketplaces.
- ▶ The environmental industry is dependent upon the development, acquisition, adaptation and integration of new and existing technologies. Generating ideas and financing and managing their development and commercialization is an on-going and risky business requiring

highly skilled people from the laboratory bench to the executive suite.

- ▶ The influence of government policies and programs is pervasive. Environmental regulations and their enforcement is a major factor in shaping both the markets and the technology demanded both at home and abroad. As well, a large share of the market is accounted for by direct government procurement.

The Canadian environmental industry is technology intensive. Research and development play a vital role in defining the competitiveness of individual firms and the national industry as a whole. However, the cost of moving an environmental product from the conceptual stage to the market is often very high. Progress is risky in both the technological sense (the idea may not work) and the economic sense (the product may not sell) in a world of changing environmental regulations and competing technologies. In addition, there are concerns about the legal liabilities associated with producing and financing the production of environmental products, processes and services.

This Consultation Paper examines the key issues associated with the market, environmental technology, financing and human resources. These themes are interrelated and are of prime importance to individual companies in the sector and are vital to the health of the environmental industry as a whole. The nurturing and growing of small and medium-sized enterprises is particularly important. In seizing the opportunities for profitable growth, it is essential to think in terms of partnerships amongst businesses,

universities, professional associations and all levels of governments. By acting together in a coherent, comprehensive and strategic manner we can create a world-class environmental industry.

DEFINITION OF THE INDUSTRY

The definition of the "environmental industry" is evolving. It is intrinsically diverse, touching upon activities throughout the economy, and is a relatively new field of study for both market analysts and government policy-makers. Traditionally, the environmental industry has referred to water and wastewater treatment, the handling of solid and hazardous wastes and air pollution controls. Over the past decade, it has come to encompass the concept of sustainable development, the management and conservation of resources, and the reengineering of industrial processes to improve their efficiency and to reduce the production of pollutants.

For the purposes of this Consultation Paper, "environmental industry" refers to the technologies and the processes, products and services which:

- ▶ **monitor and assess** the nature and pathways of pollutants and waste streams. Sophisticated measuring technologies, for example, are vital components of the feedback loops needed for cleaner and more efficient industrial processes.
- ▶ **prevent pollution** by minimizing or eliminating solid, liquid and gaseous wastes through process reengineering. These "green technologies" are increasingly being chosen by industry to meet their twin objectives of improving productivity and reducing regulatory

compliance costs. Reducing, reusing and recycling are part of this approach.

- ▶ **control pollution**, usually in response to environmental laws and regulations and often through a single-medium approach with an end-of-pipe solution. In some cases the control of pollution is the only cost effective approach.
- ▶ **clean-up and restore** the environment which has been degraded by neglect, by accident or by unsound waste storage and disposal practices, especially concerning toxic, hazardous and nuclear materials.

THE INDUSTRY

The environmental industry, as an area of focused policy attention, is less than a decade old. With an evolving definition of the sector, the national and international statistics for the industry and its markets are underdeveloped.

The environmental industry, both internationally and in Canada, is highly diverse in markets and technologies. Barriers to entry to some segments of the domestic industry, especially services, are quite low. There are approximately 4,500 firms employing about 150,000 people in Canada and generating roughly \$11 billion in annual sales. About two-thirds of the companies are service firms with revenues of approximately \$5 billion while one-third are in manufacturing with yearly sales around \$6 billion.

Participants in the industry range from one person consultancies to large corporations. However, the Canadian environmental industry is overwhelmingly comprised of

small and medium-sized enterprises (SMEs), many of which are new, with only a half-dozen or so firms employing more than 200 people. It is estimated that some 15-20% of Canadian companies either export or are export-ready. Over 50% of the existing industry is concentrated in Southern Ontario with active clusters located in Quebec and throughout Western Canada.

Unlike most markets where demand arises directly from consumer preferences, the demand for environmental products, process technologies and services is greatly influenced by current and anticipated governmental policies, regulations and procurement. A growing environmental awareness by business and an increasing desire by the public for "green products" from "green industries" also adds to the market demand. New technologies are continuously required to improve productivity and to meet evolving regulatory standards at reduced compliance costs.

As countries become more prosperous, the demand for environmental goods and services will increase. The quest for environmental quality cuts across all economic sectors and in recent years there has been a distinct trend towards pollution prevention (green technologies) and away from pollution control. "An ounce of prevention is worth a pound of cure" is becoming the prevailing philosophy. Encouraging innovation that is both clean and more productive is a critical challenge for our environmental industry and for the economy as a whole.

Canadian firms have established a good reputation for water and wastewater treatment systems, for handling liquid and solid wastes, and for providing such items as incinerators, shredders, compactors and refuse recycling equipment. Our capacity

extends from the construction of large pollution prevention and control systems down to such component parts as pumps, filters, valves and chemicals.

Canadian environmental consulting, management and engineering firms, as well as private laboratories and research establishments, are providing engineering, economic, scientific, management and technical services to both the domestic and international markets. Services are offered in a wide range of subjects including resource conservation and protection, solid and hazardous waste management, water supply, sewage collection and treatment, air quality and noise control, industrial processes and energy conservation.

The exploitation of Canada's natural resources has nurtured skills that are being used in the environmental industry. For example, mining has spawned clean-up and reclamation capabilities. Remote sensing is well developed and our capabilities in the geosciences are respected worldwide. In forestry, sustainable development management skills are being developed as are biological control techniques for pest and insect management.

Canadian lifestyle changes are leading to new opportunities and technologies for reducing, reusing and recycling a wide variety of goods and services. Energy efficient housing; public transit; the "blue box" program; the use of refuse derived fuel; less wasteful packaging; conversion of waste plastics, oils and sewage to petrochemical feedstocks; returnable bottles; and the recycling of metals, paper and wood products are examples of growth opportunities for the environmental industry.

CHAPTER 1 - CANADIAN MARKET

Context

Canada can turn environmental needs at home and abroad into economic opportunities. Virtually every sector of the Canadian economy needs environmental services, systems and products. Market demand will continue to increase as industrial activities and government policy, under the watchful eye of the public, become more environmentally sensitive and committed to sustainable development.

Experts forecast that the roughly \$11 billion domestic market will grow at 10% annually to approximately \$22 billion by the year 2000. As part of NAFTA, the domestic market may change significantly as Canadian industry responds to the integrating effect of the larger North American market, growing to some \$200 billion by the year 2000. Foreign multi-nationals are well entrenched in many areas of the environmental sector. Some 37% of the Canadian market for environmental equipment is estimated to be supplied by imports - 80% from the United States. Although some 23% of production is exported (excellent for most industries), there remains a trade deficit, estimated at \$900 million.

The industry's scattered presence within virtually every sector of the economy is often mirrored in governments' services and programs to the sector which could be better coordinated. Information channels and communications amongst the industry, its customers, governments, universities, associations and other institutions are under-developed. However, governments supporting development of Canada's environmental industry are gaining an awareness and understanding of the forces shaping

market development. The challenge for governments is to determine the means by which they can stimulate market mechanisms for the benefit of the environmental industry.

Issues and Possible Initiatives

1.1 Dominating the Domestic Market

Individually, governments may argue that their activities and programs are responsive and well implemented. However, many firms report differently. Often small and medium-sized enterprises (SMEs) are simply unaware of the various agencies, programs and initiatives available from governments. The key issue is to ensure that the interests of the industry are reflected in government programs and policies and that overlaps and duplication are minimized.

A first order of business for marketing support is to simply optimize on-going initiatives related to market information and awareness, industry and market data bases/directories, publicity materials, newsletters, workshops, seminars, conferences and trade shows.

A new sense of common purpose, a partnership, by governments working together and with industry, can find new ways to creatively ensure that governments' policies and programs effectively meet the needs of the environmental industry and are efficiently delivered.

1.1.1 Avoid duplication and overlap of governments' policies and programs and provide more coordinated

delivery of government services and programs across Canada.

Both public and private sectors lack an up-to-date comprehensive view of the size, characteristics and growth patterns of the Canadian market and of the environmental industry itself. The federal government commissioned a Canada market study in 1990. Since then, federal/provincial participation has produced a number of one-off studies of Atlantic Canada, Quebec and the four Western Provinces. However, there has not been any subsequent synthesis or updating of these data.

1.1.2 Develop and maintain a statistical data base on the environmental sector of sufficient detail to assist the industry in market planning and governments in policy and program development.

All studies have confirmed that governments consume much of Canada's environmental goods and services. Municipalities, for example, account for over 50% of the total domestic market. On the federal side, there is much potential business in site remediations, in defence installations such as the DEW Line, for example. Municipal governments can be a "hot-house" for growing the industry. Finally, it is becoming clear that this market, even for services, is increasingly global. The trend to contracting out municipal infrastructure, or its privatization is increasing and is a positive development. However, most of the commercial opportunities arising from this have been picked up by foreign competition.

1.1.3 Develop an industry/government partnership at the municipal level to identify firms and their

products/services; publicize expenditures; ease procurement, and involve industry in planning and searching for solutions to municipal environmental problems.

Governments have been encouraged, in the current economic situation, to be more mindful of the industrial and employment development impacts of their policies. For example, government support for research and technology development in the past has not necessarily considered whether an eventual outcome of the supported work could be further developed into marketable products. At issue is whether specific information and analysis on potential commercialization should be an integral part of any funding proposal.

A related issue is the inclusion of a "check-off" on all environmental protection, prevention or remediation measures proposed by governments which would question whether the particular action held any interest for industry by way of markets or technology transfers.

1.1.4 Introduce a "marketability" clause into the assessment for any requests for government assistance in support of research and development, leading to new environmental technologies.

Domestic market opportunities continue to be lost by a lack of awareness, on the part of both users and environmental firms themselves, of the products and capabilities of the Canadian sector. Although publicity materials are useful, there is a requirement to support the creation of a showcase of technologies, installed across Canada, aimed at prospective domestic and international buyers. The special recognition of made-in-

Canada technologies through large-scale commercial demonstration, perhaps as supported under technology development support programs, can speed market receptivity.

1.1.5 Establish special environmental awards to recognize both products and users of the products as a means of showcasing "winners" to potential buyers. The awards would recognize the performance characteristics, international competitiveness and total execution of the systems/technologies involved.

1.2.1 Support the formation of strategic alliances and networks amongst complementary SMEs to package their individual products and services into a competitive comprehensive product line.

Many of the sector's newer science and technology based firms are discovering the critical role of marketing. Given their focus on the delivery of highly specialized products and services to a generally small client base, many are ill prepared to meet outside competition.

A number of existing services and initiatives offered and supported by governments have been helpful. They range from newsletters, to directories to direct marketing advice. However, in an increasingly global market, no identification of the impact of foreign activity has been pursued. This important component of strategic intelligence is missing.

1.2 Foreign Competition in Canada

Much of the Canadian market is already dominated by large and long established branch operations of foreign multi-nationals. Although many have global market mandates for made-in-Canada products, they also access products and technologies developed, proven and shipped from other operations of their parent firms. Canadian firms, if for no other reason than to round out their product lines, import various materials and products from around the world. The dynamic and fast growing nature of the sector, largely characterized by the specializations and inclinations of its SME entrepreneurs, leave many product and service gaps in its wake. However, these "gaps" have never been specifically identified as potential manufacturing opportunities, either by existing domestic sources or from new capacity in Canada.

A related issue is the increasing Canadian market penetration by foreign services and engineering firms which design, build and operate facilities.

1.2.2 Track the activities of foreign competitors active in the Canadian market, to better measure market activity, to identify market gaps, and to better formulate responsive support activities for the Canadian industry and to set priorities.

1.3 Government Procurement

The federal government is the nation's largest commercial landlord and purchases over \$9 billion a year of consumer, commercial and industrial goods. Provincial and municipal governments are also major consumers. Through their purchasing practices governments have the potential to stimulate demand for environmentally

responsible products and to play an active role in the development of the environmental industry.

The Green Plan's environmental stewardship approach seeks to reconcile the government's management of economic and environmental activities to ensure that environmental considerations are incorporated into the practices and internal operations of federal departments and agencies.

A cornerstone of this procurement initiative is the Code of Environmental Stewardship which states that the Government of Canada is committed to conduct all its operations in an environmentally responsible manner. Important leadership on this issue has been given by Government Services Canada. Success appears to depend upon the encouragement of a systematic approach to identify, specific and enter more environmentally friendly products into established procurement systems. The challenge is to develop procedures for procurement which governments can subscribe to, and in the process help develop a more competitive domestic industry.

A related issue is the market pull which governments could provide by specifying environmental materials and products which meet international quality and performance standards, which will, in their supply, better prepare Canadian firms for both domestic and export markets.

1.3.1 Support the early adoption of CSA and ISO Environmental Standards currently being developed and specifying products and materials based on the highest international standards in order to stimulate and support the Canadian industry.

There appear to be few identified Canadian environmental industry "champion-users", public or private, willing to provide opportunities to promote, demonstrate, evaluate and certify new products and technologies for marketing to new prospects domestically and internationally. Taking its lead from industry, governments may wish to consider a comprehensive program to apply the principles of sustainable development directly to their own workplaces, for more efficient use, reuse and recycling of energy, water, paper and other consumables.

1.3.2 Initiate a federal "going green" program for 50,000 government facilities, paid for out of the savings from the implementation of better environmental practices and management.

Although headway has been made, many SMEs remain unfamiliar with government procurement systems and have difficulties in accessing and using those systems beneficially.

1.3.3 Review federal, provincial and municipal government procurement systems and procedures such that industry's participation can be more responsive and efficient.

1.3.4 Collect and maintain a national data base of upcoming public infrastructure projects.

1.3.5 Consult with industry to develop more effective government procurement systems, such as a two-stage open bidding system -- the first stage rates performance, capability and technical

responsiveness; the second stage seeks detailed proposals from a short-list.

1.4 Interprovincial Trade Barriers

Non-harmonization of across-Canada product standards, certifications and regulations diminish the domestic market and function as interprovincial barriers to trade. The lack of consistent compliance enforcement by regulatory authorities further fractures the market and produces uncertainty. As yet, no formal sensitivity analysis has been undertaken on possible impacts which the harmonization of product standards and regulations might have for improving access to the domestic market. Regulators, in recognition of their function as prime movers of the domestic market, are important stakeholders in the environmental sector's development.

1.4.1 Given the First Ministers' recent agreement to substantially reduce domestic trade barriers, provide federal and provincial leadership in abolishing interprovincial trade barriers for the environmental industry sector.

CHAPTER 2 - INTERNATIONAL MARKETS

Context

The world market for environmental products and services was estimated to be about US\$300 billion in 1992. This figure is expected to be US\$425 billion by 1997.

World-wide, there are countless examples of companies which have "gone green" for various reasons: new business opportunities; a sense of corporate environmental responsibility; a drive for more efficiency; a public relations/marketing edge; and the immediate and or anticipated demands of regulatory compliance at home or abroad. On the public spending side, the market for environmental products and services is primarily driven by pressures on governments to take action in resolving environmental problems through policies, laws, regulations and priority funding on infrastructure.

Issues and Possible Initiatives

2.1 Meeting the Global Market Challenge

Canada's small domestic market means that we must penetrate international markets if we are to build a dynamic environmental industry. However, many environmental firms are young and small and have difficulty breaking into global markets. The firms that use existing export assistance programs tend to be those with proven environmental products and to be already well established.

2.1.1 Provide opportunities for the environmental industry in export and development assistance programs.

Figure 1 - Most Promising Global Markets 1992-1997

COUNTRY	1992 (\$ BILLION)	1997 (\$ BILLION)	RATE OF GROWTH (PERCENTAGE)
U.S.	134	180	6
Western Europe	94	132	9
Eastern Europe	14	27	14
Canada	11	17	10
Southeast Asia	6	13	15
Latin America	6	12	12
Mexico	1	1.5	15

Source: U.S. Environmental Business Journal, 1993.

The federal government's International Trade Business Plan for the environmental industry sector provides identification and priority setting of markets, missions, trade shows and other exchanges. The collection, analysis and dissemination of strategic market information by governments for industry has been well received, although there is a need for a more targeted and comprehensive effort. New ideas such as building business alliances are being explored to seize international markets. Updated mechanisms may be needed for coordinating activities, strategic market planning, guiding trade assistance measures and technology transfers. A top priority is the collection and dissemination of strategic information on markets of most interest to the industry.

2.1.2 Create a government and industry working group for international trade which would set priorities for markets and project support activities, advise on means of best delivering existing programs and services, and provide ideas for improving and developing new support mechanisms.

Many national governments, such as the U.S., Germany, France and Japan have developed strategic plans -- linking environmental protection, industrial and trade development policies -- to support growth of their environmental industries.

2.1.3 Identify, monitor and consult with industry on the non-tariff barriers to trade in selected markets and formulate and carry out solutions as part of country marketing strategies.

Increasingly, Canadian firms report that although their capabilities and technologies

may be superior to those of already established global players, the logistics and extra costs of marketing and seeing through the installation of their first sale in a target market is a major barrier. Quite simply and naturally, foreign buyers are most comfortable in buying systems which have been proven successful in their own marketplace.

Firms with experience and financial resources have found a partial solution through the trade counselling and facilitation services offered by Canadian governments. Participation in trade missions, use of available financial instruments, and alliances with foreign partners can help accelerate market entry. New business networks which are seeking to win large-scale projects for the first time have much more difficulty. They need financial investors who can help package the financial component. At issue is the need for mechanisms to boost the preference, sale, delivery, installation and commissioning (including training of local staff) of new-to-the-target-market Canadian environmental products, systems and services, particularly from SMEs.

2.1.4 Examine government programs and services and export financing instruments which could be packaged for winning large projects -- with special provision for the coverage of internationally competitive up-front soft-cost elements (pre-feasibility studies, project definition, initial design and engineering).

2.1.5 Develop a repayable revolving fund package for full-scale demonstration of Canadian systems to help make possible the first-time market entry into targeted markets.

For gaining a foothold in promising developing country markets, Canadian companies have difficulties in competing against firms from countries such as Germany, France, the U.S. and Japan who offer tied-aid for environmental projects. Tied-aid assures that funding assistance of the donor country is provided by way of goods and services of its domestic industry. Canada's reputation abroad has led several countries to ask for help in designing and developing their domestic environmental laws, regulations and compliance administration regimes. Such technical assistance could provide a basis for firms to participate in business opportunities which might follow.

2.1.6 Review the role which Canadian development assistance could play in the development of environmental industries.

Pursuing global markets is also a matter of resources and scale -- even some of Canada's largest environmental firms are small by world standards. A number of business networks and alliances, taking different forms, are in early development stages. They have been created by the needs of individual firms to consolidate their resources to tackle global markets. Companies within networks offer a fuller product line by including complementary firms in their area of specialization. This may include network clusters focused on sub-sectors, such as hazardous waste, and targeted to specific markets, such as the U.S., Taiwan, or Poland. A second major thrust is the alliance of services/ engineering firms with technology-providing manufacturers for pursuing larger projects, because their relative strengths can be complementary. Facilitative support has already been requested from governments

for activities such as setting up sales offices abroad to provide a presence in the target markets for accelerated entry.

2.1.7 Support "Team Canada" alliance-building as a strategic instrument aimed at specific markets and sub-sectors of the environmental industry.

The U.S. market absorbs some 80% of Canadian exports in this sector. Its priorities are shifting to integrated waste management, the management of hazardous waste and to air pollution controls. Although Canadian access to the U.S. market is strong, there remain problem areas. For example, the federally mandated toxic site remediation program has Buy America preferences, set-asides, audits, inspections, guarantees, and liability insurance requirements which favour U.S. suppliers.

Under NAFTA, North America's 370 million consumers promise new opportunities in trade, investment and technology development. A key activity will be to encourage alliances amongst Canadian, Mexican and American firms, for investment, trade, technology transfer and new business development.

2.1.8 The NAFTA environmental secretariat, which will be established to guide environmental cooperation and development, will also seek to assure the positioning and raise the profile of the Canadian environmental industry.

For the rest of the world, exporters are alert to shifting opportunities and have worked

strategically with the Canadian government to explore markets in Russia, Poland, Spain, Mexico and Southeast Asia. Promising new markets are found in countries playing environmental catch-up. Enhanced communications with industry is needed to better specify priority information needs on markets, projects, product standards, laws and regulations.

2.1.9 Collect and disseminate strategic information on international markets in a way that is easily accessible by the industry.

2.2 Trading on the Global Environmental Agenda

Over the long term, industry will be required to recognize and internalize environmental costs, manage pollution at source, build in "process" changes rather than add on "end-of-pipe" solutions, and develop technologies that aim for "zero discharge". As well, there is growing, worldwide recognition of the sustainable development link between the environment and the economy.

Environmental issues are increasingly being linked to issues of global security. International financial, donor, and other organizations strongly reflect this environmental agenda with "check-offs" for evidence of impact assessments and resource plans, and protocols and agreements for the resolution of specific environmental problems. Focusing primarily on contributing to the environmental-social dimension of this activity, Canada has not as yet sought the active participation of its industry as a problem-solver. In the process of responding to global environmental problems the Canadian environmental industry can build its capabilities,

technologies and access to global markets.

2.2.1 Place environmental industry experts in key international organizations in order to balance Canada's contribution of funds with that of the Canadian environmental industry's capabilities and problem solving technologies.

In the wake of the Brundtland Commission Report, "Our Common Future", and events such as the UNCED (United Nations Conference for Environment and Development), international donor and financial organizations support for sustainable development is increasing. International financial institutions' (IFIs) commitments to environmental projects are driving Third World markets. The World Bank lent \$2 billion in 1993 for the environmental sector. Others involved include Regional Banks, the United Nations Environment Program (UNEP), the Montreal Protocol for the Protection of the Ozone Layer, the Canadian International Development Agency (CIDA) and the World Bank's Global Environmental Facility (GEF).

The GEF helps developing countries cover the added costs of activities with global environmental benefits. Grants support investments, technical assistance and research related to climate change, ozone depletion, pollution in international waters and bio-diversity. This United Nations/World Bank program is expected to be made permanent in early 1994 following its \$1.3 billion, 1991-1993 pilot program.

In all areas of Canadian participation in the global environmental agenda, the identification of opportunities, priorities and the development of a strategic approach can

only be accomplished by a closer partnership between governments and the private sector.

2.2.2 Identify and actively monitor global environmental trends, policies and initiatives for emerging market opportunities. A wider industry definition, responsive to global trends, will become extremely important for identifying trends and new market opportunities.

2.2.3 Develop mechanisms that will promote the transfer to developing countries of Canadian public and private sector expertise relating to regulations, policies, training and technical programs in order to support the export of Canadian environmental technologies.

2.2.4 Maximize business opportunities arising from the implementation of global environmental conventions and access funding from international financial institutions.

Industries, such as mining, are developing cleaner technologies which they in turn recognize and market as environmental products. Environmentally friendly products gain legitimacy as the public and entire industries buy-in to things "green", uncovering new marketing opportunities.

Canada is an OECD leader in identifying the importance of the environmental sector. In a shift from protection to prevention, new opportunities are emerging for energy efficiency and renewal, for the sustainable management of resources and for biodiversity. There is a case for the promotion of technologies, across all industrial sectors, which may be more environmentally

friendly: from transportation systems, to construction, to a wide range of industrial processes and consumer products.

2.2.5 Identify and provide marketing support for user industry's green products and services, many of which are clean technologies, products and services.

2.3 Promoting the Canadian Environmental Industry

Although much has been accomplished recently with directories and sub-sectoral profiles of Canadian capabilities, there remains a deficiency of knowledge in depth of the products and capabilities of the Canadian industry. Many prospective buyers have difficulty in finding definitive detail on specific technologies and products in the literature. As well, there is no ready identification by sector, or region/province, of where incoming buyers may visit working installations of various systems.

Finally, the relative newness of the sector has not as yet produced the same level of Canadian trade expertise and sectoral knowledge abroad as has been developed for more mature industries.

2.3.1 Improve the depth of knowledge and expertise by staffing Canadian environmental industry experts in key Embassies/Consulates abroad.

2.3.2 Develop a guide of where foreign buyers can go to see the top 50, or so, working installations of leading Canadian technologies. The guide could provide technical details of the systems, performance evaluations by the users and profiles of the Canadian suppliers.

2.3.3 A who's who guide and publicity campaign on the availability of trade development resources of governments and of their activities in international markets -- to help both foreign buyers and Canadian industry.

2.3.4 Environmental sector training programs for government officials in Canada and abroad -- to deliver effective marketing support to exporters.

2.4 Building Marketing Capacity

Over the past five years active exporters have more than doubled, from 250 to over 600 firms. Building marketing capacity is a key government support function aimed at increasing this number to more than 1,000 in the next five years. Many new exporters are unfamiliar with export markets and how to get started and face a maturing and more aggressive global industry.

Governments' market development support largely consists of training, on-going advice and from time to time, some hands-on assistance in tackling export markets. The joint Canada, Canadian Chamber of Commerce and industry associations Forum

for International Trade Training (FITT) has had success with its how-to-export course, but more specific targeting is required. Although competition from larger, more entrenched foreign firms has already carved out large shares of the global market, the door is yet open for Canada's well prepared and innovative firms.

2.4.1 Provide market awareness through cooperative information and intelligence sharing, and deliver across Canada marketing workshops focusing on specific geographical and sub-sectoral international markets.

2.4.2 Active communication of global market opportunities to Canadian firms by newsletters, reports, studies and specific intelligence, offering feedback to specific officials for follow-up. (... for example, there may be a need for an international newsletter to promote the industry by telling success stories of Canadian innovation and leading technologies ...)

CHAPTER 3 - TECHNOLOGY

Continuous generation, adaptation and integration of technology in the development of marketable products, processes and services is at the heart of the industry's competitiveness. Innovation and the market are linked through what is known as the "technology pipeline". New ideas arising out of fundamental scientific inquiry (pure research) go through a number of steps on their way to market including pre-competitive R&D, product development, prototyping and demonstration, and commercialization.

Competitiveness results not only from major breakthroughs in the laboratory, but from continuous incremental improvements in products and processes arising from an ongoing interaction with the customers. The adaptation, combination, re-combination and integration of old and emerging technologies is a vital part of the "technology pipeline".

The chart on the next page shows the "research to commercialization" spectrum. The thickness of the bars implies the level of overall capability and the shading shows the general level of focus within the organization. While it is recognized that the process is not continuous and that the various stages are interactive, the diagram is intended to be general in nature and to form a basis for discussion and understanding.

Pure research is often of high technical risk and as shown in the chart is undertaken primarily in universities and in the private laboratories of large multinational corporations. Government laboratories concentrate largely on pre-competitive and applied research. At the other end of the spectrum, most commercialization, which on average is the costliest stage of the process,

takes place in the private sector for all sizes of companies.

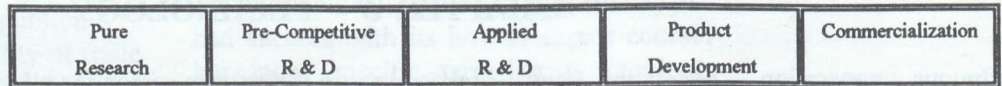
Context

Environmental technology can be very sophisticated or conventional, depending on the application. It includes diverse applications ranging from remote sensing systems to power plant instrumentation to sewage plant and site-remediation equipment. There has been a recent gradual shift from developing end-of-pipe pollution control technologies to pollution prevention which involves reengineering by developing technologies, products, and processes which do not pollute. There are also many technologies being developed which will have indirect, but significant effects on the environment such as energy-saving equipment and mass transportation systems.

Environmental technology demands a broad range of scientific and technological skills. The Canadian environment industry consists of a large number of mostly small enterprises, generally based on the ownership of a unique technology or special capability. Many lack the engineering or technical resources to continually acquire, develop, upgrade and apply new technologies and hence compete over the longer term in the fast growing domestic and global markets.

Much of the manufactured equipment used in environmental systems such as valves, tanks, piping, instrumentation and controls, is generic in nature, and is used in a multiplicity of industries in a variety of process applications. This equipment is

The Spectrum →



Universities



Large Corporations



Medium Corporations



Small Corporations



Individual Entrepreneurs



**Contract Development
Labs. e.g. ORTECH**



NRC



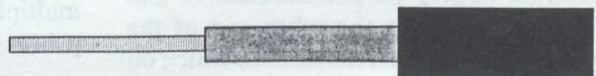
NRCan



Environment Canada



Other Departments



supplied by small, medium, and large firms, many with international connections and ownership. Some of this equipment contains advanced technology.

Canadian firms, dedicated to the manufacture of specific environmental equipment are mainly small businesses. Consequently their technology development is often limited to the niche markets which they serve. Nonetheless these firms have developed some very sophisticated and exciting technologies, and many are active exporters. Due to the small size of the domestic environmental industry there are large gaps in available Canadian sourcing of technologies and equipment needed for both domestic and export projects.

Environmental technologies emanating from the service sector are mainly supplied by consulting engineering firms. Some of these are dedicated to the environmental sector while others, including some large international consulting firms, specialize in a variety of industry sectors, such as pulp and paper, chemicals, and mineral processing where the environmental component comprises an important but often small part of a project. Consulting engineering firms can play an important role in technology diffusion since they are often in a position to broker new export opportunities for Canadian technology.

A significant portion of the environmental technologies used in Canada comes from the United States and from offshore, principally Europe. These technologies are acquired by purchase, license, as part of a project, or accessed intercorporately by multinational subsidiaries or by alliances.

As with other components of the environment industry, reliable statistical data are scarce. However, a recent OECD report

estimates environmental R&D in OECD countries at some US \$10 billion annually and that industry R&D is heavily concentrated in the United States, Japan and Germany. Large firms may allocate as much as 8-10% of sales to R&D. As much as 80% of all environmental R&D within OECD countries is funded by the environmental industries, a much higher share than for overall R&D.

The situation in Canada appears to be very different from the OECD norm. In 1992, Canadian industry accounted for 53% of total R&D spending (but only provided 40% of the funding). It is expected that environmental R&D performed by industry is lower than this due to the small size of the firms. Both total R&D expenditures and industry expenditures as a percentage of GDP were about one-half those of Japan.

Issues and Possible Initiatives

3.1 New R&D

The development and exploitation of new environmental technologies is vital to the health of the environmental industry. As with other industrial sectors, the standard innovation cycle applies ranging from the conceptual stage through pre-competitive research to development and bench testing to pilot plant or full-scale demonstration and commercialization. In the case of process technologies and some equipment, the costs and risks can be substantial. This puts most projects of this nature beyond the reach of individual inventors, universities, and small environmental firms and there are many promising environmental projects which have been terminated at various stages of the development cycle due to a lack of financial or technical resources. One practical

solution to this problem is for the technology developer to form an alliance with a user firm or consortium which can supply funds and technical resources for the project as well as a demonstration site.

There has been a growing trend in recent years for government research laboratories and financial assistance programs for R&D to emphasize the formation of consortia in all aspects of technology development, from R&D to demonstration/commercialization. We also note a similar trend amongst universities, research institutions and the private sector. It is also important to encourage small and medium-sized firms to pool their R&D resources with universities and government laboratories and to build alliances with other companies around the world, in order to have access to global technology, capital, markets, and distribution channels.

The stated intention of the government is to commit 25% of new R&D spending over the next four years to environmental technologies.

3.1.1 Plan and implement new R&D expenditures in concert with other R&D activities in the public and private sector including defence conversion.

3.1.2 Focus new R&D on those areas which are both environmentally important and commercially promising.

3.1.3 Provide better access for the private sector to university and government laboratories to jointly carry out environmental R&D.

3.1.4 Address the gap in applied research and development.

3.2 Defence R&D

A significant potential force in the development and commercialization of environmental technologies is Canada's defence industry which has significant R&D, management, and marketing capability as well as financial and scientific resources.

As a result of changing defence requirements defence markets are shrinking. The mandate of DIPP is being examined from developing defence technology to helping the industry convert and diversify into such areas as environmental technologies.

3.3 Unexploited Technology

Many environmental technologies are developed by private sector firms and most process technologies are intended for proprietary corporate applications.

It is mainly the larger corporations which are the developers and/or users of these technologies. However, there appears to be a significant amount of technology developed by major corporations which is not of a proprietary process nature and which could be exploited commercially. Most of the firms which developed the technologies are not in the environmental business and are not interested in commercializing their developments. Consequently many useful environmental technologies remain unexploited.

Government laboratories have traditionally been engaged in industrial and defence related pre-competitive research. However,

more and more of today's industrial R&D is of a shorter term nature and is performed in concert with the private sector, and government laboratories are actively and successfully marketing their facilities and expertise. Nevertheless, there are undoubtedly useful technologies now sitting on the shelf which are available for exploitation and which could be commercialized given a mechanism.

Other major players in the development of environmental technologies are universities and colleges and individual inventors. Most universities now have technical licensing/commercialization arms and these activities could be strengthened. The inventor presents another problem, frequently lacking basic business and marketing skills, and often unwilling to share the rewards of commercialization in return for the financing needed for commercialization.

There are, therefore, environmental technologies in universities, government laboratories, and industry which have been developed but never commercialized which, if exploited, could bring economic benefits to the environmental industry and to Canada. It is important to identify the most promising available environmental technologies and locate champions who would take the responsibility for their commercialization. The object of the commercialization must be the supply of goods and services, and not merely the sale of the technology.

3.3.1 Utilize the newly established National Environmental Technology Advancement Centres to identify the most promising environmental technologies and put together the necessary consortia and

demonstration/commercialization projects in cooperation with government and private sector clients.

3.4 Technology Information

There are many activities which can be undertaken which do not require a great deal of money. Global sourcing of information on available technologies or R&D in progress is needed by both users and developers of environmental technologies. It is to be found in a variety of places, but is not available from a single source. A study performed for Industry Canada indicated that technology linkages amongst science and technology organizations including the private sector are primarily of a local rather than a national or international nature.

Technology-related information and services are now available through a multitude of providers, private and public, but it can also be confusing and time-consuming to figure out what is available and useful. A network, serving Canadian environmental technology centres which could facilitate technology transfer activities, was part of the Green Plan Technology for Environmental Solutions Initiative but has not yet been put in place.

There are several government entities involved in providing technological information and assistance to the private sector and academic institutions. From an international perspective, technological support is provided by science and technology councillors and trade officials in Canada's foreign posts. The domestic market is served by associations, government bodies and by the new National Environmental Technology Advancement

Centres, just being established in Quebec, Ontario, and Western Canada. These non-profit centres are being operated by private sector consortia.

There is need for a cost effective national network which will provide information on available Canadian and foreign environmental technologies as well as R&D being performed in the many laboratories across Canada. Some R&D is of a proprietary nature and in many instances developers of new technologies are frequently reluctant to discuss their work until intellectual property rights are finalized. Nonetheless, such a network would not only provide information to industry and other researchers on new technologies under development, but could result in reduction of duplication of efforts and possible formation of new R&D cooperative alliances. The technology network should be linked to international systems and standards for data established.

3.4.1 Develop a new environmental technology network as envisaged in the Green Plan, or enlarge the existing technology network of NRC's Canada Institute for Scientific and Technical Information (CISTI), with its branch offices across Canada, to accommodate data on environmental technologies R&D.

3.5 Identifying Environmental Technology Needs of Industrial Firms

Many businesses in the manufacturing, processing, and service industries are continuously facing new and more stringent environmental regulations. Some of these firms have environmental problems, others

could increase their competitive position through adoption of environmental technologies which would revise their processes or reduce waste through recycling. Every new technology need represents a marketing opportunity.

There is a need for small and medium-sized businesses to identify environmental problems and draw up a plan of action to deal with them. Many of these firms lack the technical resources and expertise to assess their problems and evaluate new technologies effectively. Required is an inexpensive mechanism to evaluate environmental problems and potential competitive opportunities through elimination of waste and recycling.

3.5.1 Provide assistance on a cost recovery basis to SMEs to (a) assess environmental problems and draw up a plan of action to correct them through the adoption of environmental technologies; and (b) identify potential cost savings through elimination of waste and recycling.

3.6 Coordinate Government Policy and Programs

Government plays a major direct and indirect role in the development, adaptation, commercialization and marketing of environmental technologies. Significant research and technical resources are devoted to the environmental sector by several federal and provincial departments and agencies such as Environment Canada, the National Research Council, and Natural Resources Canada. Tax credits are also provided in support of R&D and commercialization. In addition there are

significant expenditures being made by provincially funded research organizations.

There is, however, an apparent lack of strategic planning and coordination amongst government agencies, as evidenced by overlaps and gaps in federal government financial-assistance programs. Some are regional in scope or dependent on federal-provincial agreements, and are not available throughout Canada.

In the view of business, a large and bewildering array of government programs and services exists in all sectors, including environmental technologies.

Environmental policies are a major factor in stimulating the development of new technologies. The time required to meet new regulatory standards should reflect the time needed to develop and commercialize these new technologies. Otherwise, there is a tendency to rely on existing technologies rather than to innovate.

3.6.1 Develop a national strategy for environmental technology development and provide coordination of government, university, and private sector programs and services supporting the development and commercialization of environmental technologies.

3.6.2 Maximize benefits to Canada by employing the latest environmental technologies in the recently announced Infrastructure Renewal program.

CHAPTER 4 - FINANCING ISSUES

Small and medium-sized enterprises account for the majority of the Canadian environmental industry. In contrast to the large and established environmental firms which can rely on traditional sources of financing such as the public capital markets, small and medium-sized environmental companies (SMEs) must seek financing from other sources. Accessing this capital is often extremely difficult for SMEs, due to a variety of barriers they encounter. SMEs in the environmental sector are typical of SMEs in other developing, high technology industries in many ways, but they face additional barriers. For example, the financial community often has difficulty evaluating the potential for commercial success of an environmental technology, let alone its ability to meet current and future regulations.

There is plenty of potential investment capital available in Canada. Nevertheless, access to this capital remains a significant impediment to growth for small to medium-sized Canadian environmental companies. This "capital gap" is caused by a number of factors which need to be addressed.

Context

One of the major problems Canadian environmental companies face is obtaining sufficient investment capital to finance start-up and growth. These financing barriers have been attributed to perceived expertise gaps, the firm's early stage of development, financial institutions' operating procedures, government practices, and environmental liability.

Figure 1

The major and minor financing sources for SMEs at various stages of their development:

SMEC Stage	Start-Up	Development	Growth	Mezzanine
Personal & Family Resources	Major	Minor		
Banks	Minor	Major	Major	Major
Governments	Major	Major	Minor	
Private Investors	Major	Major		
Venture Capital Companies	Minor	Major	Major	
Institutional Investors/ Pools			Minor	Major
Stock Market		Minor	Major	Major
Industrial Investors		Minor	Major	Major

Source: "Financing Issues for Small to Medium Sized Environmental Companies." Capital Linkages Study for Industry, Science and Technology Canada, Environmental Technologies Development Corporation, March 1993.

Financial institutions, on the other hand, seem to feel that no capital gap exists, but that managerial and related limitations are the reasons that SMEs have difficulty obtaining financing. If SMEs do face this difficulty, it is not because they are small and early stage, nor because they are environmental, but because of other factors.

They say they treat SMEs no differently than other companies, but that they simply prefer more conservative investments. This is the crux of the matter. To cover the very high risks involved, the rates of return must be very high. Only venture capital type equity investment has the potential to reap the returns required.

The sources of available financing for small to medium-sized firms varies with the stage of development of the company (Figure 1). In a company's start-up phase, personal and family resources, governments and private investors are major sources of financing. In the development phase, however, the major sources of financing are banks, governments, private investors and venture capital companies. It is during these early stages that SMEs have the most difficulty in accessing capital.

Analysis of capital placements by various sources indicates that there is not a shortage of capital available for investment, but that this capital is not accessible to SMEs to meet their requirements. It is estimated that Canadian SMEs may require anywhere from half a billion to 2.5 billion dollars in financing yearly.

How much financing Canadian SMEs actually receive is also difficult to calculate. Federal and provincial government funding

is probably in the \$100 million range, and funding by private investors is probably in the \$60 to \$120 million range. If it is assumed that, as in the United States, environmental companies accounted for 4% of venture capital deals, then that would mean that Canadian venture capital companies invested only about \$10 million in SMEs in 1991. These figures would indicate that there is indeed a capital gap, and that it is at the venture capital level, where investments are generally in the \$500,000 to a few million dollars range.

An infrastructure of government programs and services already exists to help small and medium-sized businesses access financing and financial assistance. Through the Small Business Loans Act, the government provides guarantees that reduce commercial risk to lenders. The Federal Business Development Bank provides financing assistance on a cost-recovery basis. The Canadian Commercial Corporation enters into government-to-government contracts with foreign customers, and undertakes delivery through a back-to-back obligation with the Canadian exporter. Finally, the Export Development Corporation provides a range of export finance and insurance services to Canadian companies and their foreign customers.

The need to establish investment funds to leverage the major national pools of capital, such as insurance companies, pension funds, banks and labour sponsored funds, into strategic small business investments, including in the environmental sector have been expressed in many fora. Such investment funds, if established, could cooperate with existing provincial initiatives such as the Ontario Investment Funds.

Issues and Possible Initiatives

Barriers to financing of environmental companies include:

4.1 The Expertise Gap

An expertise gap exists on the part of:

- a) **Environmental companies.** Environmental entrepreneurs often lack the ability to present comprehensive strategies, business plans and investment offerings to investors.
- b) **Venture capitalists.** There are few technology-focused venture capital companies in Canada, and thus limited expertise to knowledgeably invest in the environmental industry.

4.1.1 Facilitate recruitment of competent boards of directors by early-stage firms.

4.1.2 Enhance the ability of Canadian environmental companies to identify and recruit experienced and qualified managers, as well as strengthen their management competency.

4.1.3 Establish a mentor program to strengthen core management competencies, particularly the ability to raise capital.

4.1.4 Improve the ability to locate investors, for example, by producing a guide which describes how to find "angels", and the role of key professionals (e.g. financial advisors) in this task.

4.1.5 Encourage the establishment of technology - focused venture capital companies with expertise in the environmental industry.

4.2 The Stage of Development

When companies do not have long track records, financial institutions, which are by nature risk-adverse, cannot carry out the financial analyses they need on which to base their decisions. In the environmental industry, two-thirds of companies earn less than \$1 million per year in their first few years.

4.2.1 Generate incentives for private individuals to invest in Community Venture Pools/Bond Programs. This action would also result in funds that are geographically dispersed and closer to the SMEs.

4.2.2 Establish an investment fund corporation that could have a number of subsidiary expert investment corporations (... for example, environmental technologies ...).

4.3 Operating Procedures

Many investment institutions have their own procedural barriers which inhibit financing SMEs.

- a) When very large funds are to be invested, modest investments in small public companies and direct financing of SMEs tend to be overlooked. Furthermore, a number of major public sector pension fund trustees have mandated

their operating managements not to consider venture capital investments at all.

b) The use of quarterly relative performance measures, where a funds' trustees require quarterly updates on investments, also discriminates against SMEs for whom such measures are not readily available.

c) Institutions commonly rely on the capital asset pricing model, which some feel misleads investors by presenting a distorted view of the capital market by giving false notions that "risk" is the only real concern. This leads to indexing and a reluctance to participate in any unusual investments such as SMEs.

4.3.1 Develop, in conjunction with a leading financial institution, an investment instrument, such as a Green mutual fund that would invest in environmental companies.

4.4 Government Practices

SMEs have identified several ways in which government practices inhibit their ability to obtain financing.

a) The practice of many government laboratories of competing with private sector environmental laboratories. For example, selling analytical services at lower rates than the private sector, by not using full cost accounting, affects private laboratories' markets and can inhibit their ability to raise capital.

b) The lack of vigorous and consistent enforcement of regulations.

c) The common practice of financing up to 50% of needed funds when alternative sources for the other 50% were lacking. Companies felt that loan guarantees for a higher proportion of the funds needed were preferable to grants.

d) Excessive tax burdens and the lack of incentives to invest in wealth-generating, value-added companies such as SMEs, as well as the lack of incentives for the companies themselves.

4.4.1 Examine government pricing practices that are considered harmful to the viability of SMEs.

4.4.2 Establish government procurement policies that would assist Canadian SMEs to identify and develop market opportunities to all three levels of government in Canada.

4.4.3 Examine the responsibility of diverting existing funding that is currently going to operating companies as R&D and manufacturing incentives, to small and community-oriented capital pools working in cooperation with private investors.

4.4.4 Coordinate federal and provincial financing support programs and procurement opportunities for the environmental industry. One method for achieving this could be the training of appropriate one-stop-shop staff that could provide assistance with domestic and export-oriented programs.

4.5 The Liability Issue

The primary legislation related to the allocation of environmental liability is provincial. The Canadian Council of Ministers of the Environment have unanimously approved legislative principles for the allocation of liability associated with site remediation which were developed with multi-stakeholder input. The polluter-pays principle and the possibility of joint and several liability clauses remain paramount when allocating environmental liability.

For most of the environmental industry, new laws and regulations lead to increased markets and opportunities. However, certain environmental service companies may face a direct financing barrier due to the nature of their operations. For example, companies handling, transporting and disposing of hazardous, toxic and nuclear wastes are liable if a serious pollution incident occurs. Lenders and investors may be unwilling to expose themselves to potential liability beyond their financial commitment if they become involved with such companies.

There are two aspects of environmental liability that pose a problem for environmental companies as well as for their lenders. First, environmental liability increases the credit risks and therefore the costs of financing for enterprises that may

be held responsible for environmental damages. Second, it is also possible that an investor or lender will incur direct environmental liability, thereby suffering a cost that could exceed the value of the loan many times over.

Environmental liability can also be a barrier to the development and commercialization of new environmental technologies and products. Mechanisms to assist companies with emerging technologies in meeting the cost of insurance and financing when the environmental risks of new technologies may be unknown, need to be addressed. While addressing these needs, the principle of polluter pays should remain intact as well as the determination of joint liability clauses by provincial governments.

4.5.1 Resolve the credit problems generated by environmental liability concerns by seeking solutions which do not burden parties who exercise due diligence with undue liability, but which continue to hold accountable parties responsible for environmental damages.

4.5.2 Develop initiatives which assist the market place to meet the environmental risks associated with new technology by working with the insurance and finance industries to develop cost-effective methods to manage the risks.

CHAPTER 5 - HUMAN RESOURCES

To improve the overall competitiveness of a firm, an industry, or an entire economy, one of the critical factors is the enhancement of human skills. For the environmental industry to be successful, a sufficient number of individuals with the appropriate education/skill levels will be required to ensure that technologies are effectively used both domestically and internationally. It has been estimated that by the year 1995, the environmental industry will need an additional 5,000 to 7,000 workers, of which some 2,000 to 3,000 will be skilled employees, including both technically-skilled workers and management.

Context

As a result of concern amongst members of the Canadian environmental industry regarding availability of skilled employees to meet the industry's needs, a study on human resources was conducted. The joint government-business study and report entitled **Human Resources in the Environment Industry** (March 1993) highlighted seven key findings that required further attention. The findings related to 1) industry organization 2) management skills 3) technical skills 4) managing industry change 5) developing linkages with major stakeholders 6) attracting students and 7) industry information.

Since the report, the industry organization recommendation has resulted in the formation of the **Canadian Council for Human Resources in the Environment Industry (CCHREI)**. Its objective is to address the key findings of the Human Resources report. The council is comprised of members from the provincial

environmental industry associations, the private sector, academia, professional associations, interest groups and ex-officio members. The council has been provided \$2.03 million over three years to seed fund the formation of a permanent Canadian Council for Human Resources in the Environment Industry.

Issues and Possible Initiatives

5.1 Education/Training Programs

The majority of the key issues identified: a) management skills b) technical skills c) managing industry change and d) developing linkages with stakeholders could be addressed through effective education/training programs. The issues relate to the lack of management/business skills of employees generally within small and medium-sized, technically oriented organizations; the education levels, skills and abilities of employees and potential employees, and the need for updating of environmental curriculum and continuous learning by employees as a result of the rapidly changing technology and environmental regulations.

The purpose of the Forum for International Trade Training (FITT) program is to expand opportunities for Canadians to acquire practical international trade skills. This is achieved by raising the awareness of Canadians and by establishing national professional training standards in international business.

5.1.1 Collaborate with the FITT program to develop an educational/training module(s) which specifically

addresses the needs of the environmental industry.

5.2 Create an Awareness at the High School and University Levels of the Environment Industry's Potential Growth and Employment Opportunities

To attract potential employees with the appropriate education, skills and abilities, young people must first be made aware of the growing environmental sector and its potential employment opportunities.

5.2.1 Link into and work with Industry Canada's Science Promotion and Academic Affairs Branch. The branch promotes at the high school level the opportunities and the need for qualified individuals in the field of science and technology. For example, the Canadian Council for Human Resources in the Environment Industry and/or Provincial Industry Associations could get involved in the "Innovators in the Schools" program at no cost.

5.2.2 The Canadian Council for Human Resources in the Environment Industry, along with the Provincial Industry Associations and possibly other horizontal associations such as the Canadian Manufacturing Association, and the Association of Professional Engineers could develop and launch an awareness campaign at the high school and university levels.

5.3 Employment Programs

After attracting and educating individuals for work in the environmental industry, placement of these individuals should be facilitated.

5.3.1 Employment Service

Explore the idea of a central registry of qualified and available personnel employable on a full/part-time basis in the environmental industry. Possibly administered by the private sector, (profit or not-for-profit), this service could deal with various forms of employment: permanent versus temporary, and long-term versus short-term assignments. A service of this nature is provided in the United States by the Environmental Careers Organization (a private sector, not-for-profit organization).

5.3.2 Government/Private Sector Employment Program

The industry may wish to explore with governments the possibility of an employment program for recent graduates qualified to work in the environmental industry.

5.3.3 Co-operative Education Program

Encourage universities/colleges with environmental programs to consider Co-operative Education programs with 3 to 4 work terms of 3 to 4 months each in duration over the course of the study program. This type of program provides the students with practical work

experience and exposes companies to potential employees.

**5.3.4 Apprenticeship Type Program/
Extension of Employment Programs**

Establish apprenticeship programs for the new economy. The initial emphasis will be on new apprenticeship initiatives in growth areas with the greatest demand, such as environment services.

5.3.5 Encourage the proposed Youth Services Corp to undertake community environmental projects.

CHAPTER 6 - PULLING IT ALL TOGETHER

Context

In the preceding chapters this Consultation Paper has addressed a number of specific issues and suggested a wide variety of possible initiatives in the four areas that are fundamental to the success of any comprehensive effort to promote the growth and development of the Canadian environmental industry -- access to domestic and international markets; technology development; financing; and human resource development, particularly training. In the course of this discussion, over sixty individual initiatives have been introduced for consultation. An array of federal and provincial government programs and activities exist to support the Canadian environmental industry, as illustrated in the Appendices to this paper.

Issues and Possible Initiatives

The departments and agencies of the federal government deliver a wide variety of programs in support of Canada's environmental industry. Environment Canada and Industry Canada play primary roles in this regard, with the active involvement of External Affairs and International Trade; Natural Resources Canada; Human Resources Development; the National Research Council; the Natural Sciences and Engineering Research Council; and the Canadian Council of Ministers of the Environment, amongst others. Federal support for the environmental industry may be broken into four distinct themes - financing; technology development; market access and development; and training - although many programs serve more than one of these areas.

Programs with financing components specific to the environmental industry include Industry Canada's Environmental Technology Commercialization Program, which provides financial assistance for the development, demonstration and commercialization of promising environmental technologies; Environment Canada's Development and Demonstration of Resource Energy Conservation Program (D => RECT) which funds the demonstration of innovative technologies that reduce pollution and recover energy from wastes; and Natural Resources Canada's Industrial Energy Research and Development Program, which assists industry to develop new and/or improved products, processes and systems that increase energy efficiency.

There are a number of regionally based general financing programs which support companies in the development and marketing of environmental products and services. These include:

- ▶ Business Incentives Program, which provides assistance for research and development projects (Federal Economic Development Initiative for Northern Ontario);
- ▶ Western Diversification Program that assists in new technology development projects (WED);
- ▶ ACOA Cooperation Programs, which provide various forms of assistance to small and medium-sized businesses for innovation and technology transfer; and
- ▶ Technical research and development assistance which supports technical

innovation, industrial design and technological development (FORDQ).

Federal support for technology development is contained in the Natural Sciences and Engineering Research Council's Research Partnerships Program, which encourages partnerships between universities and the private sector to develop new products and processes; the National Research Council's Industrial Research Assistance Program, which provides small and medium-sized firms with technical information, funding and selected expertise to help develop and implement new technologies; and three new National Environmental Technology Advancement Centres, that will play a cornerstone role in assisting small and medium-sized enterprises to develop, demonstrate, and commercialize new environmental technologies.

In addition, federal scientists and engineers in the laboratories of the NRC, Natural Resources Canada and Environment Canada carry out extensive environment R&D and are major contributors to innovation and technology transfer in Canada.

In support of market access and development, Industry Canada and External Affairs publish the International Trade Business Plan, which identifies federal trade related initiatives, including trade shows and business missions, for the environmental industry. Environment Canada has established the Office of Environmental Stewardship which promotes environmental procurement within federal departments and Globe '94, an environmental industry trade show, will highlight Canadian environmental industry capabilities to the world.

Many federal support programs have training components. Of particular note is the Canadian Council for Human Resources

in the Environment Industry, which has been established with the support of a number of federal departments to ensure that educational courses, programs and other positive measures are in place to provide the high quality skills training required by the environmental industry.

The above selection is representative of a much greater number and variety of federal support programs for the Canadian environmental industry. Further detail is contained in the Appendix.

Is the problem too little government support of the Canadian environmental industry or too much? The discussion of the previous chapters clearly suggests that there is a real need for fresh thinking and imaginative new initiatives, such as those contained in this Consultation Paper. In addition, there is an equally important requirement for coordination, cost effectiveness and, particularly, for leadership.

Leadership, vision, strategy, cost-effectiveness and commitment - these are the missing ingredients that the federal government hopes to bring to its Canadian Environmental Industry Initiative, beginning with this important consultative exercise to listen to Canadians and to share their vision.

6.1 Coordinated Strategy

6.1.1 The federal government will develop an effective, coordinated and targeted strategy to strengthen federal programs and activities. In addition, we will work closely with our provincial counterparts with a view to optimizing provincial programs and activities with this federal initiative.

6.1.2 Explore the creation of an industry-university-government advisory body to advise on the implementation of the environmental industry strategy which targets government regulation and funding to critical needs.

6.2 Strategic Environmental Product Standards, Policies and Programs

6.2.1 Review and examine in support of the Canadian environmental industry sector, the current and planned environmental product standards, policies and programs of the federal government to maximize present and future employment opportunities for Canadians.

6.3 Working Strategically with National Environmental Advancement Centres

6.3.1 The network of three new National Environmental Technology Advancement Centres, located in Western Canada, Quebec and Ontario, will be a cornerstone in delivering the federal government's environmental industry strategy. The processes for establishing and operating these centres should optimize employment opportunities for Canadians and maximize our ability to care for our Canadian and global environment.

6.4 Working Strategically With Environmental Industry Associations

6.4.1 The national and provincial environmental industry associations have a particularly important continuing role to play in promoting the growth and development of the Canadian environmental industry, given its diversity and the smallness and newness of many of its member firms. The federal government recognizes the perseverance and leadership that the associations have demonstrated in sometimes trying circumstances, appreciates the support that the associations have given to the development of the National Environmental Technology Advancement Centres, and is committed to work closely with them and to help strengthen them.

It is the federal government's hope and expectation to implement these four key overriding commitments, and a strategic selection of existing government programs and new policy and program initiatives, influenced by this consultation process, as part of our Canadian Environmental Industry Initiative. In partnership with other levels of government and other Canadian stakeholders, we will help to promote the healthy growth and development of the Canadian environmental industry and the environmentally sustainable development of the Canadian economy.

APPENDIX 1

OVERVIEW OF FEDERAL PROGRAMS FOR THE ENVIRONMENTAL INDUSTRY

PROGRAM/ACTIVITY - THEMES	DESCRIPTION
<p><i>RESEARCH PARTNERSHIPS PROGRAM</i></p> <ul style="list-style-type: none"> ▶ Financing ▶ Technology ▶ Training 	<p>The Natural Sciences and Engineering Research Council of Canada (NSERCC) delivers this program, aimed at encouraging partnerships between universities and private sector organizations. Funding and technical support for projects involving the Council and private sector organizations, universities, consortia and associations is available. Activities include: research and development; seminars; workshops; scholarship; and fellowship awards.</p>
<p><i>INDUSTRIAL RESEARCH ASSISTANCE PROGRAM (IRAP)</i></p> <ul style="list-style-type: none"> ▶ Financing ▶ Technology 	<p>The IRAP is administered by the National Research Council of Canada in cooperation with various federal departments. It provides small and medium-sized firms with technical information, funding and industrial engineering and expertise in order to access Canadian and foreign technology and reduce the risk of implementing new technologies. This includes new industrial processes and other environmental technologies.</p>
<p><i>ENVIRONMENTAL TECHNOLOGY COMMERCIALIZATION PROGRAM</i></p> <ul style="list-style-type: none"> ▶ Financing ▶ Technology 	<p>This program is a component of the Green Plan Technology for Environmental Solutions initiative. Sharing the financial risks of developing, demonstrating and commercializing new technologies which address environmental problems through the use of first time pilot and demonstration projects is the program objective. Financial assistance up to 50 per cent of demonstration costs to a maximum of \$5 million and 75 per cent or \$50,000 for preliminary studies is available.</p>
<p><i>ENVIRONMENTAL INNOVATION PROGRAM</i></p> <ul style="list-style-type: none"> ▶ Financing 	<p>The Environmental Innovation Program supports innovative research and development proposals for new environmental products, processes and technologies. The program objectives are to strengthen Canada's environmental science and technology and promote environmental innovation in the private sector.</p>
<p><i>COMMERCIAL TECHNOLOGY LICENSING</i></p> <ul style="list-style-type: none"> ▶ Markets ▶ Technology 	<p>The Technology Development Branch of Environment Canada is actively involved in licensing environmental technologies developed at government research centres and institutes, to private sector partners.</p>

<p><i>ENVIRONMENTAL INDUSTRY SECTOR INITIATIVE (EISI)</i></p> <ul style="list-style-type: none"> ▶ Markets ▶ Financing ▶ Technology ▶ Training 	<p>EISI is aimed at building a strong environmental industry in Canada. A number of projects and activities in support of the industry are either planned or underway. These generally focus on areas which include market research and analysis; international technology networking; supplier/buyer conferences; capital market research; and international business missions.</p>
<p><i>NOVA SCOTIA COOPERATION AGREEMENT ON SUSTAINABLE ECONOMIC DEVELOPMENT</i></p> <ul style="list-style-type: none"> ▶ Markets ▶ Financing ▶ Technology ▶ Training 	<p>The Nova Scotia Cooperation Agreement on Sustainable Economic Development involves integrating environmental and economic decision-making in both the public and private sectors. Assistance is provided for the development of the environmental industry, particularly the service sector.</p>
<p><i>SUSTAINABLE ECONOMIC DEVELOPMENT AGREEMENT</i></p> <ul style="list-style-type: none"> ▶ Technology ▶ Training 	<p>This agreement involves developing the potential economic use of resource based by-products and the development of environmental technology in P.E.I.</p>
<p><i>D=>RECT PROGRAM, DEVELOPMENT AND DEMONSTRATION OF RESOURCE AND ENERGY CONSERVATION</i></p> <ul style="list-style-type: none"> ▶ Financing ▶ Technology 	<p>This funding program encourages the demonstration of innovative new technologies that reduce pollution and recover energy from municipal and industrial wastes.</p>
<p><i>INDUSTRIAL ENERGY RESEARCH AND DEVELOPMENT PROGRAM (IERD)</i></p> <ul style="list-style-type: none"> ▶ Financing ▶ Technology 	<p>The IERD is a cost-shared program which assists Canadian industry to develop new and/or improved products, processes and systems that increase the efficiency of energy uses and encourage the widest possible use of the technology developed.</p>
<p><i>INDUSTRIAL TARGETED PROGRAM (ITP)</i></p> <ul style="list-style-type: none"> ▶ Financing ▶ Technology 	<p>ITP is a cost-shared program which facilitates sectoral studies, and technology assessments, and which encourages follow-up research and technical field trials on energy efficient technology. The initiative is aimed at identifying opportunities and encouraging implementation through consortia of shareholders.</p>

<p><i>ENVIRONMENTAL STEWARDSHIP PROGRAM</i></p> <ul style="list-style-type: none"> ▶ Markets 	<p>This Green Plan Program is designed to promote the "greening" of federal operations across a number of areas which include procurement policies, day-to-day practices, fleet management and material management. Each department is in the process of developing an action plan which will state how various initiatives will be implemented.</p>
<p><i>GREAT LAKES CLEAN-UP FUND</i></p> <ul style="list-style-type: none"> ▶ Markets 	<p>This Fund is a component of the Great Lakes Action Plan to aid the restoration of water quality in the Great Lakes basin in Canada. Part of the Fund has been allocation to assist the development and demonstration of clean-up and pollution prevention technologies.</p>
<p><i>GREAT LAKES/ST. LAWRENCE RIVER POLLUTION PREVENTION INITIATIVE</i></p> <ul style="list-style-type: none"> ▶ Technology ▶ Training 	<p>This Green Plan program is targeted at restoring water quality in the St. Lawrence River and Great Lakes basin. The initiative includes education and awareness activities undertaken by the Great Lakes Pollution Prevention Centre in Sarnia, Ontario, and the development of voluntary pollution prevention programs with several industrial sectors. Programs are already underway with the automotive sector, and the metal finishing sector.</p>
<p><i>POLLUTION PREVENTION OFFICE</i></p> <ul style="list-style-type: none"> ▶ Markets ▶ Technology ▶ Training 	<p>The National Office of Pollution Prevention is responsible for promoting sustainable development practices; developing a coordinated national pollution prevention strategic framework and a federal government action plan; and encouraging voluntary industry action to reduce pollutants and waste.</p>
<p><i>MINE ENVIRONMENT NEUTRAL DRAINAGE PROGRAM (MEND)</i></p> <ul style="list-style-type: none"> ▶ Financing ▶ Technology 	<p>MEND is a cooperative research program 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 aquatic and terrestrial environment.</p>
<p><i>GROUNDWATER AND SOIL REMEDIATION PROGRAM</i></p> <ul style="list-style-type: none"> ▶ Technology 	<p>This government-industry funded program promotes fundamental research on innovative ways to clean up groundwater and soil contaminated with petroleum hydrocarbons. Funding is provided by the federal government and the petroleum associations in Canada and the U.S.</p>
<p><i>NATIONAL CONTAMINATED SITES REMEDIATION PROGRAM (NCSRP)</i></p> <ul style="list-style-type: none"> ▶ Financing ▶ Technology 	<p>The NCSRP objectives are to help clean-up high risk contaminated sites and stimulate the development of innovative remediation technologies. The program is jointly funded by the federal, provincial and territorial governments and administered through bilateral agreements between Environment Canada and the provincial/territorial governments.</p>

<p><i>INTERNATIONAL ENVIRONMENTAL TRAINING INITIATIVE</i></p> <ul style="list-style-type: none"> ▶ Markets ▶ Technology ▶ Training 	<p>This program involves working with Canadian companies and foreign clients to provide developing countries with educational programs and technology skills training. Programs have been undertaken in Mexico and are currently being developed for China.</p>
<p><i>ENVIRONMENTAL PROTECTION PUBLICATIONS</i></p> <ul style="list-style-type: none"> ▶ Technology 	<p>Environment Canada publishes numerous technical and non-technical reports on environmental subjects each year. This publication lists the reports of the Environmental Protection Series (EPS), the EnviroTIPS Manuals which provide information on 50 chemicals, and publications and reports published jointly by Environment Canada and other government agencies.</p>
<p><i>DIRECTORY OF MANUFACTURERS OF ENVIRONMENTAL PRODUCTS/ DIRECTORY OF CANADIAN ENVIRONMENTAL SERVICES FIRMS</i></p> <ul style="list-style-type: none"> ▶ Markets 	<p>These directories were developed as a component of the Environmental Industry Sector Initiative of Industry Canada. They list active Canadian environmental industry companies in the manufacturing and service sectors and are used to promote export opportunities, develop strategic alliances and encourage networking.</p>
<p><i>THE INTERNATIONAL TRADE BUSINESS PLAN</i></p> <ul style="list-style-type: none"> ▶ Markets 	<p>The Trade Plan has been organized by External Affairs, Industry Canada and other federal departments to identify and integrate the planning of all environmental business shows, missions and other federal initiatives abroad.</p>
<p><i>ENVIRONMENTAL CONSULTATIONS CALENDAR</i></p> <ul style="list-style-type: none"> ▶ Markets ▶ Financing ▶ Technology ▶ Training 	<p>This calendar is published twice a year primarily to provide organizations and communities with a means to focus their interventions in the environmental arena and to better access decision-makers. It provides a regular summary of upcoming consultations on Green Plan initiatives and other ongoing environmental policy, program and regulatory initiatives of federal departments.</p>
<p><i>HUMAN RESOURCE STUDY OF THE CANADIAN ENVIRONMENT INDUSTRY</i></p> <ul style="list-style-type: none"> ▶ Training 	<p>This comprehensive study of human resources in the environmental industry was conducted by Human Resources and Labour Canada. It includes an analysis of current human resource trends within the industry, a breakdown of industry issues and recommendations for future training.</p>
<p><i>BUILDING A STRONGER ENVIRONMENTAL TECHNOLOGY EXPLOITATION CAPABILITY</i></p> <ul style="list-style-type: none"> ▶ Markets ▶ Technology 	<p>This study was undertaken by Environment Canada as part of the Technology Transfer Program and contains detailed information about the Canadian environmental industry including the results of a survey on the barriers to technology commercialization and information about Canadian and international markets.</p>

<p><i>INTERNATIONAL TRADE CANADA EXPORTERS DIRECTORY</i></p> <ul style="list-style-type: none"> ▶ Markets 	<p>The Exporters Directory contains information about Canadian companies within the environmental industry which are capable of exporting. This publication is updated every 18 months and should assist companies to improve their export performance, networking and international competitiveness.</p>
<p><i>GLOBE SERIES</i></p> <ul style="list-style-type: none"> ▶ Markets ▶ Financing ▶ Technology 	<p>Since 1990, Environment Canada, in cooperation with several other federal departments, has sponsored a biannual international trade show and conference for the environmental industry. Globe '94 will offer Canadian firms the opportunity to develop foreign markets, forge strategic alliances, and access new technology and financing.</p>
<p><i>U.S. MARKETS ENVIRONMENTAL INVESTMENT PROMOTION GROUP</i></p> <ul style="list-style-type: none"> ▶ Markets ▶ Financing ▶ Technology 	<p>Industry Canada, External Affairs and International Trade Canada promote the partnering of Canadian firms with U.S. firms for technology development and investment. Support is provided for workshops, special market studies and missions.</p>
<p><i>INDUSTRIAL COOPERATION PROGRAM - PROJECT SUPPORT FOR ENVIRONMENTAL TECHNOLOGY COOPERATION</i></p> <ul style="list-style-type: none"> ▶ Financing 	<p>This initiative aims at establishing a more efficient transfer of Canadian technology to developing countries through the cost-sharing of expenses associated with the adaptation of a Canadian company's technology to a local situation.</p>
<p><i>CANMET</i></p> <ul style="list-style-type: none"> ▶ Technology 	<p>The Canada Centre for Mineral and Energy Technology, through its research facilities across Canada, works with the minerals, metals and energy industries to find safer, cleaner and more efficient methods to develop and use Canada's mineral and energy resources.</p>

APPENDIX 2

BRITISH COLUMBIA GOVERNMENT

Key Programs & Activities for the Environmental Industry

Environmental Programs

- ▶ **Battery Collection System**
(Used batteries in B.C. transported to a processor regardless of lead price / transportation costs.) Ministry of Environment, Lands and Parks
- ▶ **Financial Incentives for Recycling Scrap Tires (FIRST)**
(To ensure that used tires are directed towards processing and recycling facilities rather than to landfill sites, slash burning or stockpiles.) Ministry of the Environment, Lands and Parks
- ▶ **Science and Technology Fund**
(Support for scientific and technical innovation in the Province of B.C.) Ministry of Advanced Education, Training and Technology.
- ▶ **Equity Capital Program**
(Tax credit for establishment/expansion of manufacturing/processing.) Ministry of Small Business Development, Tourism and Culture.

Activities

- ▶ **British Columbia Environmental Industry Strategy:**
(Ministry of Employment and Investment)

Activities include: Environmental Industry Advisor
 - Globe'94 Co-Chair.
 - Centre of Environmental Technology and Advancement Corporation (CETAC) contact
 - Waste reduction Commission
 - Beverage container strategy
 - Canadian Council of Environmental Ministers
- ▶ **Regulatory reform - New Environmental Assessment Act under the Environmental Protection Act within 1 or 2 years.**
(Ministry of Environment, Land & parks)

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- ▶ **British Columbia Trade Development Corporation (BCTrade)**
(Assist environmental companies to penetrate export markets.)

 - ▶ **British Columbia Purchasing Commission (BCPC)**
(Development of environmental or "Green" purchasing policy and provides assistance for supplier and technology development.)

 - ▶ **Ministry of Employment and Investment**
(Through its Science and Technology division, and Science Council of BC, focuses on initiatives that use science and technology to foster environmental industry. It also has an interest in human resource development.)

 - ▶ **Ministry of Energy, Mines and Resources**
(To foster alternative energy sources to conserve non-renewable resources and improve air quality.)

ALBERTA GOVERNMENT

Key Programs & Activities for the Environmental Industry

Environmental Programs

- ▶ **Help End Landfill Pollution (HELP)**
(To inventory, assess and investigate, and remediate high risk abandoned industrial landfills and plant sites in Alberta.) Alberta Environment.
- ▶ **Alberta Waste Materials Exchange (AWME)**
(Operate in conjunction with Canadian Waste Material Exchange (CWME) an information clearinghouse designed to put potential users of waste materials in contact with waste producers.) Alberta Environment.
- ▶ **Municipal Waste Action Initiative**
(Start up capital to municipalities and non-profit groups for the development of recycling projects, the implementation of integrated regional waste management plans and provide information to identify opportunities and support for waste materials markets.) Alberta Environment.
- ▶ **Tire Recycling Program**
(Ensure that used tires are directed towards processing and recycling facilities rather than landfill sites, slash burning or stockpiles.) Alberta Environment, Tire recycling management board.
- ▶ **Applied Research & Products Development**
(Resources and expertise to help firms in the further development of innovative ideas. From information gathering to feasibility studies to economic and market assessment to designing, prototyping, testing and modifying a product.) Northern Alberta Institute of Technology and Southern Alberta Institute of Technology.

SASKATCHEWAN GOVERNMENT

Key Programs & Activities for the Environmental Industry

Environmental Programs

- ▶ **Environmental Technology Development Program (ETDP)**
(Assistance in the development of innovative products and processes, development and testing of prototypes, scale-up and demonstration projects.) Saskatchewan Economic Development and Saskatchewan Environment and Public Safety.

Activities

- ▶ **The Western Environmental Committee** was created as a follow-up to the Western Environmental Industry Steering Committee (WEIS). This committee produced the Western Environmental Industry Study.

MANITOBA GOVERNMENT

Key Programs & Activities for the Environmental Industry

Environmental Programs

- ▶ Sustainable Development Innovations Fund (SDIF)
 - (Assistance provided for the development, implementation and promotion of environmental innovation projects which support sustainable development.) Grants limited to \$40,000 - Special projects may exceed this limit. - Manitoba Industry, Trade and Tourism.
 - (Cost shared assistance of up to 50% up to \$25,000 may be provided for studies and development opportunities.)
 - (Manitoba's executive Council (P.O.) Sustainable Development Coordination Unit.)

Activities

- ▶ Environmental Industries Development Initiative
 - The lead instrument in Manitoba with respect to assistance to environment-related fields. An important aim of the initiative is to lever complementary resources from the private sector and other levels of government.

ONTARIO GOVERNMENT

Key Programs & Activities for the Environmental Industry

Environmental Programs

- ▶ Mine Environment Neutral Drainage Ontario (Mend-O)
(Funding to mitigate acid production from mining sites)
- ▶ Industrial Waste diversion Program (IWDP)
(Technical and financial assistance for projects designed to divert industrial waste from disposal sites by reducing, reusing and recycling)
- ▶ Municipal 3R's Program
(Assistance to municipalities to recover materials from waste disposed in landfill sites)
- ▶ On-site Sewage Grants
(Assistance to municipalities and health units in administering part vii of the Environmental protection act (sewage system certification))
- ▶ Zebra Mussel Control Program
(Environmentally safe actions to control "zebra mussel")
- ▶ Clean up Rural Beaches (CURB)
(Assistance to clean up rural beaches)
- ▶ Environmental Education and Awareness program (EEAP)
(Assistance for environmental education and awareness projects)
- ▶ Environmental Technologies Program (ETP)
(Assistance for the demonstration of innovative technologies with environmental benefits and commercial opportunities)
- ▶ University Research Incentive Fund (URIF)
(R&D - strengthen partnership industry/universities)
- ▶ New Technology Program
(R&D - encourage the adoption of new technologies for Northern Ontario Resource-based industry)
- ▶ Market Entry of Energy Efficient Technology (MEET)
(Helps Ontario manufacturers achieve first-time sales of new energy efficient products)

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- ▶ EnerSearch program
(Grants to Ontario companies developing innovative energy technologies that can have an important impact on the environment)
 - ▶ New Ventures Program
(Funding for new business through loan guaranties)
 - ▶ Technology Adjustment Research Program (TARP)
 - ▶ Trade Expansion Fund (TEF)
(Assisting companies to develop new markets in other countries)

Activities

- ▶ Ontario Green Industry Strategy:
 - Business Development Units (assistance toward commercialization of environmental and energy efficient technologies)
 - Green Industrial Ministerial Advisory Committee (GIMAC)
 - Green Industrial Analysis & Retrofit (GIAR)
 - Green Communities (home assessments to reduce consumption of energy and water)
 - Pollution Prevention Pledge Program
 - MOEE's annual Environmental Technology Transfer Conference

QUÉBEC GOVERNMENT

Key Programs & Activities for the Environmental Industry

Environmental Programs

- ▶ Aide à la réduction des déchets solides
(waste diversion / Promote recycling, reusing & reducing)
- ▶ Aide à la modernisation et à l'innovation technologique (AMITECH)
- ▶ Le fond de recherche et de développement technologique en environnement (FRDT-E)
- ▶ Programme d'aide à la recherche et au développement en environnement (PARDE)
- ▶ Programme d'innovation technologique en environnement (PITE)
- ▶ Programme de recherche exploratoire en environnement (PREE)
- ▶ Programme d'aide à la modernisation et à l'innovation technologique (PAMITECH)

Activities

- ▶ Québec's plan de relance - Volet Environnement Industry
- ▶ Financial assistance - Companies to develop new markets in other countries. 3 years and \$15 m. (announcement 20.12.93) (MICT - MENVIQ - MAI)
- ▶ Pilot project - Site remediation - region of Montreal. \$10 m. Secrétariat du Grand Montréal.
- ▶ Programme d'aide au développement de l'industrie du recyclage au Québec. \$12m. - 3 years. (MICT-MENVIQ)
- ▶ Financial assistance to companies - Mining site remediation on crown land. \$20m. - 3 years. MER

Note: All activities for Québec's environmental industry are under the project "Les grappes Industrielles". Under this project a strategy will be announced.

NEW BRUNSWICK GOVERNMENT

Key Programs & Activities for the Environmental Industry

Environmental Programs

- ▶ **New Brunswick Environmental Trust Fund**
(For action oriented activities to protect, preserve and enhance New Brunswick's natural environment.) Department of the Environment.

Note: Other generic programs delivered by the Department of Economic Development and Tourism. Environmental projects are eligible.

Activities

- ▶ **Environmental Industries Strategy** based on an action plan developed under The New Brunswick "Premier's" Round Table on the Environment and the Economy towards Sustainable Development.

NOVA SCOTIA GOVERNMENT

Key Programs & Activities for the Environmental Industry

Environmental Programs

- ▶ **Business Future Program**
(Assistance to companies registered with the WIN to establish markets and increase exports outside the Maritimes) Department of Economic Development.
- ▶ **NS Environmental Trust Fund**
(Support R&D on projects that will enhance and protect natural resources) Department of the Environment.
- ▶ **NS Youth Conservation Corps**
(Provide services by involving teams of young people in the conservation and enhancement of Nova Scotia's environment). Department of the Environment.
- ▶ **NS Youth Environmental Challenge Program**
(Opportunities for youth, aged from 17 to 24 to translate their concerns for the environment into jobs for themselves).
- ▶ **Resource Recovery Fund**
(Assist municipalities).

Activities

- ▶ Committee established by the province under the provincial Department of DOE to develop a provincial strategy for the environmental industry. It will evolve and develop into an action plan - summer of 1994.

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Environmental industry strategy for Canada : consultation paper

DATE DUE - DATE DE RETOUR

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