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ENVIRONMENT AND ECONOMY
THE CHALLENGE TO ISTC

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FOREWORD

The environmental imperative facing industry over the coming decade will present both opportunities and challenges to Canadian industry. This paper describes the nature of those challenges and opportunities and identifies ISTC's role in helping industry adapt to the transition to sustainable development. It was drafted by ISTC's Working Group on the Environment, which is also responsible for coordinating the development and implementation of an ISTC Action Plan on Environment and Economy. The main objectives of the Action Plan will be to strengthen ISTC's policy capabilities and to increase the Department's environmental deliverables to industry.

The release of this paper signals ISTC's intent to play a larger role in environmental policy development and represents a commitment to help industry adjust to both the challenges and the opportunities resulting from the implementation of sustainable development policies.

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ENVIRONMENT AND ECONOMY

THE CHALLENGE TO ISTC

1. INTRODUCTION

This paper describes how ISTC is positioning itself to respond better, in the short term, to the rapidly changing environmental regulatory environment and, in the longer term, to sustainable development. Sustainable development is a concept popularised by the report of the World Commission on Environment and Development (the Brundtland Report) and forms the basis for the Federal Government's agenda for environmental action, The Green Plan. The underlying philosophy of sustainable development is that long term economic growth depends on a healthy environment and that environmental and economic planning cannot continue to proceed in separate spheres. Sustainable development is, therefore, economic development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

The paper begins with a brief review of the nature of the public's concern about the environment and the response, to date, by the Government. The paper then focuses on the strategic opportunities and challenges facing industry, and the actions that ISTC is taking, or contemplating, to assist industry during the transition period from traditional to sustainable development.

2. CONTEXT

2.1 PUBLIC CONCERN ABOUT THE ENVIRONMENT

Environmental consciousness has been rising steadily throughout the world during the past few years to the point where environmentalism has become an election platform in many major, industrialised countries and candidates from "green" parties are being elected to office. The Brundtland Report and its recommendation for sustainable development, coupled with some significant environmental disasters (e.g. Bhopal, Chernobyl, EXXON Valdez) have solidified support for more responsible processing and husbandry of natural resources.

Scientific investigation has improved our understanding of chemical and biophysical interactions in the environment. For example, it is now well accepted that emissions of sulphur dioxide and nitrogen oxides contribute to acid rain, that chlorofluorocarbons (CFCs) in the upper atmosphere are harmful to the protective ozone layer, and that the burning of fossil fuels may contribute to global warming. Clearly, the environment's assimilative capacity is reaching its limits and is now having a noticeable impact on the biosphere, including human health. Canadians are becoming more aware of deteriorating environmental quality and its relationship to human activities and are beginning to appreciate the global consequences of individual actions. Not surprisingly, therefore, recent polls have indicated that:

- o 8 in 10 Canadians believe that pollution threatens survival of the human race;
- o 9 in 10 believe that pollution has a health effect; and,
- o 9 in 10 believe that environmental concerns should take priority over economic development. This is an increase from 8 in 10 in 1987.

These polls suggest that Canadians' concern about environmental quality and sustainable development is not transitory and will probably increase. The level of concern in Canada is currently higher than in many other countries, but there is every indication that concern about the environment in other nations is also rising. For example, a recent survey conducted in 18 European countries confirmed that environmental concerns are significant and, among other things, indicated that environmental protection is considered by the majority of

respondents as essential to future economic development. In addition, more than 80 percent saw environmental protection as an economic driver.

Canadians have welcomed the opportunity to contribute to environmental quality, as evidenced by the success of curb side (blue box) recycling programs. Further, the appearance of "green" products on the market, and their runaway success, confirm that consumers are prepared to go out of their way to act in "environmentally friendly" ways. However, they also expect industry to adopt similar behaviour and they hold governments responsible for curbing behaviour by companies that is detrimental to the environment. This has led to a demand for increasing government action, often without recognition of the extent to which such action may change lifestyles and lower living standards, or without identifying which level of government (federal, provincial or municipal) has primary responsibility for taking corrective action.

2.2 THE FEDERAL RESPONSE: AN AMBITIOUS AGENDA

Governments at all levels in Canada have responded to the growing environmental imperative. In addition to having signed international protocols and conventions respecting emissions of sulphur dioxide, nitrogen oxides, chlorofluorocarbons and the transboundary transportation of hazardous wastes, the Federal Government has, for example, implemented the Canadian Environmental Protection Act to regulate the complete "life cycle" (production, use and disposal) of new and existing chemicals, begun clean-ups of the St. Lawrence River, Great Lakes and contaminated waste disposal sites and created a Cabinet Committee on the Environment to ensure that federal decisions consider their environmental effects.

Federal action on the environment will culminate with the release, in the Fall, 1990, of The Green Plan. The Green Plan will be aimed at encouraging Canadians to consider the environmental effects of their actions. Its objective is to engender, within all levels of Canadian society, a commitment to sustainable development.

3. MANAGING THE TRANSITION TO SUSTAINABLE DEVELOPMENT

3.1 SUSTAINABLE DEVELOPMENT: A FUNDAMENTAL CHANGE

Canada's industrial structure has been largely shaped by its abundant supply of reasonably accessible natural resources, including energy. Much of Canada's resource wealth is found in non-renewable resources, whose consumption today threatens their availability for subsequent generations. In addition, Canada's husbandry of renewable resources, and their processing, has not, in general, been conducted in a sustainable manner (e.g. management of the East Coast fishery, salination of Prairie soils, soil erosion associated with poor farming and forest harvesting techniques, inadequate reforestation, water pollution from fertilizer and pesticide run-off, etc.).

Many of these problems can be linked to Canada's open economy and its position as an international price-taker. Because international market-based prices for resources and resource-based commodities reflect, in part, the production costs of the lowest cost producer, many of whom also have the lowest environmental standards, resource prices, both in Canada and abroad, do not reflect the long term environmental costs, or externalities, of their consumption. Policies implementing sustainable development would seek to ensure that the long term environmental costs of economic development are considered in decision-making.

The impact on Canada's international competitiveness of tightening environmental regulations can be both positive and negative. This is because the impact on competitiveness of increased regulation is influenced by the structure of the regulations themselves, their impact on operational efficiencies in the short, medium and long term, and the nature of the regulatory regimes in competing countries. While compliance with regulations will involve costs to business, the structure of regulations can also serve as a technology driver, helping to increase industrial competitiveness. Consequently, it is critical that both the timing and the nature of new environmental initiatives promote the development of Canada's environmental industry and its technology base.

3.2 THE CHALLENGE TO INDUSTRY

The challenge to industry is to minimise environmental degradation by making their operations more efficient and friendly toward the environment.

Efficiency is critical to competitiveness and its virtues are well understood by the business community. Efficiency improvements can be achieved by revising production processes and, where necessary, installing new equipment and technological processes. There is, therefore, also a challenge to the science and technology communities to develop, or import and diffuse, cost-effective pollution abatement and "clean" technologies. Given a long enough time horizon, one can see obvious benefits, not only for the environment itself, but also for the competitive position of industry of becoming more efficient through:

- o using inputs more efficiently; and,
- o having products that will be environmentally acceptable in other markets.

It is anticipated that the initial emphasis of The Green Plan will be to tighten the environmental regulatory regime facing major point source polluters. In the future, given budgetary restraint, heightened environmental consciousness and the need to address individually smaller, more diffuse pollution sources, regulatory mechanisms may need to be supplemented by alternative mechanisms such as market-based incentives (user charges, pollution taxes and marketable discharge permits). Nevertheless, all sectors of the economy will experience, to varying degrees, increasing pressures to reduce their consumption of resources by improving efficiencies and new pressures to enhance the durability and recyclability of their products.

3.2.1 Environmental Opportunities

Business opportunities, and challenges, will be created by policies implementing sustainable development. The environmental imperative will create opportunities for, among other things:

- o laboratories and R&D institutions to develop, adopt, or adapt technologies to improve production efficiencies and to treat residual pollutants;
- o producers of pollution abatement products and services;
- o manufacturers of "clean", or more efficient, machinery and equipment;
- o producers of "environmentally friendly" products and services; and,
- o enhancing the quality of Canada's tourism image and product.

Estimates of the size and rate of growth of the market for environmental goods and services vary, in part hampered by the amorphous character of the industry itself. ISTC's Environmental Industries and Projects Division estimates that the Canadian market is about \$10 billion and growing at a rate of 17-30 percent per year. The American market is about \$110 billion and growing at about the same rate.

3.2.2 Adjustment Costs

New regulatory and other environmental initiatives are also likely to create adjustment pressures for those firms and industries whose activities degrade the environment or make intensive use of energy and other natural resources. These pressures will mainly affect the manufacturing industries and will be strongest in the resource processing industries because:

- o some of our competitors will not face similar regulatory compliance costs, or will not purchase their natural resource feedstocks at "full environmental prices";
- o other competitors have already introduced significant improvements to their technological processes to minimise pollution and increase operational efficiencies; and,
- o resource-based sectors tend to be international price-takers, meaning that they must absorb most, if not all, of the increased costs of production.

For example, one economic forecasting firm estimated recently that the opportunity cost to manufacturers of investing in new pollution abatement measures in order to comply with a selection of current and contemplated environmental initiatives could reach about 4-5 percent of total forecast growth in Gross Domestic Product between 1990 and 2000. Some sectors, such as chemicals and petroleum and coal are likely to experience significantly higher adjustment pressures. The overall impact on economic growth between 1990 and 2000 is forecast to be a decline of about 2 percent ¹.

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It should be noted that this study only examined the impact of a handful of environmental initiatives and did not try to model, for example, the impact on economic growth of programs to reduce emissions of carbon dioxide, or nitrogen oxides and volatile organic compounds. The paper also assumed that investments in pollution abatement technologies yield no benefits to the implementing company (e.g. through increased production efficiencies); the only benefit was assumed to be regulatory compliance and a cleaner environment.

The nature and degree of adjustment pressures facing firms will be influenced by:

- o governments' schedules for achieving new, more stringent environmental objectives and the means by which they are implemented;
- o the extent to which process or product pollutants currently exceed acceptable levels;
- o the extent to which the environmental costs of industrial activities (e.g. consumption of natural resources, emissions from their processing) are currently considered and borne by those making production and consumption decisions;
- o the financial capability of firms to invest in new equipment and the opportunity cost of doing so;
- o the pace of development of pollution abatement and "clean" process S&T and their impact on production costs; and,
- o the extent and speed with which foreign competitors are faced with sustainable development measures initiated by their governments.

4. THE NEED FOR LEADERSHIP

4.1 A STRATEGIC OPPORTUNITY

Environment is the issue of the 1990s and ISTC intends to play a significant role in assisting industry to maintain or enhance its competitiveness while addressing environmental challenges. Because provincial and municipal governments, in addition to the Federal Government, are actively developing and implementing new environmental initiatives, industry is facing the daunting challenge of competing internationally while coping with rapid regulatory change. In view of these circumstances, ISTC intends to position itself to influence the nature and scope of the environmental regulatory agenda and to help industry:

- o adapt to challenges posed by environmental regulations;
- o take advantage of the business opportunities created by environmental protection; and,

- o manage both the upside and downside pressures during the transition to sustainable development.

The diversity of Canadian industry means that the need for a cleaner environment, and the attendant upside opportunities for providers of goods and services, needs to be balanced against the needs of natural resource intensive, or highly polluting sectors to have the opportunity to change their operations in a commercially viable manner. The common thread uniting the needs of both groups of industries is the need for effective leadership by ISTC. ISTC will be proactive on sustainable development and firmly exercise its mandate by:

- o fostering the development of new, more efficient (i.e. more sustainable) technologies;
- o ensuring the growth and development of the environmental industries; and,
- o influencing the Government's environmental agenda and advocating sensible regulations relative to the nature and scope of the environmental problem and the ability of individual industrial sectors to implement pollution abatement measures.

5. A PROACTIVE APPROACH

ISTC has a number of environment-related activities underway, ranging from policy and regulatory advocacy to environmental technology and industry development (see Annex I). These activities have assisted the Department in establishing a credible base of environment-related activities and knowledge. In order to expand that base, ISTC is committed to:

- o *giving environmental issues a higher priority in the Department's operations, and planning for new programs and services.*

Environmental issues are among the most pressing competitiveness issues facing Canadian industry. In exercising its mandate to foster international competitiveness, ISTC will work to ensure that proposed regulatory initiatives are structured in a manner that is consistent with both the Government's environmental and economic objectives.

- o *emphasizing the potential contribution of ISTC's existing programming to sustainable development.*

Sustainable development is based on the prudent use of natural resources and, in particular, non-renewable resources. Much of ISTC's programming is consistent with this emphasis because it is aimed at developing new science and technologies that use resources more efficiently. Examples include the Strategic Technologies Program, Canada Scholarships, Technology Outreach Program, Advanced Manufacturing Technology Application Program, Defence Industries Productivity Program, and the Microelectronics and Systems Development Program (see Annex II for a description of these programs). The potential for these programs to contribute to sustainable development remains largely untapped. ISTC will promote the application of existing programming to the development and implementation of environment-related projects. Industry will also be encouraged to come forward with environmentally benign proposals.

- o *improving the capability of the Environmental Industry Sector Initiative to meet a growing demand for deliverables*

The Environmental Industry Sector Initiative is the focal point for ISTC's environmental industry development activities. Its focus has been on improving ISTC's grasp of the industry and its needs and market opportunities, and carefully building a consultative framework necessary to achieve a collaborative industrial development strategy. However, the Sector Initiative was conceived and resourced at a time when the environmental imperative was largely nascent. It is now facing growing demands for deliverables. In addition, as other areas of the Department become more actively involved in the environmental regulatory process, ISTC's internal demands for expertise, which is largely resident in the Department's Environmental Industries' Division, will increase. As a result, ISTC plans to commit more resources to the Sector Initiative to meet these growing demands.

- o *giving a higher profile to the St. Lawrence River Environmental Technology Development Program*

The St. Lawrence River Environmental Technology Development Program (ETDP) represents a financial commitment of \$20 million over 5 years by ISTC towards the development of water pollution abatement technologies. Now that the Program has been established, the Department intends to focus greater efforts on its delivery.

The above outlines the overall thrust of ISTC's positive approach to environmental issues. The following sections discuss more detailed actions that ISTC is currently evaluating to strengthen ISTC's contribution towards sustainable development by helping industry to take greater advantage of the challenges and opportunities presented by the growing environmental imperative.

5.1 ADVOCACY

5.1.1 Investment Climate

The main objective of ISTC's advocacy function as it relates to sustainable development is to *manage the regulatory agenda so as to maintain a positive investment climate*. International competitiveness and the investment climate are inextricably linked. A positive climate is essential to ensure that Canadian industry is on the leading edge of new technology and process development, and is able to have access to, and implement, those processes that improve their operating efficiencies and competitiveness. Its regulatory environment could make Canada a less attractive location for those investments involving new or advanced technologies (e.g. biotechnology) where the environmental risks are less well understood. Sustainable development must, therefore, be viewed from a perspective that seeks to ensure that new environmental initiatives:

- o are consistent with the best international standards, unless Canadian environmental conditions are such that higher standards are required;
- o strike a reasonable balance between environmental benefit and economic cost;
- o reflect legitimate concerns of both the science and business communities;
- o maximise economic opportunities available to Canadian businesses;
- o promote, to the maximum extent possible, the private sector as the agent of delivery of most environmental services; and,
- o work with market forces.

In order to fulfil its role as a reasoned advocate for industry, *ISTC is improving its capability to document potential economic trade-offs in order to ensure that competitiveness concerns are brought to the table*, thereby improving our ability to:

- o assess the need for specific regulatory initiatives;
- o assess their technical and economic feasibility; and,
- o compare domestic regulatory proposals with those currently experienced, or likely to be experienced, by our major competitors.

Building the Department's ability to scrutinise and assess environmental problems and the economic impact of proposed solutions cannot be achieved overnight. It will require a significant increase in the number of ISTC staff devoted to the environmental issue and in building up the environmental knowledge base of existing staff. However, during the next few months, *priority will be placed on assisting in the development and refining of proposals that will be incorporated in The Green Plan. Two priorities are apparent:*

- o *ISTC will advocate that the structure of proposed S&T funding should be attractive to industry and be adequate relative to the scope and timing of planned regulatory initiatives.* In view of the pace with which new regulatory initiatives may be forthcoming, ISTC intends to take an active role in helping to design S&T financial support that will lever the desired level of technology development.
- o *ISTC plans to improve its intelligence on the regulatory regimes facing our competitors, on a sector by sector basis,* so that we can assist in the development of a regulatory agenda that is consistent with Canada's need to be internationally competitive. Sectors of direct concern to ISTC that are currently targeted for enhanced regulations include:
 - pulp and paper;
 - metal smelting and refining;
 - hazardous waste facilities;
 - textile manufacturers;
 - chemicals producers; and,
 - steel mills.

Increasingly, much of Canada's regulatory reform is being driven by international conventions and protocols, such as the Montreal Protocol. Because the orientation of subsequent domestic regulations must conform with these international agreements, *ISTC intends to play a much more active role in assisting the Government in defining the economic aspects of Canada's position on these international initiatives.* For those environmental problems that are global in nature, ISTC will seek to promote an internationally-coordinated approach to their resolution so that all nations are working together to solve environmental problems of mutual concern.

5.1.2 Technology Development and Diffusion

To complement the above approach to proposed environmental initiatives, ISTC will promote policies that encourage the development and implementation of pollution abatement and cleaner, more efficient, technologies and processes. Two interrelated strategies will be followed:

- o ensuring a positive climate for the development of S&T (the supply of technology); and,
- o encouraging demand for environmentally-sound technologies and processes.

Policy initiatives that are being considered that would encourage the development of environmental S&T include the following types of proposals:

- o promoting the formation of environmental research consortia and information sharing organisations;
- o encouraging the research councils to place greater emphasis on environmental S&T;
- o creating an environmental technology centre of excellence; and,
- o advocating fiscal support for research, development and diffusion of environmental technologies.

On the demand side, ISTC could:

- o promote environmental "cleanliness" in marketing strategies in international markets as a means to differentiate Canadian products from those of other nations, and to get a jump on the international market for "green" products; and,
- o support development of appropriate incentives to encourage investment in "clean" and pollution abatement processes and technologies.

5.2 PROGRAMMING

From a programming perspective, one of the main contributions that ISTC can make to sustainable development is to promote the development of a world-class environmental industry. The environmental industry:

- o identifies and assesses the extent of environmental problems;
- o offers advice, practical solutions, products and services;
- o is a key player in the development, diffusion and adaptation of the techniques and technologies required; and,
- o incorporates environmentally sound values in its day-to-day activities and furthers the adoption of these attitudes within client organisations.

5.2.1 Environmental Industry Sector Initiative

The Environmental Industry Sector Initiative is focused on:

- o generating information on the economic characteristics, markets and critical technologies that will form the basis for a credible industrial development strategy; and,
- o working with the many stakeholders from industry, the research community and the federal and provincial governments to gain the consensus necessary to implement an industrial development strategy that will work.

ISTC has begun to demonstrate leadership on the environment with the Sector Initiative and every effort is being made to continue to enhance and consolidate the Department's leadership in this area. To satisfy the increasing demand for deliverables, *ISTC plans to assign greater priority to the Initiative in order to accelerate completion of projects currently in the pipeline. In addition, market and industrial sector-related intelligence will be released in draft form to officials in other federal departments so as to maximise the use of this intelligence and eliminate delays due to editing and printing.*

5.2.2 Environmental Technology Development Program

A recent study confirmed that the poor reception by industry of the Environmental Technology Development Program is due to a number of causes. Among these are a reluctance on the part of companies to admit publicly that they have a water pollution problem. In view of ISTC's resource commitment and the potential to lever substantial technology development activity, ISTC is taking steps to improve its promotion of the ETDP, and is considering whether to modify it to improve its attractiveness to potential clients.

5.2.3 Other ISTC Programming

ISTC is also currently examining the feasibility of a private sector proposal to establish in Canada an international centre for environmental technologies. Such a centre could undertake applied R&D projects, adopt and adapt existing environmental technologies, and transfer those technologies to markets in developing countries and Eastern Europe. While contributing to the solution of environmental problems, such a Centre could be an important door-opener and marketing vehicle for Canadian products, services and technologies. Other departments, agencies and private sector organizations will be encouraged to assist in launching the Centre.

5.3 SERVICES

ISTC currently provides a number of information-based services to industry. However, outside the Sector Initiative and advocacy activities, few of these services are currently related to the environment. Some initiatives under consideration that could be up and running relatively soon include:

- o domestic and international market information for environmental goods and services;
- o reporting on new and emerging environmental technologies;
- o in collaboration with the granting councils, matching environmental research needs with expertise and, possibly, consortia;
- o reporting on new and emerging federal and provincial environmental regulations and policies;
- o distributing to ISTC's regional offices copies of Environment Canada's reports on firms that have installed technologies or procedures yielding an environmental benefit and a reasonable return on investment;
- o promoting the use of environmental audits as a management tool for business to ensure compliance with environmental regulations, to identify areas where mitigation or prevention technologies may be useful and where practices could be changed to be more environmentally friendly; and,
- o conducting an environmental audit of ISTC's operations to ensure that its operations and procurement practices support sustainable development.

Other services that could be considered for implementation over the longer term include:

- o financial matchmaking to assist the commercialisation of new technologies (e.g. venture capitalists or federal sources of funding);
- o publishing booklets/pamphlets describing, for example:
 - workplace practices that are environmentally friendly
 - a "road map" through the federal regulatory approval process and appropriate government contacts
- o developing, or assisting in the development of an on-line environmental database that would provide one-stop shopping for information on Canadian environmental regulations, foreign and domestic market opportunities, upcoming conferences, etc.

ANNEX I

ISTC'S ENVIRONMENT-RELATED ACTIVITIES AND PROGRAMS

ISTC's environment-related policy advocacy, programming and services are described below:

POLICY ADVOCACY

ISTC's policy advocacy efforts occur at both the sector branch (eg. regulation development) and departmental levels (horizontal policy development). In recognition of the increasing importance of environmental issues to industrial competitiveness, ISTC and Environment Canada have recently signed a Memorandum of Understanding to ensure that the competitiveness concerns of industry are reflected in the timing and scope of proposed regulations.

PROGRAMMING

Environmental Industry Sector Initiative

The overall objective of the \$4 million Environmental Industry Sector Initiative is to formulate a strategy for developing this important sector. Under its proposed schedule, a development strategy is to be prepared by March, 1991, and will be based on extensive consultations with key industry, science and technology and government stakeholders, and analyses of the sector, including its economic characteristics, markets and critical technologies.

St. Lawrence River Technology Development Program

The \$20 million St. Lawrence River Technology Development Program is one component of the St. Lawrence River Action Plan, and is designed to enhance the development and application of new and improved technologies to reduce water pollution from industrial sources. The program was launched in September, 1988, but no funds have been committed to date. Financial contributions can be directed toward studies, research, design and engineering, testing, prototyping and acquisition of assets.

SERVICES

Environmental Consulting Services

The Consulting Services Division has been an active participant in the Environmental Industry Sector Initiative and has helped develop directories of environmental services companies and Canadian environmental technologies. The division also organised a mission to the ASEAN countries in June, 1990.

Tourism

The Tourism Sector is raising the level of its environmental activities by expanding the "Action Strategy for Sustainable Tourism Development" produced at Globe '90, encouraging tourism associations to develop an environmental code of practice, investigating the usefulness of environmental audits to the industry and increasing its participation on environmental work groups of industry organisations and tourism-related organisations (e.g. World Tourism Organisation).

ANNEX II

ISTC PROGRAMS THAT COULD BE STRUCTURED TO EMPHASISE SUSTAINABLE DEVELOPMENT

Strategic Technologies Program (STP)

The objective of the Strategic Technologies Program is to enhance Canadian industrial innovation capabilities by encouraging the development and diffusion of strategic technologies in Canadian industry. STP supports R&D and technology application initiatives, as well as strategic alliances among industry, government labs and universities. In this way, the program encourages fast-track technology development and commercialization. Since December, 1988, STP has committed \$35 million in support of five projects.

Technology Outreach Program (TOP)

The Technology Outreach Program seeks to improve the productivity of Canadian industry. Introduced in September 1986, TOP offers support to non-profit technology centres for nation-wide activities and services that accelerate the acquisition, development and diffusion of technology and management skills in industry, especially in small and medium-sized enterprises. The program offers start-up and, in some cases, sustaining support to technology centres. Since the inception of the program, ISTC has contributed over \$30 million towards eligible activities.

Technology Outreach Program-Advanced Industrial Materials (TOP-AIM)

TOP-AIM encourages communication and co-operation among AIM researchers and users across Canada and worldwide, and promotes industrial investment in AIM. Since October, 1988, ISTC has contributed about \$600,000 in support of information and project networks among AIM researchers and users.

Advanced Manufacturing Technology Application Program (AMTAP)

The objective of AMTAP is to encourage Canadian firms to adopt advanced manufacturing technologies that would enhance their international competitiveness. AMTAP assists small and medium-sized firms to study and evaluate the potential impact of new technologies on their operations. The program was introduced in December, 1988, and 46 projects have been approved to date.

Defence Industry Productivity Program (DIPP)

DIPP is aimed at enhancing the competitiveness of defence-related industries. The program provides assistance for studies and R&D projects, for establishing supply capability and acquiring advanced equipment. About sixty to seventy percent of expenditures support R&D, with international programs leveraging European and American contributions

Microelectronics and Systems Development Program (MSDP)

The MSDP promotes the development of advanced microelectronics and information technologies by supporting market-oriented R&D projects in microelectronics, and in systems incorporating advanced microelectronics. The program was introduced in December, 1987, and encourages cooperation among universities, research institutes and foreign companies.

Canada Scholarships

Canada Scholarships recognize outstanding undergraduate students in the natural sciences, engineering and related disciplines, and encourage them to pursue careers in these fields. This program was introduced in 1988 and provides 2,500 scholarships annually valued at \$2,000 each for up to 4 years, with renewal contingent on maintenance of first class standing and continued enrolment in eligible disciplines.

