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TABLE RONDE NATIONALE SUR L'ENVIRONNEMENT ET L'ÉCONOMIE

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Discussion Paper

Canadian Opportunities for Meeting Foreign Demand for Environmentally Preferable Products and Services through Federal Procurement

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Executive Summary

In Canada, efforts to use public sector purchasing to achieve environmental objectives have been tentative and limited in scope. Nonetheless, an international momentum and demand for environmentally preferable products, processes and production methods should drive Canadian governments and industry towards greener purchasing. Given these circumstances, this discussion paper has been commissioned by the National Round Table on the Environment and the Economy (NRTEE) to explore the relationship between the foreign demand for environmentally preferable products and services, the competitive positions in several Canadian industry sectors, and federal procurement practices.

This paper investigates these relationships and introduces corresponding arguments (conclusions and recommendations) to the green procurement discussions. It outlines the complex set of economic and environmental conditions faced by industry and governments, the demand for environmentally preferable products and services in key trading markets, and the competitive positions of three Canadian industries including how environmental considerations influence their marketing approaches and competitiveness. Current federal green procurement practices are also summarized.

Based on the conducted research and analysis, drawn conclusions are:

- the demand for environmentally preferable products and services is global in scale and growing;
- in some industry sectors, federal procurement can be a driver for the supply of environmentally preferable products and services;
- in some industry sectors, a strong performance in domestic markets is an important component to a successful international export strategy;
- generally, environmental attributes and practices are not broadly promoted or communicated by companies in their marketing efforts;
- with greater industrial application of product life cycle reviews, environmental design, and other environmental initiatives, government green procurement processes should consider and recognize products produced by means of clean technologies or other environmentally preferable processes; and
- the scope of federal green procurement efforts is narrow and remains insufficient to stimulate the supply of Canadian products and services which could meet identified demand in some foreign markets.

In the final section of the paper, issues relating to the appropriate role of government are raised for further consideration.

1. Introduction

The National Round Table on the Environment and the Economy and Green Procurement

The National Round Table on the Environment and Economy was created in 1988 as an independent agency of the federal government "to provide objective views and information regarding the state of the debate on the relationship between the environment and the economy". In 1994, the NRTEE recognized that "green" procurement policies and practices, i.e. those which establish environmental preference, were potentially a major driving force towards environmental preservation and economic development in Canada. A Green Procurement Task Force was established to assist federal government departments and agencies in their mandate to "green" their procurement policies and practices.

A first report published in 1996 contributed to the federal work on green procurement by assisting federal buyers and sellers to overcome barriers and obstacles to further greening of procurement. To complement this work, the NRTEE commissioned this discussion paper to present new perspectives on green procurement and broaden the basis upon which federal procurement decisions are made. This paper explores the relationship between the foreign demand for environmentally preferable products and services, the competitive position adopted in three industry sectors in Canada, and federal procurement practices.

Government purchasing in the global environmental context

Environmental conditions around the world are driving demands for governments to initiate controls and for industry to change the way they do business. In recent years, there has been an unprecedented change in the dynamics of the marketplace as environmental considerations become a constant factor in institutional and business decision-making. The demand for environmentally preferable products and services is now global and growing. The discrimination of consumers and the emergence of comprehensive environmental regulations and standards are playing a critical role in stimulating the supply of such products and services and thereby encouraging innovation.

While governments have traditionally influenced society's values and behaviour towards the environment through regulatory means, they are increasingly relying on a broader set of approaches, including popular education, voluntary initiatives, community funding programs and direct market instruments. On the private sector front, many companies have begun to redesign products and processes to minimize their environmental externalities. With

heightened awareness and enhanced environmental performance and responsibility in the private sector, there is pressure for governments to "lead the way" and "get their own houses in order". Governments are consumers themselves and are thus increasing efforts to integrate environmental considerations into operational decision-making processes.

Government procurement constitutes an important influence in many markets because of the volume of products and services purchased, the standards it sets through specifications, and the credibility it can impart to suppliers. In this regard, green procurement should stimulate the supply of environmentally preferable products and services and assist governments attain their sustainable development objectives.

In Canada, efforts to use public sector purchasing to achieve specific environmental objectives have been tentative and limited in scope. There are many economic and institutional conditions that have slowed the adoption of broad-based green procurement practices, despite many high level commitments to do so. Nonetheless, the international momentum and demand for environmentally preferable products, processes and production methods will continue to drive Canadian governments and industry towards greener purchasing.

About this discussion paper

Several publications and research papers report that Canadian federal procurement is a major force in the marketplace capable of shaping or influencing the supply of products and services (The Delphi Group 1996 and Energy Pathways 1994). The Federal government is no doubt the single most important purchaser in Canada, with purchases totalling some $11.6 billion annually. As Canada's largest landlord, it owns or leases 25 million square metres in more than 64,000 buildings and facilities (Price Waterhouse 1996). To date, efforts to stimulate the supply of environmentally preferable products and services have met with some success but are largely unquantified. Furthermore, the influence of federal procurement practices varies significantly among sectors of the economy as the attention of many Canadian industries and businesses is turned more to international markets.

There is an appropriate role for government in pursuing environmental and economic objectives. While several reports and papers on the effects of environmental regulations on trade and competitiveness have concluded that some industries win and others lose, it is clear that mandatory environmental measures have also provided incentives for innovation and higher environmental performance (Porter et al. 1995; Canadian Council of Ministers of the Environment 1993; Environment Canada(1) 1995; U.S. Congress 1994). Similarly, government's intervention in the marketplace through public purchasing can stimulate

improvement and innovation, thus supporting industry's competitive advantage. However, there are many relationships that must be explored and understood in order for government green procurement actions to fulfill this role.

This paper explores relationships and brings forth new arguments to the green procurement discussions. In the next section, key conclusions are presented. Three subsequent sections outline: the complex set of economic and environmental conditions faced by industry and governments (Section 3); the demand for environmentally preferable products and services in selected trading markets (Section 4); and the competitive position of three sectors in the Canadian economy and how environmental considerations influence their marketing approaches and competitiveness (Section 5). In the sixth section of the report, federal green procurement practices are summarized. Finally, several issues for further consideration are proposed in the last section.

2. Conclusions

The research conducted for this discussion paper confirms certain trends for environmentally preferable products and services in foreign markets and highlights some potential relationships between these markets and federal procurement. Based on the findings, these are the central conclusions:

1. **The demand for environmentally preferable products and services is global in scale and growing.**

As reiterated throughout this paper, markets and market share for these products and services are expanding in many regions of the world based on both domestic and international influences. Key national demand drivers include: public and private sector green procurement policies; pollution prevention initiatives and the expectation of industry environmental performance; consumer demand; and domestic environmental and/or developmental challenges which present special market opportunities. The specific characteristics of each country's market depends on the environmental conditions, economic situation and social priorities unique to that country.

2. **Federal procurement is, in some sectors, a driver for the supply of environmentally preferable products and services.**

Where federal procurement represents an important share of market demand, it can influence how products will be produced and services delivered. As a direct supply driver in some sectors, green procurement practices can ensure that environmental requirements are consistent with or exceed those of foreign markets. Several examples are provided in the evaluations of the market dynamics in the United States, Japan and The Netherlands contained in Section 3 (and Appendix A).

Besides stimulating demand through purchases of specific products and services, federal green procurement can more broadly stimulate manufacturers and suppliers in many industry sectors to upgrade their processes, implement cleaner production techniques, and change the way in which their services are delivered. As further discussed under conclusion #5 below, national governments can introduce broader environmental requirements such as environmental design considerations, adoption of environmentally preferable process and production methods (PPMs), and implementation of appropriate environmental management systems, for many industrial categories. While the private sector seems more progressive in this regard, such public sector efforts are beginning to be adopted in Europe and the United States. The Netherlands has shown some leadership, as described in the relevant country review in Section

3. By incorporating broad environmental requirements into procurement specifications, the federal government can also "indirectly" drive demand for environmentally preferable products and services by companies desiring to bid on such procurement call-ups.
Two interesting Japanese variations on this theme are support of the Japanese fuel cells industry through the subsidizing of purchases by hospitals, hotels and schools, and devoting most of Japan's direct Chinese aid to introducing [Japanese] environmental technologies.

3. **In some sectors, a strong performance in domestic markets is an important ingredient to a successful international export strategy.**

While this is definitely the case in Japan and the United States (refer to the country reviews in Section 3), some Canadian firms are also using their local experience to showcase their products, services and expertise abroad. (Examples are provided in the country review of the Peoples Republic of China in Appendix A and the Green Building Design and Management Sector profile in Section 5.) Consequently, Canadian green procurement strategies should take into account the needs of sectors which may be favourably positioned to tap into international green markets. Canadian government officials can learn from the experiences and actions of the American, Japanese and The Netherlands governments which have already implemented such strategies.

4. **Environmental attributes and practices are not broadly promoted or communicated by companies in their marketing efforts.**

As price and performance remain the predominant marketing features, companies do not widely use the environmental characteristics of their products nor their broader environmental performance as marketing points. (Northern Telecom is a noteworthy exception through demonstrating leadership in this area as discussed in the Telecommunications Sector profile in Section 5 and corresponding Appendix C.) However, promotion of general environmental achievements, especially related to the manufacturing stage, appear to be more common than of product-specific environmental attributes.

A common phenomenon of most ecolabelling programs around the world (exceptions being the German Blue Angel and Japanese Ecomark programs), is broad industry interest but low participation levels signalling reluctance towards, and even opposition to such initiatives. In fact, with respect to the Canadian Environmental Choice^{M} Program (ECP), few companies which have been licensed to use the EcoLogo^{M} (ecolabel) are actually incorporating it in their major marketing initiatives. Of note, many companies identify current ECP participation as an "investment for the future"and seem anxious to be poised for any potential future market demand for ecolabelled products.

Nonetheless, from a widely-held business perspective, corporate environmental achievements including production and process improvements are recognized as improving competitiveness by increasing efficiencies and reducing costs.

The arrival of ISO 14000 certification, increasing green procurement practices, and significant international interest in ecolabelling, are all indicating and triggering a market change in which companies will increasingly use their environmental achievements as selling features. Northern Telecom's pioneering initiatives provide good examples of what should be expected.

5. **With greater industrial application of product life cycle reviews, environmental design, and other environmental initiatives, government green procurement processes should, in parallel, consider and recognize products produced by means of cleaner technologies or other environmentally preferable processes.**

Traditionally, procurement processes predominantly focus on criteria specific to a product's use and disposal. In the area of green procurement, recognition of pollution prevention and other environmental efforts along the entire product life cycle are only beginning. Internationally, environmental leaders in the public and private sectors are encouraging the introduction of more energy efficient processes, less polluting technologies, and other environmental features, in order to provide products which are environmentally preferable from a more comprehensive perspective (see the country review on The Netherlands in Section 3 and the discussion of Northern Telecom initiatives in Section 5 as examples). Most ecolabelling practitioners and the ISO 14000 subcommittees preparing international environmental management standards have accepted and adopted this broader perspective.

While there is no conclusive definition of what "environmentally preferable" or "green" means, industrial and scientific developments and practices are providing useful guidance. Officials administering green procurement activities should recognize and reflect this evolving, expanded and more sophisticated definition of "environmentally preferable" and "green" in pertinent procurement specifications.

6. **The scope of federal green procurement efforts is narrow and remains insufficient to stimulate the supply of Canadian products and services which will meet the demand in some foreign markets.**

In some regards, Canadian federal government green procurement practices are lagging behind such initiatives in Europe, the United States, and the private sector.

Firstly, as highlighted throughout Section 3, life cycle considerations and costing, waste avoidance strategies, packaging requirements, and other considerations are part of other jurisdictions' procurement approaches. A clear example of the influence of these more progressive procurement approaches are Northern Telecom's various environmental initiatives undertaken in Europe and the United States to satisfy existing and/or proposed regulatory compliance and procurement requirements (see the pertinent description in the telecommunications sector profile in Section 5). To aid the Canadian government in moving in this direction, the Environmental Choice[M] Program(ECP) is incorporating these considerations in its product and service certification criteria development process. Federal procurement officials can both adopt existing ECP environmental criteria and learn from the ECP criteria development process.

Secondly, green procurement policies and specifications must strive for a more flexible decision-making system which encourages and rewards environmental leadership in as many product and service categories as possible, and especially in those areas where international niche markets exist. Current specifications development processes focus on established, "industry norm" processes; in this way, they actually discourage innovation and development of unique alternatives. The federal government's ECP and planned Environmental Technologies Verification (ETV) Program will continue to identify environmentally preferable products, services, technologies and other industry initiatives. At the same time, federal funding and technical support will continue to be provided for research, development and demonstration of environmentally preferable options. A significant change will be required which includes: increased awareness and knowledge on the parts of specification developers and procurement decision makers; revised policies and processes to reward rather than penalize environmental leadership; and coordinated recognition and favourable treatment of those products, services and technologies involved under these identified (and other) government initiatives.

Thirdly, in order to address the decentralization of green procurement decision making, appropriate federal officials must develop and disseminate useful and effective guidance tools and share acquired expertise. Two current examples cited in this report are an *Environmentally Responsible Construction and Renovation Handbook* to assist in federal planning, construction and renovation in an environmentally preferable manner, and the Federal Buildings Initiative (FBI) Program which establishes three-way partnerships between utilities, qualified energy management firms and federal organizations to increase energy efficiencies in federal facilities. Green procurement workshops are also being encouraged and staged. These initiatives must continue, be replicated in other sectors, and be complemented.

Fourthly, federal officials should continue and increase their efforts to foster the establishment and growth of procurement networks in Canada, and assist Canadian companies to have their environmentally preferable products and services recognized within these networks. This strategy is consistently being pursued by many other countries including the United States, Japan and The Netherlands (see Section 3). Further, Canadian officials should explore ways to access and participate in American and other evolving national and multinational procurement networks on behalf of Canadian industry. Besides promoting Canadian products, services and technologies, Canadian officials can assess the compatibility of Canadian and foreign procurement requirements, and make revisions to Canadian specifications if deemed appropriate and beneficial.

Lastly, an approach which merits some consideration is the provision of "notices of intent" regarding proposed environmental standards which companies procuring to the Canadian government will have to satisfy in the future. Cited foreign examples include Japan's "Five-Year Program for Sewerage Construction and Basic Program for Public Investment", and the Taiwanese Environmental Protection Administration's "1991-1997 National Plan" which has allocated Cdn$31 billion for environmental protection projects including sewage systems, municipal solid waste incineration, river and related pollution control, etc.. If a future demand can be identified in advance, this may be a sufficient incentive for companies to environmentally improve or innovate.

Based on these conclusions, several issues for further consideration have been formulated and are presented in Section 7.

3. Foreign demand for environmentally preferable products and services

Global context: trade and environment trends

The number of nations involved in international trade and environment issues has expanded significantly in the past decade. The broadening of the community of nations influencing global action is an outcome of the liberalization of trade and the increase in investments in developing countries. Many developing nations are now playing a substantial role in international debates on trade and environmental protection.

The industrialization and modernization of many heavily populated regions, such as China, Brazil, India, Indonesia, and Eastern Europe, is causing unprecedented growth in economic output and putting increased pressure on the earth's resources and ecosystems. In 1995, the global economy grew by an estimated 3.7 percent, the second largest expansion ever. This robust growth was led by developing countries, in particular the fast-paced Asian economies. China recorded double digit growth at 10.2 percent for a fourth consecutive year, closely followed by Korea (9.7 percent), Vietnam (9.0 percent), and Thailand (8.4 percent) (Brown 1996: 74). Even more remarkable is the growth in trade, which was twice the growth rate of world economic output in 1995. The driving force behind this growth is the development of regional trading blocs. Along with falling tariffs and expanded investments in developing nations and emerging economies, the proliferation of regional trading groups is expected to be a feature of the world economy for several years (Brown 1996: 76).

The global economic momentum established in the 1990's is now being parallelled by an environmental one which has begun to shape the way in which resources are exploited, transformed and traded. Governments worldwide have been active in concluding global treaties (Figure 1) and implementing national measures to protect the environment. The involvement of developing nations and emerging economies has also brought the financial and economic implications of environmental protection to the forefront of discussions. More than ever, the environment is a recurring concern in economic discussions, and governments are increasingly turning to the marketplace to implement corrective measures.

Figure 1 Examples of international environmental treaties signed in the past decade

Year	Agreement and Number of Participants
1972	Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter. 74 parties.
1973	Convention on International Trade in endangered Species of Wild Fauna and Flora (CITES). 130 parties.
1973	International Convention for the Prevention of Pollution from Ships (MARPOL). 92 parties.
1982	United Nations Convention on the Law of the Sea. 158 signatories.
1987	Montreal Protocol on Substances that Deplete the Ozone Layer. 154 parties.
1989	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. 96 parties.
1992	United Nations Framework on Climate Change. 166 signatories. 153 parties.

1992 Convention on Biological Diversity. 168 signatories. 140 parties.
1994 Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification. 115 signatories. 25 parties.
1995 Agreement on the Implementation of the Provisions of the United Nations Convention on the Law f the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fisk Stocks. 32 signatories.

Public opinion and awareness of the scope and seriousness of the problems afflicting the planet have evolved in a fairly constant manner since the 1960's (Environment Canada(1) 1995; Brown 1996). Along with public pressure, private sector initiatives such as ISO 14 000 and government regulations and environmental taxes are creating the right set of conditions to encourage consumers and businesses to choose the path of least pollution.

This path is irreversible and will continue to support the growing interconnectedness of economies and help governments address looming global environmental pressures. Some emerging trends are already beginning to have a significant impact on the way in which businesses operate:

- the market for environmental products and services, driven by public and other pressures, will expand;
- environmental considerations manifested by domestic regulations will restrict the import of products, processes or industries originating in countries that are perceived as having less stringent environmental standards; and
- over the long-term, industry will be required to recognize and internalize environmental costs, manage pollution at source, build in process changes instead of add-on "end-of-pipe" solutions, and develop technologies aimed at zero discharge (Industry Canada(1) 1994: 2).

The importance of globalization for Canadian governments and industries

Canada derives approximately 35 percent of its Gross Domestic Product (GDP) from export activities, one of the highest levels in the industrialized world. In fact, one out of four Canadians owes his/her job to Canada's success in the global marketplace (Government of Canada(1) 1996: 3). Because so much of our prosperity and employment is linked to international markets, Canada has everything to gain by seeking opportunities which will arise from increased liberalization of trade and the emergence of new markets worldwide.

For both governments and industries, global economic trends as well as widespread actions to protect and restore the environment present new opportunities and challenges. Industries face increased competition in traditional markets and must innovate to remain competitive in established markets and position themselves to capture emerging market opportunities. As part of its efforts to establish a fiscal, economic and policy framework that will support Canadian industry in meeting and surpassing international competition, the federal government must maintain and improve the domestic environmental framework consistent with global environmental trends.

Canada's international leadership on environmental issues is recognized and its work to establish a credible domestic environmental regime is respected. This situation forms a strong foundation upon which Canadian industries can base a successful positioning in emerging environmentally-discriminating markets. Given the importance of external markets to Canada, a better understanding of the needs and demands of foreign markets can guide government action to support innovation and competitiveness through its domestic programs.

Defining the demand for environmentally preferable products and services

The demand for such products and services has grown over the past decade out of the necessity to effectively address serious environmental problems. One of the main forces driving this demand is the realization by nations of the impact of a decayed ecosystem on their chances for prosperity and quality of life. Today, environmental issues clearly influence public opinion and motivate political commitments, government action and legislation, industry initiatives and investments, etc.. These factors are all drivers of the demand for more sustainable ways to use our resources and enhance our quality of life.

Although the demand is global, it varies from country to country depending on public awareness, country priorities, and willingness of governments to act. Green procurement practices are one manifestation of the demand but there are many others.

Government intervention through regulation is one of the most direct and common drivers influencing the demand. Pollution prevention initiatives, design for the environment, and life-cycle assessments are also important influences on industry and government decision-making; these approaches lead to more sustainable choices and consumption patterns. The worldwide emergence of environmental labelling programs in the past decade is also an indicator of the public's level of awareness and the strength of its demand. Green procurement practices are in their infancy in many countries but increasingly becoming part of governments' mandates and affirmed in specific policies and purchasing specifications. To describe the opportunities for environmentally preferable products and services in foreign markets, a range of demand drivers were reviewed. They are:

- policies of government with respect to green procurement;
- pollution prevention initiatives and the expectation of industry environmental performance in that country;
- consumer demand and the vehicles for consumer information in the country; and
- the actual environmental or developmental challenges in the country that present special market opportunities.

4. Exploring the demand in selected markets

As outlined earlier, the considerable expansion in global trade and the fast growth in emerging economies present opportunities for Canadian businesses. However, Canada's current export earnings come predominantly from trade with the United States, Japan and Western European countries. Because market conditions, government priorities, and demand drivers vary significantly between countries, a cursory review of six countries - the United States of America, Japan, The Netherlands, Mexico, Taiwan, and the People's Republic of China - was undertaken to determine which countries represent a meaningful cross-section of market opportunities for Canadian companies and would offer interesting lessons for green procurement.
From the initial list, the United States, Japan, The Netherlands and the Republic of China were retained for a more in-depth evaluation of their markets for environmentally preferable products and services. Key findings of the evaluation work are presented below. (The fuller evaluations are presented in Appendix A and brief discussions of market characteristics in Chinese Taipei - Taiwan and Mexico are provided in Appendix B.) The selection criteria included the size of the market, the type of market opportunities and whether the key sectors matched products and services procured by the federal government, the type of adopted environmental leadership that could shape the demand for green products and services in a region or world-wide, and the importance of the country for Canada's international business strategy.

The United States of America

Economic and trade context

The United States is Canada's major trading partner, accounting for over 80% of total export sales which generate 25% of Canada's gross domestic product. The combination of the North American Free Trade Agreement (NAFTA) and the preceding Free Trade Agreement (FTA) have substantially liberalized trade between the two nations, creating many new opportunities for Canadian industries, notably in the high-technology and high value-added sectors such as environmental technologies, information technologies, medical and health-care, and biotechnology. Of six priority export sectors identified in *Canada's International Business Strategy for 1996/97*, two of the sectors - telecommunications and environmental industries and services - are profiled in Section 5 of this paper.

Japan constitutes another very important bilateral trade relationship for the United States (and Canada). Given that Japanese industry sectors are implementing strategies of environmental responsibility and performance (see the "Japan" section below), American industries are beginning to pay greater attention to environmental performance in order to compete in shared markets.

Demand for environmentally preferable products and services

At the federal level, efforts are being made to ensure that the U.S. government's acquisition and procurement processes (which relate to an estimated $200 billion of purchasing power annually)recognize and affirm environmental policies and goals, and stimulate markets for products and services that meet those goals. Three specific Executive Orders direct agencies to undertake measures to reduce the impact of their operations on the environment. As of December 1995, 20 government agencies had prepared relevant "Affirmative Procurement Plans". Green procurement networks and initiatives are also spreading at the state and local levels. Green procurement efforts are complemented by strong environmental legislation and an array of pollution prevention and waste reduction initiatives across the various levels of government. At the same time, several American companies and non-profit organizations, notably the Society for Environmental Toxicology and Chemistry (SETAC), have been leaders in the development of life-cycle assessment methods, while others are funding and developing environmental technologies and clean processes. Established environmental labelling programs help consumers identify environmentally preferable products; several pertinent publications provide a mainstream vehicle for the promotion of environmentally preferable products and services. The net result of these various initiatives has been the emergence of a competitive climate in many industry sectors for environmentally preferable products and services.

Conclusions

There is a high level of awareness and a solid base for environmentally preferable products and services demand in the United States. This demand is expected to significantly grow as many of the government procurement programs mature and stimulated innovation brings forth generations of products that have less of an environmental impact.

These developments should provide opportunities for Canadian companies to increase exports of their environmentally preferable products and services to the United States. On the other hand, Canadian companies which can not, or do not keep up with these expected developments, may competitively suffer in global markets, and most significantly in the North American (including the Canadian) market. In this regard, it could be advantageous if Canadian efforts "mirror" those in the United States including green procurement initiatives.

Japan

Economic and Trade Context

Japan has the second largest national economy in the world which accounts for 20% of the world's gross domestic product. From a Canadian trade perspective, Japan is Canada's second largest

national export market. According to *Canada's International Business Strategies for 1996/97*: "...the soaring yen, domestic deregulation and increasing consumer sophistication are forcing basic manufacturing out of Japan and boosting imports of value-added goods". In this regard, while the majority of Canadian sales continue to be resource products, more than 40 percent of sales are manufactured or value-added goods. Of eight priority export sectors identified in the 1996 edition of *Canada's Action Plan for Japan,* two of these - telecommunications and [green] building - are profiled in Section 5 of this paper.

Demand for Environmentally Preferable Products and Services

A *Basic Environment Plan,* which was initiated in 1994, establishes long-term environmental policy objectives, incorporates sustainable development principles, and identifies a series of central government programs and expected actions of all societal sectors in environmental conservation practices. An "Action Plan" instituted under this broader Plan calls for significantly reduced environmental impacts of central government operations.

The Japanese government and industry have formed cooperative alliances to stimulate industry environmental sensitivity and competitiveness (domestically and internationally). In contributing to the promotion, development and marketing of environmentally preferable equipment, products, and innovative technologies, the Japanese government has exercised various means including tax credits and exemptions and high levels of research funding (relative to levels in other countries). At the same time, and with government support, a "Green Purchasing Network" has grown in less than a year to include over 450 organizational members (i.e. companies, local governments, non-governmental organizations, etc.).

Japan's national environmental market is the second largest in the world after the United States. This market continues to grow, supported by strict standards in some areas and efforts to match better foreign performances in others. The Japanese industry has translated domestic strength into recognized world leadership in various industry segments (e.g. in the areas of air pollution control, energy efficient and clean energy technologies, and recycling technologies). Interestingly, the Japanese government is further promoting and rewarding its industry strength through devoting most of its foreign direct Chinese aid to the introduction of [Japanese] environmental technologies.

Conclusions

Japan's government is creating a strong foundation for companies to innovate and become competitive on the international environment front. By being aggressive (more than any other country), this strategy seeks to position Japanese companies competitively abroad. The standards that the Japanese will set are likely to be very high.

For Canadian companies, this makes market entry and participation more difficult not only in Japan, but in other shared markets (notably the Asian markets) where Japanese product and service attributes are quickly becoming the "industry leading standards" by which competitors will be judged. Canadian public and private sector officials can and must learn from the Japanese strategy; failure on the part of the Canadian government to increase its efforts to stimulate and promote comparable Canadian technologies, products and services, could be detrimental.

The Netherlands

Economic and Trade Context

After the United States, the European Union is Canada's most important commercial partner. The Netherlands represents an attractive market for Canadian firms as well as being an entry point to EU markets. There are good market opportunities in The Netherlands (and throughout the European Union) for finished products including telecommunications and related equipment, and in various sectors including environmental technologies (see the relevant sector profiles in Section 5).

Demand for Environmentally Preferable Products and Services

The Netherlands is the European leader in product policies and is internationally recognized for many of its innovative environmental initiatives. Its National Environmental Policy Plan (NEPP) provides broad guidance and specific commitments relating to innovative work on life cycle assessments, environmental design, and pollution prevention approaches. As well, the NEPP contains stringent objectives for dramatically reducing industrial pollution emissions. A complementary Technology and Environment Plan calls for close cooperation between government and industry sectors, and focuses heavily on significant incentives and subsidies to help industry meet the NEPP targets.

All Dutch Ministries have an environmental management system with green procurement as a component. While three Ministries are particularly active in green procurement, the Ministry of Environment is considering the establishment of a centralized national program to stimulate green procurement. Green procurement initiatives are also occurring at local levels in The Netherlands and throughout the European Union.

Conclusions

There is a high level of commitment, public awareness, and government investment in environmentally preferable products and production processes in The Netherlands which sets the stage for opportunities to meet a growing demand in this country (and subsequently throughout the evolving European Union marketplace). In this regard, The Netherlands is perceived as being

well ahead of most other countries (especially other European Union members). As the Japanese are defining and establishing the "environmental leadership standards" in the Asian region, The Netherlands (along with Germany) are doing similarly in a unifying European Union market. Canadian companies which wish to market their products or services in the European Union based on environmental preferability should be cognizant of the "standards"being established in The Netherlands. Canadian government officials can learn from the implemented promotion and stimulation strategies and consider the Dutch "standards" in the development of Canadian federal green procurement requirements.

The Peoples Republic of China

Economic and Trade Context

The Chinese government's strategic economic (as well as social) goal of a smooth transformation to a "socialist market economy" is intended to involve job creation, industrial modernization, infrastructure expansion, increased industrial output and efficiency, greater availability of installed power capacity, and reform and decentralization of government. Over the past few years, China's economy has grown exponentially.

Since China embarked on its "open-door" policy of economic reform, Canada-China trade relations have evolved rapidly with China now being Canada's fifth largest export market. While exports have traditionally comprised of basic commodities, sales of manufactured goods have dramatically gained importance. Many of China's import and infrastructure requirements correspond to Canada's prime export strengths, including in two sectors - telecommunications and environmental technologies and services - which are profiled in Section 5 of this paper. As well, under the Canadian International Development Agency's Industrial Co-operation Program, financial contributions have been provided to Canadian firms which are co-operatively participating with local Chinese partners in sustainable development projects.

Demand for Environmentally Preferable Products and Services

Chinese environmental protection policy has been designed not to impede economic growth. Because policy priority has been given to rapid industrial growth, severe air and water pollution and soil erosion problems have been created. While a National Environmental Protection Agency (NEPA) and corresponding environmental legislation exist, the Agency has demonstrated limited power and influence at the national and local levels. Much of China's international environmental commitments are contingent on overseas aid and technology.

The Chinese government has formulated its "Ten Points for the Environment and Development" which sets the development of environmental industry and environmentally preferable products as a priority. A 1993 Memorandum of Understanding between Environment Canada and the

Chinese NEPA has provided a framework for addressing mutual environmental concerns, providing environmental protection assistance to China, and promoting relevant Canadian commercial opportunities. A Sino-Canadian High-Technology Centre of Resources and Environment exists to promote technology transfer to China, expand business opportunities between the two countries, and stage pertinent workshops and seminars.

Conclusions

With established political, economic and environmental relations between China and Canada, the dramatic growth in the Chinese economy accompanied by a need for considerable infrastructure development that is not too environmentally damaging should bode well for Canadian exports of environmentally preferable products and services.

However, as noted in the "Japan" and "United States of America" sections above, Canadian exporters must compete with Japanese companies which are setting high environmental standards domestically and in their exports to China (and throughout the entire Asian regional markets), and American companies which are taking steps to increase their competitiveness in the Asian markets.

5. Profiles of three sectors

Having determined general trade and environmental conditions and trends for environmentally preferable products and services in major Canadian export markets, a few industry sectors were identified for focused consideration. For the majority of the countries considered earlier in this discussion paper, *telecommunications* and *environmental services* were noted to have major current and future export potential. A third sector, *heating and cooling*, was initially selected on the basis of a potential demand in specific export markets such as China, and on an assumption that Canada has technological expertise and leadership in this sector. However, research has identified a limited Canadian manufacturing and export industry, despite various government and utilities' initiatives to encourage technological and environmental innovation in this sector. In fact, the majority of Canadian high efficiency equipment comes from American manufacturers which have a clear competitive advantage in this market. For this reason, a more detailed profile of the sector to explore any environmental competitiveness aspects was not pursued. Instead, a more cursory review of the somewhat relevant, emerging green building design and management industry has been conducted.

This review of three selected sectors explores general competitiveness requirements and how environmental procurement initiatives might lead to or support Canadian competitiveness and industry's ability to tap into markets for environmentally preferable products and services.

Telecommunications

The Canadian Industry

The Canadian telecommunications industry is one of the fastest growing sectors of the Canadian economy, outperforming the overall economy in terms of growth in the 1990's. According to 1991 Statistics Canada data, this industry was larger than the electric power industry and ten times the size of the forest industry, with revenues of $23 billion - $7 billion for equipment and $16 billion for services (Statistics Canada 1996). On a per capita basis, Canada has the most extensive telecommunications system in the world, with 98% of Canadian homes having telephones. For the purposes of this paper, the analysis below focuses on the telecommunications *equipment* industry.

The Canadian telecommunications equipment industry is composed of: one large, vertically integrated, research and development-based company - Northern Telecom (Nortel); subsidiaries of several multinational firms including Ericcson, Alcatel, and Motorola and Harris; and a number of smaller specialty firms including Eicon, Gandalf, Mitel, Newbridge and SR Telecom. While largely concentrated in Ontario and Quebec, the industry employed 39,838 people and shipped

$6.8 billion worth of manufactured goods in 1994 (Walsh 1996).

Its principal customers are telecommunications common carriers which use the equipment to offer a variety of communications services. Extensive service industry deregulation has led to a strong market of residential and business customers who desire their own terminal equipment and private networks. Since 1988, growth in manufacturing shipments has averaged 4.9% per year, reflecting some maturity in the Canadian market and increased competition from foreign suppliers. Improved access to the US market has driven export growth while difficulty in achieving consistent, sustained success in other foreign markets has somewhat constrained this growth. Conversely, import growth has grown from approximately 25% of the domestic market in the early 1980s to over 50% in 1994 (Walsh 1996).

Canada is a major global player in the telecommunications equipment market, leading the world in the development and application of data communications, networking and multiplexing equipment, customer premise and multimedia equipment, personal communications and wireless technologies, and fibre optic transmission and satellite communications systems. Major export markets include the United States (60 percent), the European Union (10 percent), China, and a number of other countries, primarily in the Pacific Rim (Walsh 1996).

International Context and Canadian Competitiveness

The estimated 1994 world market value for telecommunications equipment was US$149 billion (up from US$100 billion in 1990); the industry serves a world-wide communications infrastructure with a cummulative investment value of US$1,074 billion and whose revenues were growing at 8% per year (Walsh 1996). Since that time, the market has been driven by significant growth in mobile and data communications (e.g. products and technologies relating to wireless personal communications services and the Internet).

With ongoing developments in the World Trade Organization (WTO), and complementary bilateral and multilateral negotiations between trading partners, the telecommunications sector has received major international attention and is undergoing significant changes. For example, under the WTO's General Agreement on Trade in Services, Canada and many other trading nations have agreed to make significant tariff cuts (i.e. elimination of some tariffs, 33 to 60 percent reductions of others) over the next five years. At the same time, major negotiations are ongoing regarding the elimination of government procurement preferences in this sector; the international Agreement on Subsidies and Countervailing Measures is intended to provide trade discipline on government assistance. Finally, the corresponding Agreement on Technical Barriers to Trade is intended to ensure that technical regulations, standards and testing/certification procedures do not create unnecessary or inappropriate trade obstacles.

From a Canadian perspective, these international developments should improve access to foreign markets, create a fairer trading environment, and provide some assurance that foreign technical

regulations and standards do not deny access to Canadian products.

Sharing many of the same underlying technologies as the computer industry, telecommunications equipment is rapidly increasing in speed and capacity while decreasing in price. Carriers are upgrading their networks from analog to digital technology and deploying broadband interactive capabilities to support enhanced service offerings. End users are acquiring increasingly powerful customer premises equipment (e.g. terminals and private networks) requiring sophisticated network connectivity. Equipment manufacturers are differentiating their products on the basis of software and support services as the basic hardware systems components become more uniform.

Foreign Markets

The United States telecommunications market is the largest in the world with a value of about US$55 billion in 1995 which is expected to grow to US$85 billion by the year 2000 (Technomic Consultants International 1992: iii). At the same time, it is one of the most open since the divestiture of AT&T. With over 20 percent of this market made up of imports, competition between domestic and foreign suppliers is intense. With Canadian exports over $1.3 billion (Industry Canada(2) 1994), it is anticipated that head-to-head competition between Canadian and American manufacturers will remain fierce.

In this regard, key trends which are influencing the North American telecommunications industry (and in fact, the global industry) are:

- the convergence of telecommunications and computing which is leading to integrated delivery of voice, video and data;
- continuing and rapid liberalization of telecommunications services markets which is leading to expanded equipment trade;
- the rapid reform of Mexico's economy(and that of other developing countries') which has led to extensive upgrading and modernization of Mexico's information technology infrastructure; and
- the industry is being consolidated through mergers, acquisitions, joint ventures, strategic alliances and research consortia.

In the area of US government procurement, the NAFTA has increased opportunities for Canadian firms to sell. While the procurement disciplines of the preceding FTA applied only to goods purchased by some departments, the NAFTA has expanded the scope to include services and construction, lowered the thresholds for competitive bidding, and expanded the coverage to include more US departments and agencies including the departments of Energy and Transport and the Army Corps of Engineers. These markets are valued at over $12 billion (Industry Canada(2) 1994). The NAFTA also promotes the use of compatible standards, technical regulations and

conformity-assessment procedures; these provisions should eventually reduce the burden for the two countries of compliance with different standards.

In many instances, the recommended approach for Canadian companies to do business in the United States (and elsewhere) is through strategic alliances with domestic companies. These alliances may take the form of technology licensing, licensing of manufacturing rights, joint development agreements, marketing rights, joint marketing programs, or distribution agreements.

In Japan, participation of foreign carriers is increasing while the national telephone company completes the digitization of its switching facilities. The breakup of Nippon Telephone and Telegraph into five regional carriers is also opening markets to foreign suppliers. Largely due to discussions between Japan and the United States, Japan has introduced measures to significantly increase access and sales of competitive foreign telecommunications products in the Japanese market. At the same time, systems integration support for Japanese products targeted for the North American market is enabling Canadian companies to develop strategic alliances that should enhance their ability to participate in the Japanese market (DFAIT(1) 1995).

The telecommunications sector in The Netherlands is in transition at this time. While commercial operation of the telecommunication infrastructure is currently controlled by PTT Telecom (a private sector company spun-off from government in 1989), a second national fixed telecommunications infrastructure (which involves Bell South of the United States as a partner) is expected to be fully operational by the European Union's 1998 deadline for a liberalized European telecommunications market. While the US$1.6 billion market is dominated by a few large domestic suppliers, the market has been characterized as "...in a growth mode...[and]...competitive due to a steady increase in the number of Dutch companies marketing a variety of foreign-made telecommunications equipment" (DFAIT(4) 1994). Although it doesn't manufacture in The Netherlands, Nortel is a large player in the Dutch market. However, since there are a large number of Dutch importers/distributors and systems integrators in the sector, most active Canadian companies operate through local representation.

Countries undergoing rapid economic and industrial transformation, including both China and Taiwan, have identified major priority and demand for the import of telecommunications technology and know-how. According to *Canada's International Business Strategy 1996/97*, prospects for Canadian business in China are good because Canada is seen as a source of advanced equipment and technology. Particular areas of opportunity include data, fibre optic, satellite, rural and mobile telecommunications.

Under Taiwan's Six Year National Development Plan, $4.114 billion has been allocated for investment in the domestic telecommunications sector in the three main areas of an urban telephone digital switching system, long distance telephone digital switching system, and high

efficiency mobile telephone system (Canadian Chamber of Commerce 1991: 24). Besides its own domestic market opportunities, participation in the Taiwanese market is a good means of accessing the huge Chinese market.

The Role of Environmental Considerations and Measures in Competitiveness

The key demand or competition parameters are price, performance, and quality. Interviews with pertinent Canadian industry officials re-enforced these "competition points" and identified that environmental considerations are not directly marketable or significant.

However, an interesting alternative perspective was offered by a Nortel official and is reflected in some of the company's published materials including its Environmental Position Statement (see Appendix C). In its 1995 Environmental Progress Report, a five component business case is presented relating to Nortel's plan to have all its manufacturing and research locations committed to the company's EMS Standard (which is based upon ISO 14001 and ISO 9000 and addresses British Standard 7750 and the European Eco-Management and Audit Scheme) and working toward local implementation by the end of 1996. The business case highlights cost reductions resulting from increased resource use efficiency and that environmental activities can strengthen relationships with key Nortel stakeholders including its customers, employees, suppliers, and the communities in which it operates. The Manager of Environmental Performance and Communications identified that having facilities apply the EMS has already benefited Nortel in one instance in satisfying British Telecom specifications.

In the area of building environmentally preferable products, Nortel initiated a corporate environmental life cycle program in 1992 that commits the company to factoring resource efficiency into all stages of the product life cycle. While its environmental targets are primarily focused on reducing waste and inefficiency (and corresponding costs) in the manufacturing stage, the company has begun to address ways in which environmental impacts can be reduced during other life cycle stages (i.e. design, materials input, distribution, use, and post-consumer) and benefit customers.

Highlights of initiatives to date include:

- the introduction of innovative and environmentally more sound packaging solutions which saved the company $7 million in 1995;
- as a result of greater concern on the part of customers and legislators regarding "product take back", e.g. landfill avoidance, handling of toxic substances (notably in obsolete equipment), Nortel has set up take back facilities in Canada, the US and the UK;
- based on a life cycle assessment of a fixed radio access printed wiring board which identified that more energy is used in the product use stage, Nortel is designing a board which will

operate in a more energy efficient manner to decrease environmental impacts and provide customer cost savings;
- "eco profiles" are being developed for other products in 1996; and
- the company's plant in Wales was given an award by British Telecom (BT) for its reusable polystyrene packaging for telephone mouldings which has reduced cardboard and plastic waste at BT and Nortel (Northern Telecom 1995).

Nortel's emphasis on the environmental soundness of its products, processes and general business practises is relatively innovative, but does flag that environmental considerations will probably increase in significance for this sector (and generally across industry sectors). Life cycle costing, application of environmental management systems, product take back for landfill and pollution avoidance, and packaging considerations are all examples of environmental measures which Canadian federal government procurement could consider and recognize in specifications and guidelines. While the implementation of such measures doesn't ensure market advantage, it appears to be receiving international recognition as "better business practise" and "industry leadership".

Environmental Services Industry

The Canadian Industry

The Environmental Services Industry (ESI) is part of the Environmental Industries sector, one of Canada's fastest emerging markets and one for which the international demand is growing at an equally fast pace. Environmental industries in Canada have recently gained status as an important sector of the economy and been the object of several studies and government initiatives to support the growth of this sector. It is a sector which is undergoing continuous evolution, ever expanding and driven by changing technologies. Both Environment Canada's report on *Technology, Competitiveness and Canada's Environmental Industries* (1995) and Industry Canada's *1994-95 International Trade Business Plan for Environmental Industries* capture the essence of this sector in Canada:

> "The environmental industries sector in Canada is large and growing rapidly. Current estimates by Canada's Department of Industry suggest that the sector contains 4,500 firms employing 150,000 workers with annual sales of $11 billion. One third of these firms are manufacturers and account for annual sales of $6 billion while the other two-thirds are service providers with total annual sales of $5 billion" (Environment Canada 1995:63).
>
> "It is estimated that the industry has been growing at a rate of 6 percent annually, about three times the rate of the Canadian economy. It is largely an enabling sector that provides expertise, technologies and services to meet the environmental needs of the traditional

industrial sectors" (Environment Canada 1995:63).

"The environmental industries sector is largely comprised of small and medium-sized businesses. The size of these firms varies, with some representing individual consultants and others employing more than 1,000 people"(Environment Canada 1995:63).

"Exports from the sector as a whole amount for approximately $1 billion annually, with almost 80 percent directed at the U.S. market. During the past five years, active Canadian exporters have doubled to over 600 firms, with 1200 export-ready" (Industry Canada 1994:3)

Environmental services firms typically provide consulting and related engineering, scientific and technical services in resource conservation and protection, water supply, sewage collection and treatment, solid waste disposal, industrial waste water treatment, air pollution controls and energy conservation. Consulting engineering firms, solid waste management operators and recyclers, private laboratories and research establishments are also part of this sub-sector (Industry Canada 1994). In total, approximately 333 firms employing between 8,000 to 14,000 people provide services to the domestic and international markets (Environment Canada 1995:73).

Canada's and other countries' experiences with the environmental industries sector indicate that its strength is directly influenced by environmental regulations (Environment Canada 1995; U.S. Congress 1995, Canadian Trade Office in Taipei 1994). Environmental services respond to the needs of traditional sectors to modernize and implement changes to eliminate pollution or clean-up an existing problem. Market-based instruments, although not widely in place, are also believed to promote the demand for these services. While pollution prevention measures are increasingly used to achieved higher cost-effectiveness and increase competitiveness, strong environmental regulations remain the most important driver of the demand for environmental services across many sectors of the economy.

Foreign markets

The Environmental Industries Sector is one of the most promising global markets for the next decade. Market growth forecasts for the entire environmental industries sector are impressive, calling for an average annual growth rate of 9 percent for the period 1992 to 1997 (Industry Canada 1994). "A study by the Organization for Economic Co-operation and Development (OECD) estimated the 1990 market for environmental services and traditional pollution control and waste treatment equipment at $200 billion, with the potential to grow to $300 billion in the year 2000" (U.S. Congress 1994:8). Yet these projections do not fully capture the full extent of market opportunities particularly in the area of pollution prevention and cleaner production technologies and services. Canada's current share (3.5 percent) of the world market for environmental products

and services is expected to grow (Environment Canada 1995; Industry Canada 1994).

In 1990, the largest environmental markets were in the industrialized nations of the OECD, accounting for approximately 80 percent of markets worldwide. Of this, 24 percent was for environmental services (U.S. Congress 1994:90,97). However, markets in emerging economies are growing rapidly. *Canada's International Business Strategy for 1996-1997* has identified it as a priority sector for many trading partners including the United States, China, Taiwan, Latin America, Korea, The Netherlands and India (Government of Canada 1996).

The value of Canadian exports is currently estimated at $1billion, 80 percent of which is destined to the United States (Environment Canada 1995:42). The U.S. is both the world's largest producer and market for environmental goods and services. Estimates on the market size vary anywhere between US$78billion in 1990 (OECD) and US$133.7 billion in 1992 (Environmental Business Journal) (Environment Canada 1995: 42). Canada's Foreign Affairs and International Trade Department reported in 1993 that 40 percent of environmental spending came from public sources while the remainder of the market is from the private sector (DFAIT Undated). Figure 2 shows the share and type of spending by some of the larger public sector buyers in the U.S..

EPA	*$3billion/year*	*Construction grants*
	$2.5 billion	*Superfund hazardous waste cleanup*
Federal Defence	*$4.5 billion/year*	*Environmental activities*
State governments	*$9 billion/year*	
Municipalities	*$35 billion/year*	

Figure 2 - U.S. Public Sector Spending on Environment in 1991
(U.S. Congress 1994)

Some of the more pressing environmental issues in the U.S. include the control of smog in southern California, the clean-up of contaminated sites, particularly from U.S. military activities and, waste treatment and management in large urban areas. While the level of spending on environmental protection goods and services will continue to be the highest in the world, the growth in future demand will be determined by the introduction of new regulations and the revamping of old ones by state and federal governments.

Market opportunities for Canadian firms are also growing rapidly in other trading nations; notably, the OECD estimates the Japanese market will grow to US$39 billion by 2000 (Environment Canada 1995:43). The Japanese market is stimulated by a set of strict standards in some areas and several pollution prevention incentive programs. Air quality markets are already quite developed in Japan and improvements in sewage treatment infrastructure, waste management and recovery are growing needs (U.S. Congress 1994:105). "The Five-Year Program for Sewerage Construction and Basic Program for Public Investment" anticipates that sewer services will be

provided for 70 percent of Japan's residents by 2000"(Environment Canada 1995:44).

In Taiwan, both the government's Environmental Protection Agency (EPA)and public pressure to protect the island's deteriorating environment are dominant drivers of the demand for environmental services and technologies. The relatively new EPA, established in 1987 in response to public pressure, plans to allocate over $US 38 billion for environmental projects, primarily in the areas of sewage treatment and solid waste disposal (Canadian Trade Office in Taipei 1994:2). Public water resource protection projects represent a high proportion of public environmental protection projects and are reported to offer a range of opportunities for environmental design services and equipment suppliers. High levels of acid rain over the island are driving higher air emission standards and are creating many opportunities for suppliers of emission control and analysis technologies and services. While most of the local technology and know-how is coming from Japan, Canadian firms in this sector are encouraged to "seek niches where their proprietary technology is relatively cost-effective ...,technically sufficient, and easily serviced. Creating production joint-ventures, identifying marketing partners, developing local/regional service capabilities ... are all possible market entry strategies" (Canadian Trade Office in Taipei 1994:33).

Important market opportunities also exist in emerging economies of Latin America. Environmental spending is growing in Brazil, Mexico, Chile and Argentina supported by investments from national governments, IFI and development agencies. In 1992, Mexico's environmental market was estimated at $US 614 million. To date, Canada has been a minor player but its role is growing, especially in waste water treatment, monitoring and metering equipment, technical studies, and a variety of other environmental services (DFAIT[2] 1993). As Mexico faces near-crisis conditions in air and water quality, as well as waste management, the opportunities for both conservation and pollution abatement are substantial. In 1993, the World Bank entered into an agreement with Mexico to provide US$1.8 billion in loans to clean up water and industrial pollution and implement garbage and toxic waste disposal for the years 1994-1996. Although the devaluation of the peso in 1994 has slowed down the activities in this area, efforts are expected to resume in 1996 [DFAIT [2]1993, DFAIT [3] 1995).

Finally, the markets for environmental services and technologies world-wide are growing rapidly, but are extremely difficult to predict as they are highly influenced by regulations, economic prosperity and, public and political priorities. It is expected that this market will undergo continuous change in the years to come with an emphasis on new areas including pollution prevention technologies, environmental analytic software, services to design cleaner production systems and assist emerging economies to "leap-frog" to cleaner technologies.

Canadian competitiveness

The potential for tapping into rapidly expanding international markets is enormous for Canadian firms. The competition is also very strong, especially coming from U.S., Japanese and German companies. However, there is room for well qualified Canadian firms, especially "if you specialize in one specific area and provide an excellent service" (DFAIT Undated).

Currently, there are actually only a few large Canadian firms in the environmental industries sector and the largest, Philip Environmental, does not provide the full range of services offered by major international competitors (Environment Canada 1995:63-64). Many Canadian firms have chosen to enter the market via some form of partnering arrangement. These ventures offer specific competitive advantages including access to growth capital, technology exchange, product development, and management know-how (Government of Canada 1996, DFAIT Undated).

This sector has many demonstrated strengths and its fast expansion attests to the solid base in environmental science and technology support in Canada, including research institutes, universities, federal and provincial governments, and R&D facilities within companies. With Canada enjoying a reputation for strong environmental ethics (Environment Canada 1995), an impressive network of government programs provides support and incentives in facilitating access to technologies, markets and financing. Several environmental service firms have won numerous offshore engineering projects and enjoyed success through various activities and projects supported by International Financial Institutions (Industry Canada 1994).

An analysis of the Strengths, Weaknesses, Opportunities and Threats (SWOT) conducted for Environment Canada identified that companies in the environmental industries sector face many difficulties, mainly:

- "a limited access to funds which is common to many SMEs;
- a shortage of management skills due to the dominance of scientists and engineers in this sector with few having training or experience in managing a business, strategic planning, or marketing and communication;
- highly unpredictable sector because it is fuelled by technological innovation and driven by government regulations and enforcement; and
- many lack the ability and capital to upgrade or create new technologies that would allow them to take advantage of growing domestic and international markets" (Environment Canada 1995).

The strategy for the environmental services industry must be to establish its dominance in the domestic market and tap into strategic international markets (Environment Canada 1995). Even so, many firms are still not large enough to satisfy Canada's domestic environmental requirements. Canada remains a net importer of environmental technologies. With expectations that the Canadian market will grow at about 10 percent annually over the next 5 years, the sector must mature to meet the anticipated demand in Canada as well as seize opportunities abroad.

Because there is a direct link between the establishment and enforcement of an effective environmental management framework and the strength of the market for EIS, federal procurement can play a significant role in supporting the competitiveness of this sector. Federal procurement can directly support this sector by itself requiring environmental services to implement its Green Government mandate but a more important role is its indirect influence as a driver of the demand for environmental goods and services by other sectors of the economy. By introducing environmental requirements for a broad spectrum of products and services it will incite manufacturers and suppliers in many industry sectors to upgrade their processes, implement cleaner production techniques, change the way in which their service is delivered. In this way, federal procurement is an important complement to regulations and economic instruments as essential elements to encourage growth and competitiveness of the environmental industries sector.

Green Building Design and Management

An initial intent was to examine the heating and cooling products sector and identify environmental leaders. However, based on research and interviews with relevant experts, a decision was made to shift and broaden the focus of analysis to exportable Canadian expertise in building design and management incorporating "green" strategies including heating and cooling measures.

As described in an August 21, 1996 CanadExport On-line article,

> '"Green" buildings are designed and built to allow operation that is responsive to the local microclimate, reduce their environmental impacts in their material selections, and save energy. They pay particular attention to occupant health, productivity and construction quality, and typically cost no more to build then conventional constructions' (DFAIT(5) 1996).

It is apparent that a knowledge and experience base has been developed and continues to evolve in the Canadian green building design and operations area. This service industry area is still becoming established and involves multidisciplinary knowledge and expertise in: building and

equipment design, engineering, building contracting and construction, building science, environmental science, architecture, planning, operations management, and various specialized trades (e.g. ventilation and cooling system design and installation). The two major objectives for participants in this industry are to improve overall and environmental quality in buildings and improve relevant resource utilization efficiencies, notably in the areas of energy demand and waste reduction.

A major stimulus for the development and advancement of this industry sector has been numerous government initiatives which have directed and sponsored research, development and demonstration of relevant technologies, systems and approaches. Canada Mortgage and Housing Corporation projects and studies, various Natural Resources Canada programs including the R-2000 and C-2000 Programs, Advanced Houses Program, the former EnerDemo-Canada Program, and various Industry Energy Research and Development programs, and corresponding work of the National Research Council and Industry Canada, have collectively stimulated and supported innovative work in all major sectors relating to improved energy utilization and efficiency, waste reduction, and indoor air quality. Environment Canada, through its Office of Federal Stewardship, has researched and promoted consideration and implementation of further measures to reduce environmental impacts in this area. Provincial, regional and local governments have similarly directed and supported important work in this area.

Another major driving force behind the formulation of this industry has been Canadian utility initiatives promoting energy use reductions and higher energy efficiencies. One example of this is the Canadian Oil Heat Association's promotion, through a consumer newsletter and informational pamphlets, of energy-efficient retrofits and conversions from electricity to oil when appropriate. Similarly, Canadian natural gas utilities, particularly in Ontario and B.C., have incorporated energy efficiency promotion as a component of implemented demand-side management initiatives. Consumers Gas in Ontario has promoted various residential retrofit measures through different incentives including the offering of competitive rate financing for certain activities and expenditures under its "Energy Saver" banner. Consumers Gas officials have predicted that 10% of the utility's customer base (i.e. 120,000 customers) will take advantage of the promoted measures. Canadian electrical utilities are also offering a variety of incentives and promotional literature to encourage reduced energy consumption through retrofit and more energy efficient new construction activities.

Within the various building sectors, research and development results and conclusions are being shared and incorporated into education and training courses, workshops, and seminars. Pertinent associations and organizations have been, and continue to be established as a further means to network and exchange information between parties which have decided to place greater emphasis on environmental considerations or at least keep informed of developments.

While most of the business activities and initiatives to date have focused in the Canadian market, export opportunities for expertise and technology are increasing dramatically. Further, Canada's reputation as a world leader in this area is recognized and respected.

Successful Export Examples

One example of successful transfer of Canadian know-how and technology to foreign export markets is the success of Canadian residential sector companies in Japan. At the 1996 Japan Home Show in Tokyo, more than 80 Canadian exhibitors will participate (a 55% increase over 1995) and the Japan External Trade Organization will feature over 20 Canadian companies at its stand. Concurrent events being staged by Japan's Imported Housing Industries Organization, including a daily seminar series, will involve a series of product installation demonstrations and individual business meetings between Canadian exporters and potential Japanese clients.

According to a September 27, 1996 CanadExport on-line article, a booming market for imported housing in Japan has arisen in the past few years due to deregulation and changing consumer tastes. For Canada, this has led to a 139 percent increase in manufactured home packages exports in 1995 and an expected doubling in 1996 (DFAIT(6) 1996). The same trend is evident for a wide range of Canadian housing components including windows and heat exchangers.

While the popularity of North-American-style woodframe construction leaped last year when the Kobe earthquake demonstrated the superior strength of that housing style, Japanese home builders' and other industry officials' interest in Canadian 2x4 construction was to some degree secured earlier on through Japanese delegation meetings with Canadian R-2000 and other officials in the late 1980's and early 1990's. The Japanese were impressed with the building science behind Canadian construction and the "house as a system" concept. While there is Japanese interest in specific products, their broader interest is in the overall housing technology.
Strong interest in Canadian R-2000 and advanced housing strategies and technologies has also been shown by organizations and governments in the United Kingdom, the Nordic countries, the United States, Russia, and others.

A second example of successful Canadian export of green building know-how is the recent rewarding of a contract by the City of Santa Monica, California, to a Canadian team to help develop sustainable development guidelines for all new municipal construction and major retrofits. In beating out 30 other competitors, the team's relevant experience and Canada's proven track record in the field of sustainable development research and implementation were cited as decisive factors (DFAIT(5) 1996). With this being one of the first municipal "green" construction directives anywhere, it will be precedent-setting in an emerging market in North America and Europe (and potentially elsewhere).

Several other US cities, including Seattle, Portland and San Jose, have written sustainable city policies that set broad environmental goals. Austin, Texas has developed "green" builder certification programs. New York and Los Angeles are considering how a "green agenda" would affect city policies (DFAIT(5) 1996). Similarly, new environmental legislation has an impact on all areas of construction in Mexico, with pollution control systems and environmentally safe building technologies in high demand (Townsend Trade Strategies Inc. 1994: 32).

Federal Government Promotion Through Procurement

Recognizing that approximately 40% of annual resource expenditures are consumed by the construction industry (Environment Canada and Public Works and Government Services Canada 1995: 7) and the main criterion for federal government selection of building materials and equipment has been traditionally financial first cost (not operating, disposal or other costs), the federal government has implemented several initiatives in the past few years to encourage consideration and implementation of environmental aspects.

The *Environmentally Responsible Construction and Renovation Handbook*, a collaborative effort of the Office of Environmental Stewardship, Environment Canada, and of the Real Property Branch, Public Works and Government Services Canada, has been prepared "...for federal property and facility managers to assist them in planning and undertaking construction and renovation in an environmentally responsible manner. It outlines many key issues and introduces a number of possibilities now available for combining practical construction decisions and environmental considerations, while still remaining cost effective" (Environment Canada and Public Works and Government Services Canada 1995: 5).

The Federal Buildings Initiative (FBI) Program, managed by Natural Resources Canada, is bringing about increased energy efficiency in federal facilities by establishing three-way partnerships between utilities, qualified energy management firms and federal organizations. Basically, the program enables energy efficiency upgrades to be financed through resultant energy savings. Departments significantly participating in the Program already include Natural Resources Canada, Public Works and Government Services Canada, Environment Canada, Agriculture and Agri-food Canada, Indian and Northern Affairs Canada, Transport Canada, and National Defence. The Program overcomes the lack of public sector project capital by facilitating energy management contracts with the private sector under which the contractor provides the up-front capital for renovations and retrofitting and is paid back from the resultant savings in utility costs over a specified period. Work being performed under the Program has included extensive building retrofits, the use of co-generation, and the implementation of small, cost-effective measures such as the installation of time-controlled thermostats and higher efficiency lighting equipment. Both the

innovative financing approach and the work being conducted under this program are receiving considerable international attention.

Current Canadian multi-sectoral initiatives are stimulating and promoting Canadian leadership. However, international competition is inevitable. The federal government, through its Federal Buildings Initiative and other procurement initiatives can take advantage of the developing Canadian industry for environmental, economic (i.e. cost savings and avoidance) and competitiveness reasons. If not, the Canadian "edge" might be lost.

6. Perspectives on Federal procurement

Federal purchasing: scope, processes and trends

A recent report by Price Waterhouse conducted for Environment Canada reported that the federal government spends $11.6 billion on products and services annually–an average of $6 billion on goods and $5.6 billion in services. In addition, the federal government owns and manages approximately 64,000 buildings throughout the country. This level of activity confers upon the federal government the status of the largest single buyer and property manager in Canada (Price Waterhouse 1996).

The trend of the past five years has been towards decentralization. Agencies such as Treasury Board and the former Supply and Services (now Public Works and Government Services Canada) have seen their role in the federal procurement process changed and redefined. The role of setting specific policies in the area of purchasing now rests with individual departments which do so under the broad guidance of Treasury Board Material Management Policy and the " Material management environmental guidelines" (Energy Pathways 1994).

Public Works and Government Services Canada (PWGSC) continues to be the main federal government purchaser, especially concerning large purchases such as military equipment, vehicles, computers and telecommunications equipment, and coast guard vessels. PWGSC also has responsibility for the majority of activities related to federal infrastructure and installations, including construction, engineering, realty operations, and maintenance and leasing contracts. In all, PWGSC purchases account for close to half of federal procurement spending. However, the trend towards privatization and the creation of Special Operating Agencies will continue to diffuse the federal purchasing power in the hands of more and more managers.

While Treasury Board and departmental policies provide broad guidance to responsible managers, there are several ways in which managers can fulfill their purchasing requirements. Purchases can be made by a central agency, by a number of purchasers that buy collectively, or by each department independently. Authority has been delegated to individuals for purchases under $5,000. Many purchasing decisions are made using standing offers or government specifications. While standing offers are negotiated between suppliers and the federal government and renewed on a yearly basis, specifications involve a more lengthy development process and often will not be updated for several years depending on the clients' needs and whether technical, market and policy conditions have changed. Both of these steps in the purchasing process are critical to the implementation of new policies of government, such as those pertaining to green procurement.

Trends in Green Procurement

In the context of the decentralization of purchasing responsibilities discussed above, green procurement has been slowly making its way into most federal departments' policies and practices. Since the early 1990s, several committees and task forces have been formed and studies carried out to examine how departments can overcome some of the barriers to green procurement and work together to implement what is now a broad federal government mandate as expressed in the 1995 *Guide to Green Government.*

A recent report commissioned by the NRTEE provides a comprehensive review of the scope of green purchasing activities across the federal government (The Delphi Group 1996). Findings from the report indicate that the scope of green procurement remains relatively narrow and that environmental considerations apply to a very small percentage of government purchases, mostly goods. The actual implementation of green procurement appears to rely on the application of specific product criteria either expressed in individual purchasing orders or as part of department-wide specifications. The report indicates that only a few standing offers include green procurement guidelines (The Delphi Group 1996).

Furthermore, the decentralization of purchasing in the federal government poses many challenges to the implementation of green purchasing. First, the federal government must rely on each department to implement its own environmental purchasing policies, but also to provide relevant tools and information to its purchasers. Second, decentralized purchasing has diluted the influence of the federal government in certain markets because of the ability of more agents to express different purchasing preferences. Third, in the present climate of fiscal restraint, few resources are likely to be devoted by each department to keep purchasers up-to-date on advances in this area; simultaneously, investments in research to incorporate environmental considerations in product or service specifications are kept to a minimum.

Despite decentralization trends, the federal government can exert leverage in several sectors where the proportion of federal government purchasing within the market is large and the prescribed environmental criteria are compatible with those of other clients in the sectors. The federal government can also play a role in supporting innovation and perhaps even stimulating investments for enhanced environmental performance from their suppliers.

7. Issues for further consideration

This discussion paper was intended as a first scan of the potential relationships between the foreign demand for environmentally preferable products and services, and the federal procurement process. As such, it has uncovered several issues that merit deliberation by interested parties and perhaps further examination. To complete the discussion paper, we would like to highlight these issues with a view to encourage readers to formulate their own conclusions on the appropriate role of government in this area.

Federal procurement is subject to many rules and must meet several objectives such as performance, price and now environmental considerations.

What is the appropriate role for Canadian federal procurement given that:

- governments in key Canadian trading markets are beginning to use their purchasing power to achieve environmental objectives;
- federal procurement can strengthen the domestic market and thus provide a competitive environment from which companies can develop niche markets for export;
- there is a continued debate and scepticism on the role of environmental measures (whether regulations or market-based approaches) in enhancing the competitiveness of businesses.

In the context of the globalization of trade, governments are working at many levels to harmonize practices and standards, and at the same time are introducing initiatives, especially in the environment area. Harmonization efforts, while facilitating transactions between regions of the world, also result in the application of broad rules and standards achievable by a larger set of players. Often the incentives for environmental leadership and innovation cannot be found in the common rules.

How can government work on the harmonization of standards and at the same time develop a procurement system that will support if not stimulate innovation on the part of companies?

Private sector procurement in many countries has placed the emphasis on broader company responsibility, and the onus on suppliers to demonstrate their environmental claims. Public sector procurement in some countries (e.g. The Netherlands, Germany, the United Kingdom) is also beginning to shift the emphasis in this manner?

Will a difference in emphasis between public and private sector buyers, and at the domestic and international levels, place a difficult and/or inappropriate burden on Canadian companies? How can and should Canadian public sector officials address this issue and provide assistance to Canadian exporting companies?

- Finally, the research confirmed a strong and growing market worldwide for less harmful products, less polluting equipment and technologies, and leading-edge environmental services. However, in the sectors reviewed, companies do not necessarily compete on the basis of environmental performance; price, performance and product characteristics are premier considerations. Nonetheless, there are some relationships to federal procurement that were uncovered, although these should be explored more broadly across industry sectors to confirm their relevance. These are:

- **whether and how companies use their experience as government suppliers in export markets;**

- **how do federal procurement requirements compare with private sector ones domestically and with those of foreign governments;** and

- **can the right kind of federal procurement incentives actually stimulate environmental investments on the part of industry with a view to enhance their ability to capture foreign markets for green products and services?**

Appendix A
Candidate Countries Which Received Full Analysis

The United States of America

Economic and trade context

The United States unequivocally dominates the Canadian export market, capturing 82 percent of total merchandise exports in 1994. "Trade in products and services between the two countries support more than 1.5 million jobs and directly generates 25 percent of Canada's GDP" (Government of Canada (1) 1996: 13). Furthermore, the North American Free Trade Agreement (NAFTA) has strengthened the substantial liberalization achieved under the Free Trade Agreement and created many new opportunities for Canadian industries, notably in the high-technology and high value-added sectors such as environmental technologies, information technologies, medical and health-care, and biotechnology.

More changes can be expected in US-Canada trading relationships as the United States launched in 1993 a National Export Strategy aimed at better opening foreign markets. The Strategy recognizes that exports will be one of the driving forces behind national growth and attempts to focus government's resources on American business overseas (Garten 1994).

While Latin America is the fastest growing market for the United States, with an average increase in trade of 16 percent for the past five years, Japan constitutes a very important bilateral relationship which is receiving considerable attention from the American public and private sectors. Several Japanese industry sectors have already adopted strategies of environmental responsibility and performance. The United States' preoccupation with Japanese markets will undoubtedly lead American industries down this same path of high environmental performance.

Canada's International Business Strategy for 1996/97 focuses on six priority sectors for exports to the United States: computing technology, environmental industries and services, biotechnology, telecommunications, and cultural industries. Of note is the importance and potential for growth in the U.S. environmental products and services industry. This market is currently valued at US$135 billion and a 4 percent annual growth is predicted to the end of the decade. It is estimated that Canada's share could increase by 20 percent over the next two years.

The demand for environmentally preferable products and services

Several federal initiatives since the early 1990's have made inroads in establishing the demand for environmentally preferable products and services. There are important efforts at the federal level to ensure that the Government's acquisition and procurement processes recognize and affirm environmental policies and goals, and stimulate markets for products and services that meet those goals. Three Executive Orders direct agencies to undertake measures to reduce the impact of their operations on the environment: Energy and Water Efficiency (#12902), Federal Acquisition, Recycling and Waste Prevention (#12873), and Compliance With Right-to-Know Laws and Pollution Prevention Requirements (#12856) (Environmental Protection Agency(1) 1995).

Executive Order #12902 mandates that federal agencies purchase energy-efficient, renewable, and water-conserving products that are designated "best practices". "Best Practices" refer to products that are in the upper 25 percent of energy efficiency for all similar products, or products that are at least 10 percent more efficient than the minimum level that meets federal standards. The US Department of Energy's Federal Energy Management Program (FEMP) is charged with recommending best practices products for a range of product categories including: office technologies, residential equipment, residential appliances, commercial appliances, lighting technologies, water saving technologies, industrial technologies, renewable technologies, commercial equipment, transportation technologies and building technologies (Center for the Study of Responsive Law's Government Purchasing Project 1996: 10).

Executive Order #12873 requires the US Environmental Protection Agency (EPA) to issue guidance to federal agencies on how to procure "environmentally preferable" products and services. The purpose of the guidance is to assist the federal government in using its tremendous purchasing power — estimated at $200 billion annually — to spur the innovation of products and services in order to address some of the pressing environmental problems facing the nation (EPA(1) 1995). To date, 20 Government Agencies have prepared "Affirmative Procurement Plans" and 24 items have been designated as containing recovered materials (EPA(1) 1995). The EPA has also undertaken a series of pilot projects to study the workability of using biodegradable cleaners and computer equipment with attributes beyond the Energy Star designation.

Green procurement networks and initiatives are also spreading at the state and local levels. A joint project of purchasing officials, leaders from state and federal government, utility companies and public interest groups - the Energy-Efficient Procurement Collaborative - was initiated for the purpose of assisting purchasing officials to identify best practice and products. The City of Santa Monica has a long-standing commitment to green procurement and worked with Green Seal, a US ecolabelling program, to design environmentally preferable specifications. The State of Washington has also passed a law that helps purchasers identify environmentally preferable products.

Green procurement efforts are complemented by strong environmental legislation and an array of pollution prevention and waste reduction initiatives across the various levels of government. Initiatives such as the Department of Energy's Green Lights Program, EPA's Common Sense Initiative targeting six industry sectors, the EPA's Design for the Environment Program, and the National Pollution Prevention Round Table contribute to the creation of a competitive environmental climate in many industry sectors. Non-profit organizations, including the Society for Environmental Toxicology and Chemistry (SETAC), have been leaders in the development of life-cycle assessment methods. Other organizations, including the National Research Foundation, several university-affiliated research centres, and the Bureau of Mines, are funding and developing environmental technologies and clean processes.

There are many vehicles for consumer and business information on environmental products and services. A few environmental labelling programs help consumers identify environmentally preferable products: Energy Star, Green Seal, Scientific Certification Systems, and a newly piloted energy label - Energy Saver. Several publications, such as *In Business*, provide a mainstream vehicle for the promotion of environmentally preferable products and services.

As in many other jurisdictions, procurement requirements often lag behind the development of new technologies and new approaches of performance requirements; nevertheless, there is a broadening of perspective and opportunities in many government levels and a recognition of the importance of creating a demand for environmentally preferable products and services.

Japan

Economic and Trade Context

With the highest average economic growth among major industrialized countries in the 1980s and early 1990s, Japan's $5 trillion economy in 1995 made it the second largest economy in the world, accounting for 20% of the world's gross domestic product and 70% of the total economic output of the Asia-Pacific region (Government of Canada(2) 1995: introduction). In *Canada's International Business Strategies for 1996/1997*, Japan is described as "...a dynamic and broadly based market with a growing appetite for imports, offering unique and profitable opportunities for foreign suppliers" (p. 30). Canada's Action Plan for Japan similarly describes it as "...an increasingly consumer-driven economy where lifestyle preferences and demographic needs promise to dictate future import requirements to a significant degree" (Government of Canada(2) 1995: introduction).

Relations are primarily based upon the two countries' partnerships in the Quad (Canada, the European Union, Japan and the United States), the G-7, the United Nations, and the OECD, and common membership in the Asia-Pacific community, including APEC and ASEAN.

From a Canadian trade perspective, Japan is Canada's second largest export market, with export levels rising from $9.5 billion in 1994 (DFAIT(1) 1995: 38) to $12 billion in 1995 (Government of Canada(1) 1996: 30). To give this 1995 level some perspective, it exceeds Canada's 1994 total export sales to the 15 member European Union (Government of Canada(2) 1995: introduction).

While the majority of Canadian sales continue to be resource products, more than 40 percent of sales are manufactured or value-added goods (DFAIT(1) 1995: 38). According to *Canada's International Business Strategies for 1996/97*: "...the soaring yen, domestic deregulation and increasing consumer sophistication are forcing basic manufacturing out of Japan and boosting imports of value-added goods" (p. 30). *Canada's Action Plan for Japan* is a joint undertaking of Canadian federal and provincial governments and the private sector. Initiated in 1993, it is intended to alert Canadian industry to changing market conditions in Japan, encourage product adaptation, and help promote products. In the 1996 edition, action plans are provided in the identified priority sectors of: fish products, forest and building products, processed food products, software, telecommunications, tourism, medical consumer products, and furniture.

Demand for Environmentally Preferable Products and Services

A *Basic Environmental Law* was introduced in November 1993, and a *Basic Environment Plan* announced in December 1994. Besides establishing long-term environmental policy objectives and incorporating sustainable development principles, the Plan identified a series of central government programs and expected actions of all societal sectors in environmental conservation practices. With respect to central government operations, an Action Plan has been instituted to significantly reduce environmental impacts. More broadly, the government and manufacturers work cooperatively through alliances to stimulate environmental sensitivity and competitiveness (Environment Canada and the Environmental Agency of Japan 1996: 7-8).

One example is the "New Earth 21" program, which was launched by Japan's Ministry of International Trade and Industry (MITI) in 1990. This program calls for the promotion of the efficient use and conservation of energy, large-scale introduction of clean energy sources, the development of innovative environment-oriented technologies, and the development of energy-related technologies. In addition to coordinating and funding research activities, MITI has arranged for a number of tax credits and exemptions to facilitate the creation of environmentally friendly facilities, equipment, and products. Included are special tax credits (i.e. 10% in 1992) for energy, labour-saving, and environmentally conscious equipment. (Department of Energy et al. 1993: 7).

A second example is the Research Institute of Innovative Technology of the Earth (RITE), Japan's leading environmental institution, which was formed in 1990 to develop innovative technology for addressing global environmental problems. Between 1990 and 1993, $128 million was allocated to RITE to develop leading edge technologies (Department of Energy et al. 1993: 9).

A third example is a "Green Purchasing Network" (GPN) which was launched in February 1996 with the support of the Environment Agency of Japan. Begun with 73 charter members and a steering committee of 24 members from companies, local governments, consumer groups, and academia, it had grown to 450 organizational members by June 1996. At that time, the membership included 330 companies, 70 local governments, and 50 non-governmental organizations. The GPN's purpose is to: disseminate the concept of and promote the practise of green purchasing among central and local governments, companies and consumers; provide members with useful information for the practise of green purchasing; and exchange experiences and information among members (Japan Environment Association and Hashizume 1996: 1).

After the United States, Japan has the second largest national environmental market, estimated at $24 billion in 1990 by the OECD. This market continues to grow, supported by strict standards in some areas and efforts to match better foreign performances in others. Japan is also a leading force in the air pollution control market. Because of high energy prices and aggressive government policies adopted after the energy supply shock of the 1970s, Japanese industry has made significant strides in adopting energy efficient technologies. Japan is contending for leadership in some clean energy fields. Since early 1992, the Japanese Government has supported its fuel cells industry by subsidizing purchases by hospitals, hotels and schools. Moreover, Japan is active in recycling technologies and a world-leader in some air quality markets.

Japan's government is creating a strong foundation for companies to innovate and become competitive on the environment front. By being aggressive (more than any other country), this strategy seeks to position Japanese companies competitively abroad. The standards that the Japanese will set are likely to be very high.

The Netherlands

Economic and Trade Context

Western Europe is the world's leading importer of products and services, and after the United States, the European Union is Canada's most important commercial partner. Similar to the Canada's formal dealings with Japan, relations are based upon partnerships in the Quad (Canada, the European Union, Japan and the United States), the G-7, the United Nations, and the OECD. The Netherlands represents an attractive market for Canadian firms as well as being an entry point to EU markets. Current exports to this country are in the order of $1.23 billion and consist of fabricated materials such as wood, paper, metals, chemicals and textiles (Government of Canada(1) 1996: 20). There are good market opportunities for finished products such as pharmaceuticals and medical equipment, telecommunications and related equipment, industrial machinery, transportation equipment, industrial instrumentation, and office equipment. Other sectors of

opportunity include defence, civilian security, environmental technologies, consumer software and business services.

The Demand for Environmentally Preferable Products and Services

The Netherlands is clearly the European leader in product policies and is recognized in the European Union (EU) for many of its innovative environmental initiatives. As a country, it benefits from broad guidance and specific commitments under its National Environmental Policy Plan (NEPP), including leading work on life cycle assessments and environmental design. Industry sectors have also been targeted by the Dutch government to achieve stringent environmental objectives; their pollution prevention approaches are considered some of the most innovative in the EU. The leadership of The Netherlands on product policies and life cycle approaches stands out among countries of the OECD and the EU.

Under the NEPP, the Dutch government has set stringent objectives for reducing pollution emissions by the year 2010 to between 10 and 30 percent of their 1985 levels. To achieve these ambitious goals, the Economic and Environmental Ministries developed a Technology and Environment Plan. This Plan calls for close cooperation between government and industry sectors, and focuses heavily on incentives and subsidies to help industry meet the targets. In 1992, the Government spent an estimated US$375 million on environmental technologies, with half the expenditures supporting the demonstration of pollution prevention technologies (U.S. Congress 1994: 318).

The NEPP also provides the framework and direction for green procurement in The Netherlands, including actions pertaining to government operations. In accordance, all Dutch Ministries have an Environmental Management System and green procurement is a component in varying degrees of comprehensiveness. Green procurement initiatives are largely decentralized and, not unlike in many other countries, each agency incorporates the environment in its purchasing decisions in a different way commensurate with its mission, priorities and organizational structure.

Ongoing discussions on the environment and the economy in The Netherlands could well result in strengthening the government role in stimulating sustainable development and, more specifically, the market for environmentally sound products. The Ministry of Environment is presently considering setting up a national program to stimulate green procurement. However, some of its momentum in this direction could be slowed by other EU members which may interpret The Netherlands' efforts as establishing non-tariff barriers to trade.

Three Ministries are particularly active in green procurement: Defence, Public Works and Water Management, and Housing, Spatial Planning and Environment. The Ministry of Defence has developed a public purchasing protocol in which the environment plays a prominent role. The Ministry of Public Works and Water Management has developed an environmental manual for

maintenance products which provides general guidance on how to select products and specifications for five products categories: outside paint, protective coatings for wood, cleaning products, strong cleansing agents and lubricants. The manual also contains a listing and rating of products. Finally, the Ministry of Housing, Spatial Planning and the Environment incorporates environmental considerations in the management of public buildings, including energy and waste management considerations, the location of buildings, and buildings materials. Most buildings are situated near a train station and parking lots have been limited to encourage staff to use public transport. In building construction and renovation, set objectives include: reduce the use of scarce resources; avoid use of any materials which are harmful to humans and the environment; increase the use of renewable resources and the reuse of materials; and reduce waste, energy and water consumption, and soil pollution (Boschloo 1996).

Government green procurement initiatives are also occurring at local levels in The Netherlands and throughout the European Union. The ICLEI organization, which has been established to serve an international movement of local authorities striving to achieve tangible improvements in global environmental conditions through cumulative local actions, has launched a European Environmental Procurement Initiative. Recognizing that local authorities in several European countries have already implemented green purchasing policies, this Initiative includes establishing a network of municipal procurement officers, producing a guide to environmentally-conscious procurement, staging training seminars, conducting municipal pilot projects and case studies, and planning the first "Procura Forum'97" to be held in Germany (ICLEI undated).

The Peoples Republic of China

Economic and Trade Context

The Chinese government's strategic economic (as well as social) goal of a smooth transformation to a "socialist market economy" is intended to involve job creation, industrial modernization, infrastructure expansion, increased industrial output and efficiency, greater availability of installed power capacity, and reform and decentralization of government. While China did not join the World Trade Organization (WTO) in 1994, the country has made efforts to unify its foreign trading regime under international auspices. Today, China may be viewed as a collection of large regional markets which are distinctly different but sharing similar geographic boundaries, industrial bases and cultural factors (Government of Canada(1) 1996: 33). As a country, China's economy has grown exponentially, with its world trade position improving in 1994 based on an export growth rate of 32 percent (which reversed a 1993 trade deficit) (Government of Canada(1) 1996: 32).

Bilateral relations between Canada and China have been in place for over 25 years; the relationship

is broadly based on four important and inter-related issue areas: economic partnership; sustainable development; human rights, good governance and the rule of law; and peace and security. Since China embarked on its "open-door" policy of economic reform, Canada-China trade relations have evolved rapidly. In this regard, Canada has consistently supported relevant Chinese efforts, extended "most-favoured-nation" status to China, and publicly supported China's application for WTO membership.

China is now Canada's fifth largest export market, with 1994 bilateral trade having exceeded $6 billion and Canadian exports accounting for almost $2.2 billion of this (a 40% improvement over 1993 Canadian export levels). Canadian exports reached $1.4 billion during the first six months of 1995, almost equalling total 1993 exports. While exports have traditionally comprised of basic commodities including wheat, fertilizer and wood pulp, sales of manufactured goods (e.g. electrical, mechanical and telecommunications equipment) have gained importance. While manufactured goods represented 4% of 1988 exports, this proportion rose to 32% of 1993 exports and 34.3 % of 1994 exports (DFAIT(1) 1995: 29).

Many of China's import and infrastructure requirements correspond to Canada's prime export strengths, especially in the areas of telecommunications, oil and gas, power generation, environmental technologies and services, transportation, the mining and petrochemical industry, and agricultural products and technology. As of 1995, more than 100 Canadian companies have established offices in China and Canadian companies have invested over $1.8 billion in China (DFAIT(1) 1995: 29).

Since 1981, Canada has had an official development assistance program with China; annual funding has exceeded $30 million since 1990 (DFAIT(1) 1995: 28). Under the "New Country Development Policy Framework for China" which was launched in 1994, all CIDA programs focus on the four inter-related issue areas identified above. For example, under CIDA's Industrial Co-operation Program, $8.3 million was disbursed in 1994-95 as financial contributions to Canadian firms which are co-operatively participating with local Chinese partners in sustainable development projects (DFAIT(1) 1995: 30-31).

Demand for Environmental Products and Services

Because policy priority has been given to rapid industrial growth over the past forty years, severe air and water pollution and soil erosion problems have been created. For example, the burning of high-sulfur content, low-quality coal to provide over 75% of China's energy has led to high levels of industrial air pollution and acid rain. It has been suggested that the Chinese situation could be considered "...the most serious threat to the global environment". It is noteworthy that Japan, where much of China's generated acid rain falls, devotes most of its foreign direct Chinese aid to the introduction of environmental technologies (Shirk 1994: 81-82).

While China established a National Environmental Protection Agency (NEPA) and corresponding environmental legislation in 1989, the Agency's status as a sub-ministerial organ has given it limited power and influence at the national and local levels. Further, China's commitment to the Montreal Protocol is contingent on overseas aid and technology; China is eligible for an estimated $200 million worth of aid from the UN's Global Environment Facility (Shirk 1994: 82).

Chinese environmental protection policy has been characterized as one designed not to impede economic growth. Mr. Song Jian, the Chairman of the NEPA, stated at the 1992 United Nations Conference on Environment and Development (UNCED): "To talk about environment in isolation from economic development and technological progress means an environmental protection devoid of a material basis" (Shirk 1994: 83). In follow-up to the UNCED, the Chinese government formulated "Ten Points for the Environment and Development" which sets the development of environmental industry and environmentally friendly products as one of the country's priorities (Yang 1996).

Since its establishment in April 1993, a Memorandum of Understanding between Environment Canada and the Chinese NEPA has provided a framework for addressing mutual environmental concerns such as the reduction of greenhouse gas emissions, providing assistance to China in domestic environmental protection, and promoting Canadian commercial opportunities, most notably in pollution control technology and stratospheric ozone protection (Lepage and Yang 1996).

Several companies from Canada (e.g. AGRA Earth and Environmental, BFL Consultants, Canpolar East and Seaborne Information Technologies) have recently teamed up with Chinese firms to create the Sino-Canadian High-Technology Centre of Resources and Environment (SCH-CORE) in Beijing. This Centre will help promote technology transfer to China and expand business opportunities between the two countries. In November 1996, the Centre will begin hosting workshops and seminars.

Appendix B
Candidate Countries Which Did Not Receive Full Analysis

Chinese Taipei - Taiwan

Economic and Trade Context

Formally, Canada has observed a "one China" policy since 1970 when diplomatic relations were established with the People's Republic of China. Nevertheless, "informal" relations, notably in the trade area, have been established and provide strong ties between the two countries. For example, the Canadian Chamber of Commerce, the Canadian Export Development Corporation and the Canadian Commercial Corporation are all quite active in Taiwan (Government of Canada(1) 1996: 37).

In Taiwan, there is a prevailing mood of having "arrived" as an economy. With greater disposable income and more leisure time, Taiwanese citizens are aspiring to a better quality of life accompanied by increased demand for consumer products and services. Under a massive National Infrastructure Development Plan (NIDP), there are huge market opportunities within the infrastructure (e.g. building materials, construction, engineering and consulting industries) sector. Further, as Taiwanese industry strives to rationalize and improve production automation and quality, there is significant potential in advanced equipment technologies, environmental products and services, and engineering consulting services (Government of Canada(1) 1996: 36).

Taiwan was Canada's 11th largest export market in 1994 with total exports of $1.2 billion (a 20% increase over the 1993 level). Major Canadian exports included mineral fuels, wood pulp, paper, paper board, electrical equipment, agricultural products, processed foods, pollution control and environmental engineering services, transportation equipment, telecommunications, avionics, high technology products and engineering services (DFAIT(1) 1995: 57).

Demand for Environmental Products and Services

Major existing environmental problems include contamination of farm land, fishing waters and rivers, degradation of forests, and significant air pollution caused by industrialization and urbanization. Further, while huge quantities of domestic and industrial waste are annually generated, Taiwan has few hazardous waste landfills and no regulatory system to ensure safe disposal.

The Taiwanese Environmental Protection Administration was established in 1987. In its 1991-1997 National Plan, the government has committed to funding environmental protection projects including sewage systems, municipal solid waste incineration, river and related pollution control, etc. Under the NIDP, Cdn$31 billion has been allocated for environmental projects in the public and private sectors. Efforts are ongoing to establish a bilateral environmental technology partnership which matches Taiwan's interest in environmental solutions with the appropriate Canadian technologies and regulatory and development experience.

Mexico

Economic and Trade Context

The North American Free Trade Agreement (NAFTA) brought the countries of Canada, the United States and Mexico into a market of 360 million people - "a market larger that the population of the 12 countries of the European Community and one with a total North Amercian output of over $7 trillion." (DFAIT(2) 1993). Mexico is one of Canada's most important trading partners in Latin America along with Brazil Argentina and Chile. Canada`s cumulative investments in Mexico now total over $1.3 billion up from $580 million in 1992 (Government of Canada(1) 1996; DFAIT(2) 1993).

Demand for Environmentally Preferable Products and Services

The market for green products and services in Mexico is largely driven by recent Mexican efforts to strengthen environmental regulations, improve public infrastructure, and address public alarm over industrial pollution (DFAIT(3) 1995). While the *Ley de Equilibrio Ecologico y Protection al Medio Ambiente* (Law of Ecological Equilibrium and Environmental Protection) was introduced in 1988 and supplemented with new enforcement mechanisms in 1992, tight money policy, the devaluation of the peso in late 1994, and high interest rates have made it difficult for small and medium-sized companies to comply. As well, trade liberalization has exposed many Mexican companies to aggressive foreign competitors and lowered their profit margins.

The devaluation of the peso in 1994 slowed down or put on hold many infrastructure projects aimed at improving municipal and industrial wastewater treatment, waste management, air pollution controls, etc. Despite these set backs, demand for environmental equipment and services has increased. Mexico's public spending on the environment rose from US$95 million in 1988 to US$2.5 billion in 1993 (DFAIT(3) 1995).

The growth of the environmental sector is further encouraged by the North American Agreement on Environmental Cooperation and under the broader NAFTA provisions which oblige parties to

enforce their own environmental regulations. While Mexico's regulatory requirements are strict and reflect American requirements in many areas, it is reported that they are poorly enforced. The government's new commitment to enforcement and the seriousness of environmental problems in Mexico should lead to considerable growth in this sector (DFAIT(3) 1995; DFAIT(2) 1993). The World Bank and the Inter-American Bank have also earmarked funds for environmental projects in Mexico.

Government officials are also considering ecolabelling as a means to strengthen the competitiveness of Mexican exports. Lack of public awareness and demand for other types of environmentally preferable products and services is apparent. Mexican efforts in the near future will likely shift to getting industrial pollution under control and establishing an infrastructure to clean-up the environment and restore healthy living conditions for Mexican citizens.

Appendix C
Northern Telecom's Environmental Position Statement

"NORTEL is committed to being a leader in the telecommunications industry in protecting and enhancing the environment. To live up to this goal, the company must continually develop innovative approaches to managing the environmental impact of its products from conception to final disposition.

Environmental excellence is excellent business. NORTEL's experience demonstrates that sound environmental management can bring financial benefits. By aiming for both economic and ecological efficiency, the company has reduced costs and begun to fulfil its social responsibility toward future generations.

NORTEL's corporate Environmental Management Systems Standard uses quality management approaches as a model. It orients the company's comprehensive environmental protection program to a continuous improvement focus, and help managers in NORTEL operations around the world systematically scrutinize all activities looking for inefficiency and unnecessary waste. At the heart of the program are the company's 57,000 employees, who are encouraged to innovate and influence business operations to help meet the corporation's environmental goals and targets. Each year, the company voluntarily submits its environmental record to public scrutiny.

NORTEL was the first in the telecommunications industry to eliminate the use of ozone-depleting chlorofluorocarbon (CFC-113) solvents from worldwide manufacturing and research operations. Such environmental achievements have won NORTEL prestigious awards from organizations such as the United Nations Environment Program (UNEP) and the U.S. Environmental Protection Agency.

One key to NORTEL's success is its willingness to share technologies and expertise in protecting the environment. In several countries [including China, India, Vietnam, Brazil, and Mexico], Northern Telecom has volunteered to work with governments, customers and even its competitors for the benefit of the global environment.

NORTEL will continue to pursue its mission of leadership and stewardship, setting new goals and meeting new challenges through innovation, determination and dedication." (Copied from Northern Telecom's "Habitat" Web Site)

Appendix D

The Canadian Heating and Cooling Products Sector - Key Findings

The research relating to heating and cooling products resulted in the following findings:

- the industry is essentially North American in scope, and strongly based in and controlled from the USA;
- Lennox Industries Canada is the lone remaining major heating and air conditioning manufacturer in Canada, other former Canadian owned companies have relocated to the US and/or been bought out;
- most companies operating in Canada are subsidiaries and/or distributors for major US manufacturers;
- most equipment being manufactured and purchased is in the mid-efficiency range;
- generally speaking, purchases of highest efficiency products are only economically attractive in central and northern Ontario and Quebec due to heating and cooling load requirements, energy costs, and other relevant factors particular to this region;
- "high efficiency" products available in the marketplace are very high efficiency already (e.g. gas furnaces are 97%);
- Canadian companies were initial leaders in the heat recovery ventilation (heat exchanger) industry and still have a market presence in Canada (although American companies are moving into Canada and/or buying Canadian firms); however, this is a relatively small, predominantly residential sector industry with some domestic and export niche market potential;
- while there may be potential future markets for two residential / small commercial niche products being developed in Canada, these are not environmentally better, just comparable "options":
    - combination (space/water) heating systems
    - roof top package heating units;
- new construction has slowed down considerably while most building retrofit work focuses on measures with short investment payback periods - lighting, controls, thermal shell, windows rather than equipment upgrades;
- energy prices will not make high efficiency heating appliance retrofits attractive for a long time; and
- Canadian leadership is more significant and export marketable in building design and management in order to achieve high end efficiency (e.g. envelope, window glazing, orientation, heating and cooling system sizing and controls) rather than particular products.

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