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TABLE RONDE NATIONALE SUR L'ENVIRONNEMENT ET L'ÉCONOMIE

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CANADIAN CAPABILITIES TO UNDERTAKE A SUSTAINABLE CITIES INITIATIVE

Volume I: Analysis

Prepared for the
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Volume III: Company Capabilities

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Volume IV: Global Urban Contacts

- Annex "F": Multi-City Programs of Canadian Agencies and Organizations
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PREFACE

This report identifies, maps and analyzes Canada's capabilities to undertake integrated programs for environmentally more sustainable development in cities and urban regions around the globe.

Initial development of the mapping information in March-April of 1998 was funded by the Canadian Department of Foreign Affairs and International Trade (DFAIT), with logistical and other support by the National Round Table on the Environment and the Economy (NRTEE). In the summer of 1998, NRTEE decided to support a further process of updating and expanding the first version. This work was carried out over the months from August to December. It involved a mailout to over 670 organizations, as well as additional research, translation, and direct contacts with many companies and non-governmental organizations.

DFAIT has sustainable development as one of its key objectives. Throughout the 1990s, the Department has been active in promoting Canada's positions on such urban-related issues as global climate change, marine pollution, peacebuilding and reconstruction, and development of civil society.

In addition, the Canadian International Development Agency has been investing in a growing number of urban projects. It took a leading role in developing the Canadian position for HABITAT II, the second United Nations Conference on Human Settlements, held in 1996. In September of 1998, CIDA signalled the growing importance of urban issues to its development cooperation agenda by publishing *An Urbanizing World: Statement on Sustainable Cities*.

The National Round Table is one of four advisory bodies to the Prime Minister of Canada. In 1995 and 1996, it hosted a series of round table reviews of domestic environmental infrastructure, with emphasis on water and wastewater services in Canada. This resulted in a major report on the "state of the debate" in this field.

During 1997, the National Round Table gave even more focused attention to the subject of sustainable cities, with an international focus. For example, in May, it hosted an international workshop *Toward Sustainable Cities in APEC: Urban Air Quality and Urban Energy Management*, to provide recommendations to the Canadian government. The Round Table also co-chaired the Business Leaders and Local Authorities Forum of the APEC Environment Ministerial, and commissioned an inventory of Canadian sustainable cities expertise, used as one of the base documents for this report.

Finally, the chair of the Round Table Foreign Policy Committee presented key information on sustainable cities at the Beijing meeting *Environmental and Economic Policies Toward Sustainable Cities in APEC*. At the end of January, 1998, the Round Table hosted a workshop on "Sustainable Cities Solutions" in Ottawa, bringing together some 50 experts from industry, government, non-governmental organizations, and centres of expertise across Canada. This "mapping" project was one of the principal recommendations arising from the workshop. The need for it was reenforced at additional round table sessions of stakeholders held in May and in August of 1998 on financing sustainable urban development.

The following people contributed actively and effectively to preparing this report: Michael Harcourt, Chair, Foreign Policy Committee, NRTEE; Brian Morrissey, Director General, DFAIT; David Morgan, Policy Advisor, NRTEE; Peter Paproski and Isabel Hentic, Canadian International Development Agency; Lucien Bradet, Director General, Environmental Affairs Branch and Prue Thomson, Environmental Affairs Branch, Industry Canada.

Detailed and intensive work to assemble the initial contacts with organizations and companies across Canada and to prepared profiles was by Michel Frojmovic, Cynthia Taha, Lisa Van Buren, Patricia Cuttell, Antoine Tinawi, and Jairo Viafara of The Bayswater Consulting Group, Inc, and Gisele Yasmeen, University of British Columbia. Updating the information involved very attentive efforts by Cynthia Taha, Lisa Van Buren and Evelyn Babirye.

Any remaining errors or omissions are the responsibility of The Bayswater Consulting Group, Inc., recognizing that a document like this must always be considered a "work in progress".

We would like to express our sincere appreciation to the many organizations and companies who took the time to review materials and provide their comments on the information used for mapping Canada's capabilities.

C. David Crenna
President
The Bayswater Consulting Group, Inc.

1. INTRODUCTION

1.1 Purpose and Scope of This Report

In urban regions around the world, there are huge opportunities for Canadians to work with municipalities and provincial/state authorities, as well as with selected private sector organizations and public/private partnerships to build a more sustainable future. Forming successful relationships with and marketing to these people requires both specialized knowledge and integrated solutions. In the vast majority of cases, they want packages that include financing, capacity-building, technology transfer and local employment as well as new technologies and products.

Building on previous work of the National Round Table on the Environment and the Economy, this four-volume report maps in detail current Canadian involvement in programs and projects leading to sustainable development in urban regions around the globe. It also relates this map to efforts of International Financial Institutions and to private sector capital pools. The report offers a reasonably accurate and comprehensive picture of current Canadian urban capabilities and commitments. It links them to issues and opportunities in cities around the globe, although such a picture is always shifting and changing as new capabilities and projects come on stream.

In more specific terms, this report covers participation by Canadian non-governmental organizations, university-based experts, government agencies, private sector companies and others in specific cities and regions in the following kinds of activities:

- planning cities and urban regions so as to increase their environmental, economic, social and political sustainability;
- planning and implementing urban-scale infrastructure projects to reduce energy, materials and natural resources consumption;
- planning, building and operating urban facilities, public buildings, and housing in ways that conserve energy, materials and water, reduce solid waste, and prevent pollution and damage to surrounding habitats;
- supporting and increasing the capacity of local governments for environmental management through consulting services, training services, institutional strengthening projects and other means.

The overall aim is to facilitate more integrated efforts by Canadians abroad, to increase Canadian export prospects and jobs and growth in Canada, and to help build environmental and social sustainability in the global cities, for fellow human beings.

This report specifically complements CIDA's document, *An Urbanizing World: Statement on Sustainable Cities*, which considers the other half of the equation, the host cities and regions.¹ The latter statement asserts that implementation of sustainable urban development programs and projects must include key elements of:

- Promoting the exchange of expertise and opportunities for partnership and cooperation between Canadian cities and institutions and those of partner countries:
 - municipalities and other forms of local government;
 - non-governmental and community organizations;
 - educational and research institutions;
 - specialized institutions and professional associations; and,
 - the private sector.
- Ensuring coordination with bilateral programs of other countries and with multilateral programs in progress in the field and strengthen dialogue and inter-institutional coordination.
- Using the lessons of experience, in particular those drawn from local communities.

CIDA's statement also emphasizes the need for wide-ranging partnerships, including Canadian municipalities and their associates, which play a positive role in international cooperation by sharing their know-how with foreign partners, while enhancing their own experience.

CIDA's own active partners in urban cooperation include specialized institutions (housing cooperatives, credit unions, etc.), professional associations (urban planners, engineers, demographers, etc.), educational institutions and research institutes (universities, colleges, centres of excellence, research networks), and non-governmental and community-based organizations.

The CIDA document recognizes that urbanization in developing countries offers a growing number of economic and business opportunities. Canada's private sector is increasingly involved in urban cooperation, especially in the fields of environmental protection, sustainable infrastructure, consulting and strategic planning.

¹ (Ottawa: Minister of Public Works and Government Services Canada, 1998).

1.2 Contents of the Report

Included in the successive volumes of this report are baseline information and data on: Canadian centres of urban expertise (Volume 2); Canadian non-governmental organizations involved in urban project delivery (Volume 2); Federal government organizations with mandates touching on or including sustainable cities issues (Volume 2); consulting engineering firms, urban planners, builders and others that can implement urban projects (Volume 3); Canadian technical assistance and development-oriented private sector projects by urban region (Volume 4); current integrated urban initiatives, by urban region or regions of focus (Volume 4); selected urban investment projects of International Financial Institutions by city or region (Volume 4); international organizations ready to act as partners in Canadian endeavours (Volume 4).

1.3 Methods Employed

The Bayswater project team first considered information already collected on behalf of the National Round Table, the Department of Foreign Affairs and International Trade, Environment Canada and others involved in the sustainable cities issues over the period from March of 1997 to February, 1998. Then they undertook a four-step process in gathering, organizing and verifying information on the topics listed above:

- checking comprehensive information and data bases of governmental organizations, notably company databases at Industry Canada and DFAIT and extensive Canadian International Development Agency and International Development Research Centre project and organizational information;
- checking with non-governmental, governmental and industry association networks and centres of excellence, nationally, and in each of Canada's five major regions, including the Federation of Canadian Municipalities, International Trade Centres, provincial government sources, and key university-based institutes and consortiums;
- checking with some individual research institutes, companies, and locally-based non-governmental organizations;
- sending drafts of completed profiles to some of the research institutes, universities, companies and non-governmental organizations to verify the information.

Field researchers were employed in Vancouver, Winnipeg, Montreal and Halifax to do research on activities of educational institutions and research centres.

Primary sources of company information included: Industry Canada *Strategis* Canadian Company Capabilities database; Industry Canada "Canadian Environmental Solutions" database; Environment Canada's "success stories"; Canadian Environmental Industry Association's database; provincial environmental directories; DFAIT's listings of "Team Canada" companies, 1993-1998; IFINet; *Canadian Exporters Catalogue*; participants at the Globe '98 trade show and the "Construct Canada" trade show.

These sources supplemented and extended company information gathered previously by The Bayswater Consulting Group on behalf of Environment Canada and DFAIT.

By the end of the initial collection process, over 670 company and organizational profiles were recorded in the databases. These were then sent by mail in August to designated contacts of the companies and organizations for verification and updating as necessary. Close to 150 responses were returned by December, and were incorporated into the databases.

The following table indicates principal sources of information collected on each topic.

TOPIC	PRINCIPAL SOURCES OF INFORMATION
Canadian involvement by type in different urban regions around the world, organized by sector and discipline.	CIDA; IDRC; Internet databases; national organizations; directories produced by government departments and industry associations.
Amounts of current and allocated Canadian technical assistance and development-oriented investment by urban region.	CIDA; IDRC; Federation of Canadian Municipalities
Current integrated urban initiatives and centres of expertise in urban issues across Canada, by urban region of focus.	IDRC; Centres of expertise; Federation of Canadian Municipalities; interviews with key people in urban field.
Urban investment projects of International Financial Institutions and private sector financial institutions.	IFINet; direct contacts with urban and environmental staff and management networks in IFIs; <i>Engineering News Record</i> .

1.3 Limitations of the Data

In any data collection process such as this, it is inevitable that there will be errors and omissions. The scope of what is to be included is not always clear. While the Bayswater mapping team contacted many different organizations, some that are highly relevant may simply have eluded those undertaking scanning work.

For example, information on the "environmental industry" is extensive. It is not feasible to exhaust this information, especially since it is not always clear to what extent individual firms are engaged in both prevention and remediation work.

However, the document does reflect a fairly complete picture of companies which are now exporting products and services relevant to sustainable cities, especially in relation to environmental analysis, pollution prevention, and infrastructure systems. The database continues to expand weekly with a current total of approximately 511 company profiles.

There are bound to be gaps in this information, especially in relation to companies offering multiple types of services, e.g., trading companies, as well as in relation to non-governmental organizations which also undertake consulting contracts.

2. CANADA'S URBAN PROJECT AND PROGRAM CAPABILITIES

2.1 Canada's Centres of Urban Expertise

"Centres of urban expertise" exist across Canada. These typically combine social science, technical and other research on issues and problems of urbanizing regions with practical experience in cities of developing countries and emerging economies. These centres may include: university or college departments, focused on planning, geography or the environment; specialized research and training institutes; and non-governmental organizations (NGOs) that are local, regional and or national in scope.

Through their programs and projects, these NGOs offer valuable insights and practical knowledge on urban environmental, economic and social issues. They also collect solid business intelligence as a byproduct of their efforts.

Canada has a wealth of urban expertise generally. Much of it, however, is focused on a domestic level. Most organizations selected for inclusion in this database are focused on urban environmental, social and political issues *from an international perspective*, though there may be domestic capabilities and expertise in the same people and institutions as well.

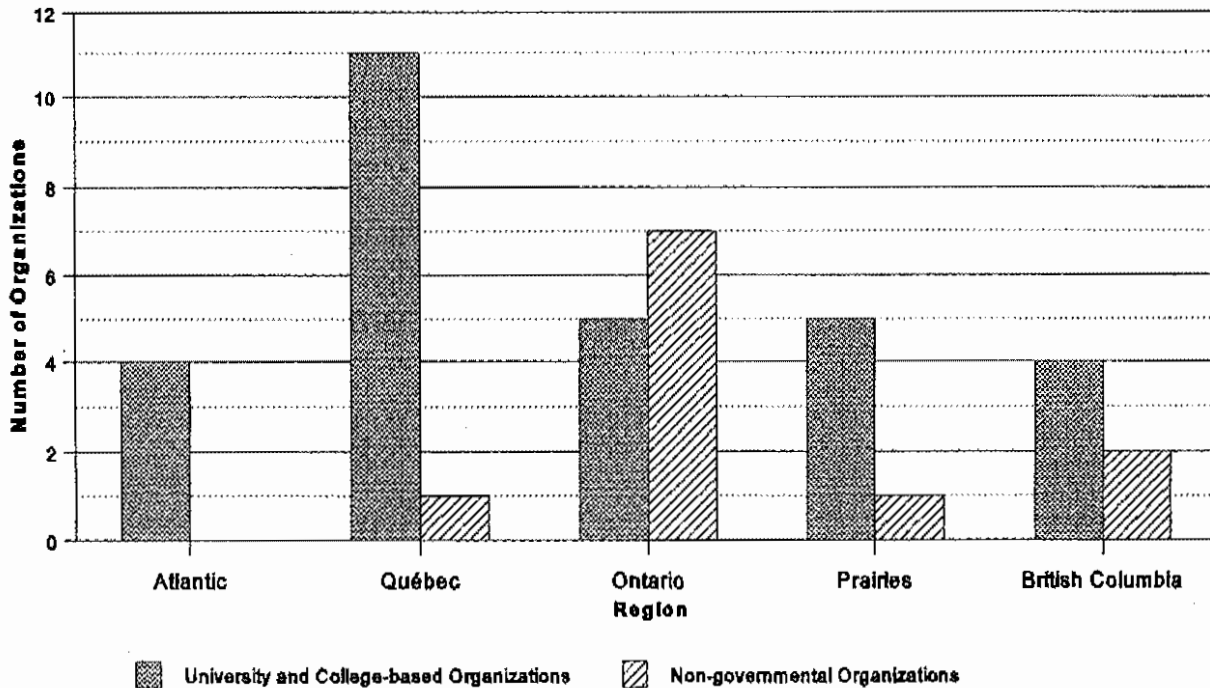
The main national membership organization involved in urban partnership programs is the Federation of Canadian Municipalities (FCM). It brings together Canadian municipal actors primarily to work on a domestic level but also increasingly on an international level.

Several organizations are involved principally in international urban development projects: the Canadian Urban Institute; the International Centre for Sustainable Cities, and Rooftops Canada.

Next are university-based organizations with a substantial focus on various aspects of urban sustainable development. These include: the Canadian Universities Consortium; the Centre for Human Settlements at the University of British Columbia; the Centre for Urban and Community Studies at the University of Toronto (including the Global Urban Research Initiative); le Groupe interuniversitaire de Montréal; Villes et développement (GIM); and INRS-Urbanisation.

Two other organizations, the International Institute for Sustainable Development and the Sustainable Development Research Institute at the University of British Columbia have an international outlook focused on sustainable development in all fields, but also address urban issues. Most of these organizations draw on a wealth of academic expertise to provide urban centres with research training and technical assistance.

CANADA'S CENTRES OF URBAN EXPERTISE



The next "tier" of centres of expertise includes educational institutions both university and college with well-established international programs focused on specific sectors relevant to urban development. Departments such as civil engineering, environmental studies, geography, international studies, urban planning, urban and tourism studies are doing urban-related research projects, training programs and technical assistance projects overseas. Although urban sustainable development is not their primary focus, these organizations can make an important contribution to Canada's bank of practical expertise.

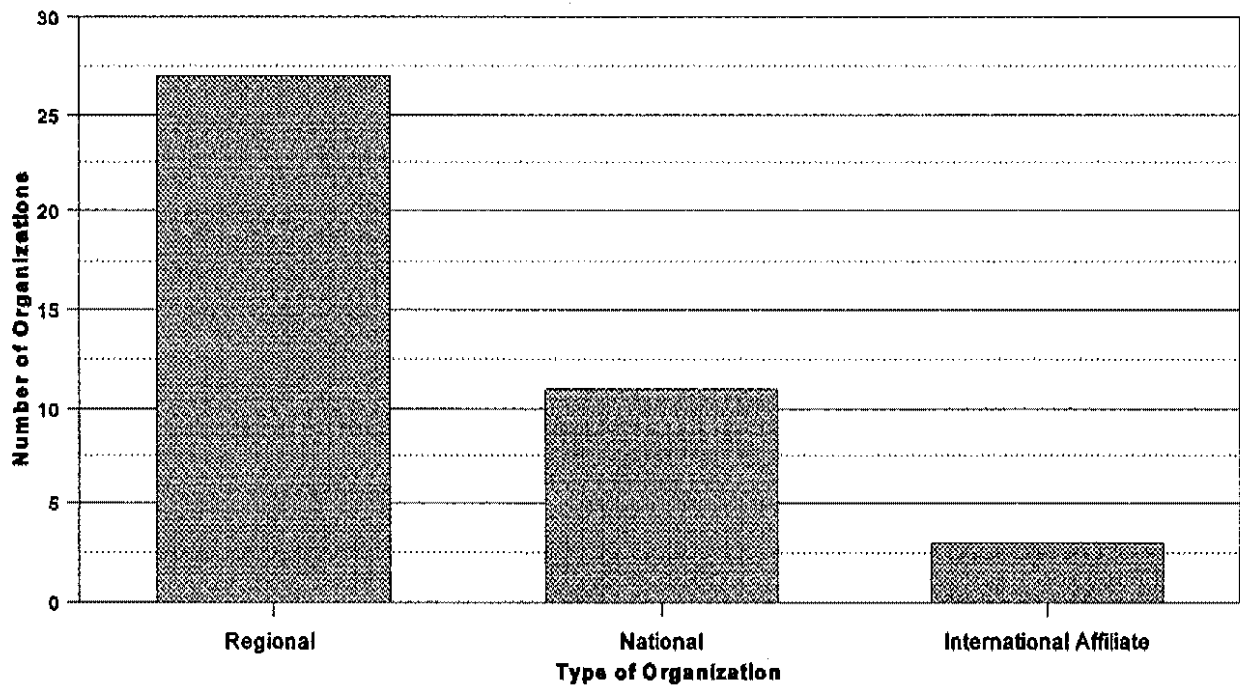
The final tier includes a mix of organizations. There are organizations with a primarily domestic regional focus, such as the Centre for Sustainable Regional Development, the Institute for Bioregional Studies, and the Intergovernmental Committee on Urban and Regional Research. All would appear to have the potential to develop their international urban profiles.

Another subset of organizations includes those such as the Canadian Centre for Pollution Prevention, the Green Building Information Council and the Green Communities Association which have an obvious environmental focus but are still largely oriented toward domestic communities of interest.

2.2 Non-Governmental Organizations Engaged in Urban Project Delivery

There are many Canadian non-governmental organizations which do not specialize in urban development, but which do undertake urban-centred development projects within a wider portfolio of international projects. Such organizations include, for example, Alternatives, CARE Canada, Carrefour de solidarité international de Sherbrooke, Jeunesse Canada Monde, and World Vision Canada. It would appear that there is growing interest in the problems and opportunities of cities among these organizations, and they already possess substantial "on-the-ground" expertise in the fields identified by CIDA's *Urbanizing World* statement.

NONGOVERNMENTAL ORGANIZATIONS INVOLVED IN URBAN PROJECT DELIVERY



2.3 Key Industry, Municipal and Professional Organizations

While most industry and professional organizations act mainly as representatives of domestic concerns of their members and as networking bodies, a surprising number are engaged in international projects or have international special interest groups, programs or committees. Almost major associations have members active in projects around the world, promote the products and services of their members at trade shows, and encourage them to develop greater export experience. Some associations are specifically geared to the environmental industry, while others represent products and services such as residential construction and urban design, which have major environmental quality dimensions.

Among the organizations profiled in the database are the Canadian Institute of Planners, the Royal Architectural Institute of Canada (RAIC) and the Transportation Association of Canada (TAC). CIP has an international internship program for planners in cooperation with CIDA. RAIC is one of CIDA's principal urban partners with international work related to human settlements research. The TAC has a specific program focused on environmentally sustainable urban transport.

La Corporation professionnelle des urbanistes du Québec is another professional organization active in overseas urban development work. Its expertise includes public sector management, and urban planning and urban management.

Also included in the database are municipally-based agencies such as Montreal International, le Bureau des Relations internationales - Montréal, and Toronto International Partnership. These operate without the support of partnership programming at FCM and are developing numerous international linkages for their own cities and firms. International programming at the municipal level also exists in Edmonton, Halifax, Moncton, and Ottawa.

Two sectoral organizations, the Asia Pacific Foundation and the Canada-ASEAN Centre, are helping to build international networks and providing assistance to environmental projects, some with an urban focus.

The Alliance of Manufacturers and Exporters of Canada supports a number of well-established international-linkage programs for all types of Canadian businesses.

2.4 Governmental Organizations

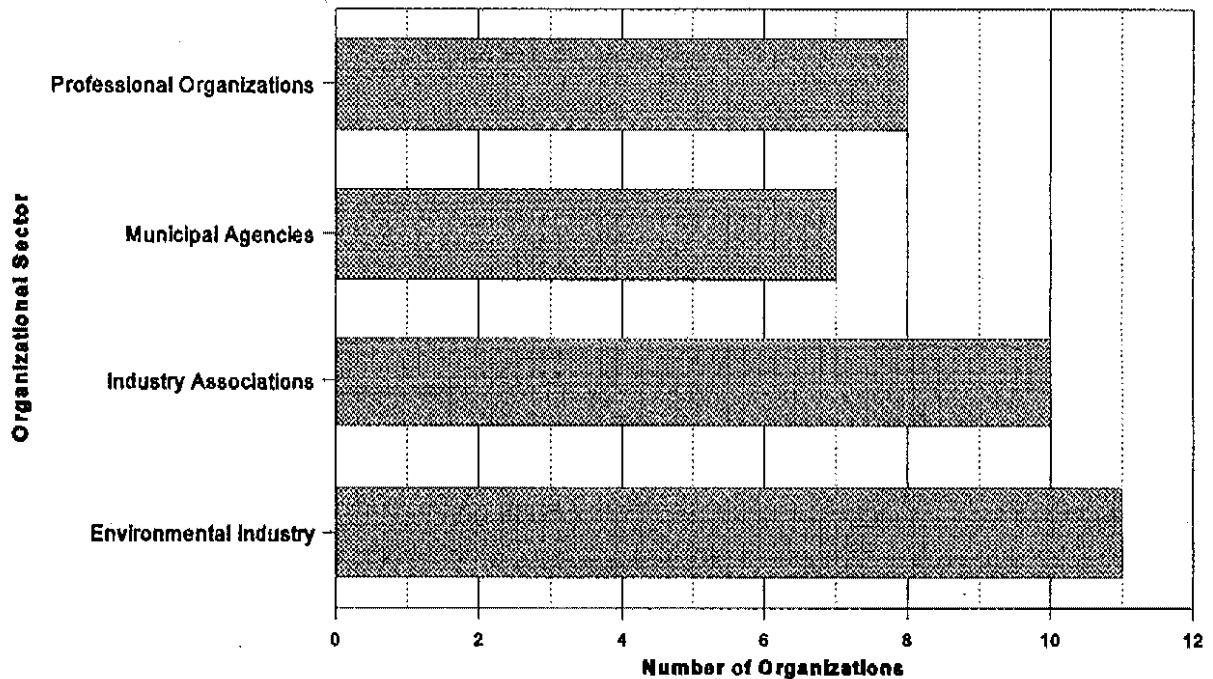
The database profiles 15 Canadian governmental organizations with urban-related mandates and services. For the most part, their programs and services are domestic, but are relevant to international opportunities as well. In some cases, like Human Resources Development Canada and Transport Canada, there are very active efforts to market departmental services abroad.

The Canada Mortgage and Housing Corporation, the Canadian Commercial Corporation, Foreign Affairs and International Trade Canada, the Export Development Corporation, Industry Canada and Western Economic Diversification Canada are all engaged in assisting the Canadian private sector to export to other countries.

The International Development Research Centre (IDRC) funds a number of research projects in urban regions of the developing world. For example, their "Cities Feeding People" project is focused on exploiting the potential of urban agriculture and involves cities in Asia, Africa and Latin America. In partnership with universities and NGOs, IDRC is also researching urban waste treatment and management, as well as new methods of constructing shelter for the urban poor.

Key agencies explicitly supporting sustainable cities initiatives are CIDA, Environment Canada, Foreign Affairs and International Trade Canada, IDRC, the National Round Table on the Environment and Economy, the National Research Council of Canada and Natural Resources Canada.

KEY INDUSTRY, MUNICIPAL AND PROFESSIONAL ORGANIZATIONS



2.5 Canadian Capabilities to Implement Sustainable Cities Projects in International Settings

The study team worked with a variety of sources to compile over 500 different suppliers of different types of goods and services needed for more sustainable cities, including:

- urban architecture, design and planning firms, especially those with international experience;
- consulting engineering firms, and their service suppliers, such as GIS systems
- suppliers of a wide array of urban infrastructure equipment, as well as construction services, focusing on those which will contribute to revenues and savings over time, and on low-cost solutions;
- suppliers of building technologies, including low-cost housing;
- suppliers of services which will facilitate integration and successful adoption of new urban services and technologies, such as development consultants.

Canada has unique strengths for building and maintaining more sustainable cities, including sectoral expertise in power and energy-generation equipment and services, industrial process technologies such as lumber production equipment, telecommunications, information technology, transportation (aviation, rail transport, etc.) and groundwater drilling. There are also many Canadian strengths and niche-oriented products in low-rise and high-rise building, construction machinery, residential and commercial heating and lighting systems, and in key aspects of environmental technologies generally, e.g., small-scale sewage treatment systems.

Canadian-owned or Canadian-based construction and urban development companies are part of this country's unique capabilities to address urban development problems. The management and planning of major urban regions requires experience in intensification, compact expansion, regeneration of the natural environment, community development, infrastructure design, and structure planning.

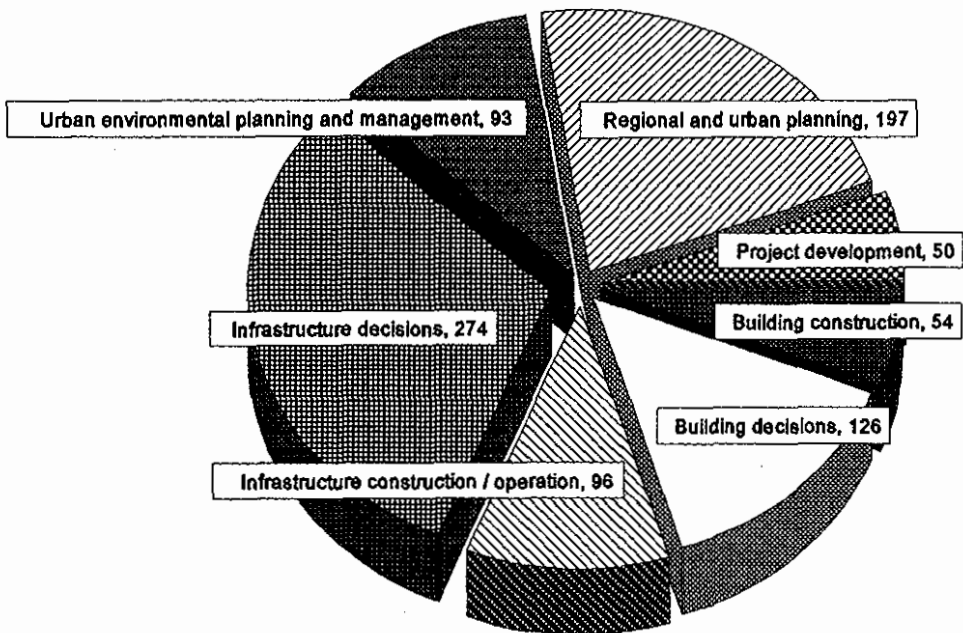
Canada has a growing environmental, planning design, buildings and infrastructure industry with a keen interest in international markets. Companies with substantial international project and financial experience are relatively few, however, in relation to the need and the opportunities. In addition, many companies are active in only one or two urban areas or are dealing through agents to market their products.

On the capacity building side, CIDA bases its urban programming on Canada's expertise in city planning and management. Areas where Canada possesses experience and skills relevant to developing and transitional countries include:

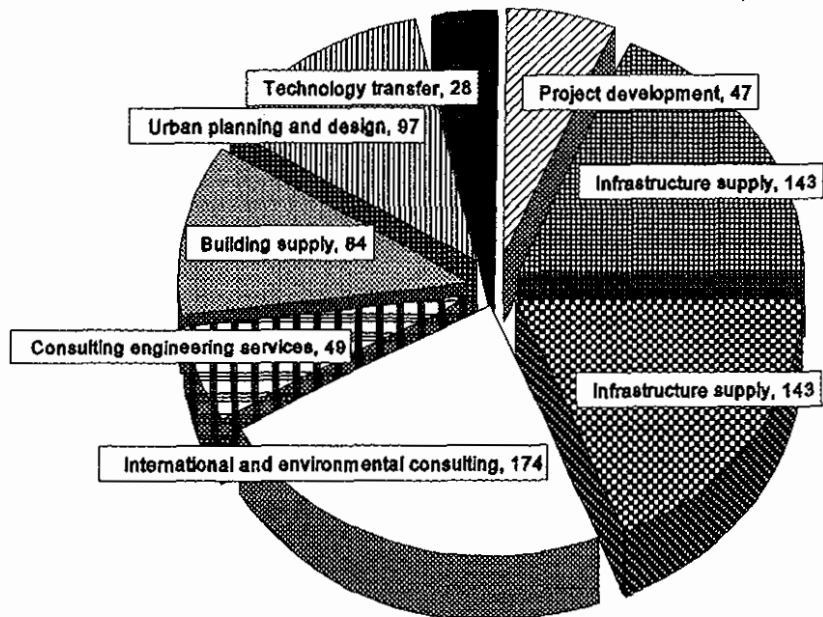
- a decentralized municipal administration system;
- municipalities that are diverse and open to the world;
- solid expertise in urban environmental management;
- participatory practices in urban planning and democratic management of municipal life;
- proven public-housing policies and programs;
- state-of-the-art technological tools, such as land tenure systems and geographic information systems (GIS);
- land-use management policies that show concern for surrounding areas;
- effective infrastructure development and maintenance mechanisms, such as partnership between public and private sectors;
- solid experience in savings and credit unions and housing cooperatives.²

² *CIDA and Cities: Toward Sustainable Development of the Urban Environment*, Canadian International Development Agency, 1997, p. 6.

CANADIAN CAPABILITIES ACCORDING TO THE URBAN LIFE CYCLE



DISTRIBUTION OF CANADIAN CAPABILITIES



More than 60 Canadian companies participated actively in defining a Canadian sustainable cities initiative, including:

- AGRA Earth & Environmental Ltd., Calgary, Alberta
- Baker McGarva Hart, Vancouver, British Columbia
- Bombardier Inc., Saint Bruno, Québec and Kingston, Ontario
- By Design Consultants, Ottawa, Ontario
- Canrede Inc., Ottawa, Ontario
- Chreod Associates, Ottawa, Ontario
- Commonwealth Historic Resource Management Limited, Vancouver, British Columbia
- Consultants C.R.E.N.A. Inc., Nemaska, Québec
- CONTACTO Group, Toronto, Ontario
- Contemporary Information Analysis Ltd., Fisherville, Ontario
- Davnor Water Treatment Systems, Calgary, Alberta
- Delcan Corporation, Ottawa, Ontario
- Dessau International Limitée, Montréal, Québec
- Douglas Manufactured Homes Limited, Delta, British Columbia
- Envision Sustainability Tools Inc., Vancouver, British Columbia
- ESSA Technologies Group Ltd., Vancouver, British Columbia
- ETV Canada Inc., Ottawa, Ontario
- Fibrehouse Limited, Ottawa, Ontario
- Global Change Strategies International Inc., Vancouver, British Columbia
- Groupe International Désourdy Inc., Saint-Hubert, Québec
- Heath Consultants, London, Ontario
- IBI Group, Calgary, Alberta
- Inukshuk Planning & Development, Whitehorse, Yukon
- Jacques Whitford Environment Limited, Halifax, Nova Scotia
- John Van Nostrand Associates Ltd. Toronto, Ontario
- Kaede Housing Systems Limited, North Vancouver, British Columbia
- KEIR Consultants Inc., Toronto, Ontario
- K. Ito and Associates, Vancouver, British Columbia
- La Cie de Pavage d'Asphalte Beaver, Division du Groupe Devesco Ltée, Montréal, Québec
- Le Groupe SM International Inc., Sherbrooke, Québec
- MASCON Engineering Limited, Brampton, Ontario
- MG Drake Consulting, Vancouver, British Columbia
- M.G. Environmental Limited, Oakville, Ontario
- Nascor Inc., Calgary, Alberta
- Newcourt Credit Group, Toronto, Ontario
- O.D. Sterling and Associates, Vancouver, British Columbia
- Royal Building Systems (Cdn) Limited, Woodbridge, Ontario
- SCC Environmental Group Inc., St. John's, Newfoundland
- Sefram Inc., Etobicoke, Ontario

- Sheltair Scientific Limited, Vancouver, British Columbia
- SNC-Lavalin International, Montréal, Québec
- Sodexen Inc., Laval, Québec
- Solar Plus, Shawnigan Lake, British Columbia
- Soprema Inc., Québec, Québec
- Soprin ADS Inc., Montréal, Québec
- Sumon Engineering Canada Limited, Vancouver, British Columbia
- Swiftsure Enterprises Ltd., Vancouver, British Columbia
- TEAMIC International - Canada, Ottawa, Ontario
- Teron Inc., Ottawa, Ontario
- TerraChoice Environmental Services Limited, Ottawa, Ontario
- Wardrop Engineering, Winnipeg, Manitoba
- Wavemill Energy Corp., Belleville, Ontario
- WaveRider Communications Inc., Toronto, Ontario
- Wintec EMC Energy Management Corporation, Toronto, Ontario
- Wright Environmental Management Inc., Richmond Hill, Ontario

2.6 Position of Canadian Companies in International Design, Infrastructure and Building Construction Markets

For the past four years, Canada's Department of Industry as well as its missions abroad have been giving increasing attention to the potential for Canadian firms to capture a larger share of design, infrastructure supply, and building construction markets. They have focused on both projects financed by International Financial Institutions such as the World Bank, and also on privately-financed projects, including those undertaken by "public-private partnerships" (PPI).

According to the annual review of major companies and projects published by *Engineering News Record*, nine Canadian companies rank among the world's leading international design firms, and capture 7.4% of international billings, almost twice as large as the American market share on a proportional basis. Canadian design firms do particularly well in Africa and Latin America. SNC-Lavalin, based in Montreal, is ranked third among all companies in the world in this field.

Turning to the actual construction of projects, the situation of Canadian firms is less impressive. There are just three major international firms based in Canada, and their share is less than 1% of international revenues. Most Canadian construction contracting is undertaken in the United States, rather than offshore.

CANADIAN MARKET POSITION IN UNDERTAKING MAJOR INTERNATIONAL

DESIGN AND CONSTRUCTION PROJECTS BY SECTOR
(Top International Firms)

SECTOR	ALL DESIGN (\$ MILLIONS)	ALL BUILD (\$ MILLIONS)	CDN DESIGN (\$ MILLIONS)	CDN BUILD (\$ MILLIONS)	RANK OF TOP CDN FIRMS DESIGN	RANK OF TOP CDN FIRMS BUILD
Transportation	2,482	21,254	159	0	2nd	0
Hazardous Waste	525	668	13	0	12th	0
Industrial	1,780	13,036	298	0	5th, 7th, 12th, 13th, 22nd	0
Water Supply	997	5,595	68	0	2nd	0
Sewerage	704	2,995	17	35	12th	20th

Source: *Engineering News Record*, (December, 1997).

**CANADIAN MARKET POSITION IN UNDERTAKING MAJOR INTERNATIONAL
DESIGN AND CONSTRUCTION PROJECTS BY REGION**
(Top International Firms)

REGION	ALL DESIGN (\$ MILLIONS)	ALL BUILD (\$ MILLIONS)	CDN DESIGN (\$ MILLIONS)	CDN BUILD (\$ MILLIONS)	RANK OF TOP CDN FIRMS: DESIGN	RANK OF TOP CDN FIRMS BUILD
Latin America	1,100	8,105	127	0	2nd, 18th, 23rd	0
Asia	4,507	42,453	163	0	3rd	0
Europe	4,414	35,122	92	0	13th	0
Africa	1,169	10,285	155	0	1st, 18th	0
Middle East	1,293	13,527	48	0	6th	0

Source: *Engineering News Record*, (December, 1997).

In January of 1998, the Canadian Embassy in Manila, The Philippines published a guide entitled *How Canadian Firms Can Profit in Asia's Infrastructure Market*.³ Noting that Canadian manufacturers have not been active in the growing Asian infrastructure market, and that performance of all kinds of firms has not yet realized its full potential there, the guide suggests the strategy of marketing to firms from *other countries* looking for suppliers of quality and reasonably-priced products and services. It contains information and tips from 35 senior executives representing 26 major firms active in the region, but owned in other countries.

Early in August of 1998, the Office for Liaison with Financial Institutions in Washington, D.C. produced its annual report on the comparative performance of Canadian firms in obtaining World Bank contracts during 1997.⁴ This revealed that according to some indicators, Canadian firms had done quite well compared to similar firms from other countries, and had a high reputation. On the other hand, they were still winning a disproportionate share of project preparation and other "front-end" contracts compared to actual implementation-related contracts for manufactured goods and construction services.

In September of 1998, Industry Canada and the Department of Foreign Affairs and International Trade co-sponsored a major conference on "Winning in Global Infrastructure Markets". Several speakers at this conference, which focused on public-private partnerships such as "Build-Own-Operate" arrangements, noted the need for new strategies to market and finance projects undertaken by Canadian-based companies. There appeared to be a gap between undeniable technical and organizational capabilities and past performance in securing the new types of projects which will put these strengths and competencies to work effectively.

³ Arthur Fraser, (Manila: Embassy of Canada, 1998), p. 1.

⁴ Contact Matthew Clark, Office for Liaison with International Financial Institutions at the Canadian Embassy for a copy.

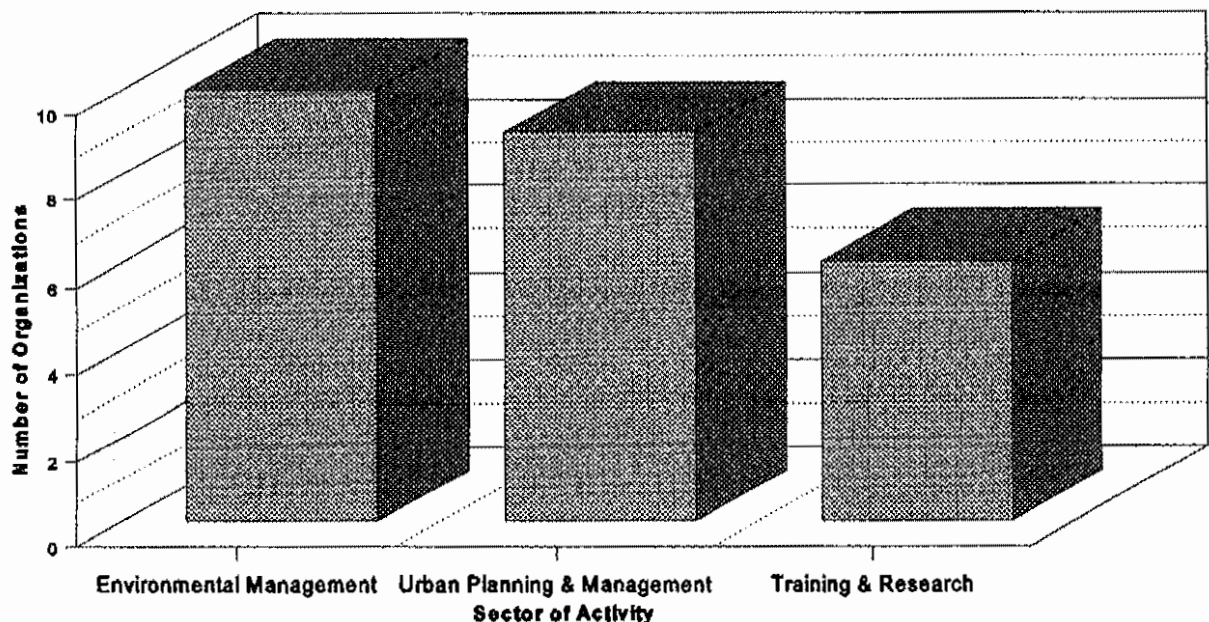
3. CITIES AND URBAN REGIONS IN WHICH CANADIANS ARE ACTIVE

3.1 Multi-City Programs of Canadian Activity

The "multi-city programs" operate in several cities, either of the same country, e.g., the "Open Cities" Program of China, or in cities in several different regions, as in the case of IDRC's "Cities Feeding People". They are normally implemented by either a centre of urban expertise, or by the Canadian funding agency. Most multi-city programs are based on strong local relationships with Southern institutions, such as the Asian Institute of Technology in Bangkok, Thailand.

Others include: the Canada-Baltic Municipal Assistance Program; Canada Southern Cone Environmental Technology; the Canadian Universities Consortium - Asian Institute of Technology Partnership Project (CUC-AIT); Development of Management Skills for Urban Local Government; Economy and Environment Program for South East Asia (EEPSEA); Healthy Cities and Villages (East and Central Africa); Latin America Urban Water Management Network; Local Agenda 21 Initiative (Global); Open Cities Project (China); REDATAM and GIS Generic Population Related Application Tools; SACDEL II - Training Support System for Local Development in Latin America; Solid Waste Management Project; Small Grants for Population and Urban Development Research; University Partnership Program in Urban Development; Urban Environmental Management Project (UEM) Phase II; Water and Sewage Human Resources Development; Water and Waste Management Project.

MULTI-CITY PROGRAMS OF CANADIAN ACTIVITY



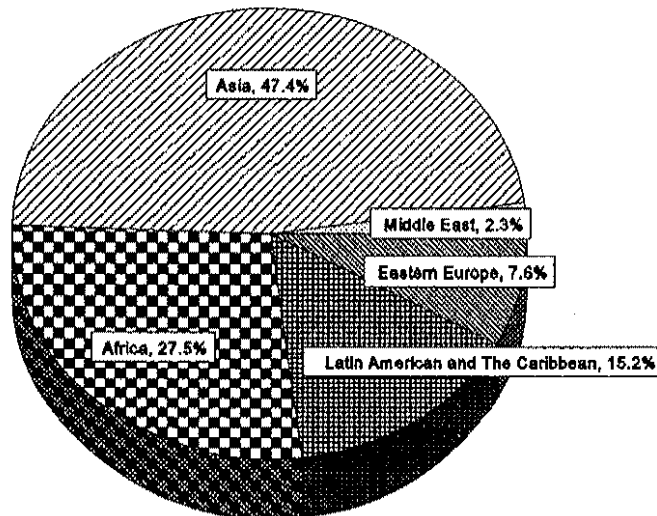
3.2 Individual Cities and Regions in Which Canadians Are Active

According to research undertaken for this project, Canadian non-governmental organizations and private sector companies are active in virtually all regions of the world, and in over 170 different locations. Through efforts such as "Team Canada" missions, Canadian businesses have become more active in China, Southeast Asia, and Latin America. In a number of cases, these activities are either centrally concerned with urban environmental improvement, or have this net effect, e.g., urban rapid transit systems.

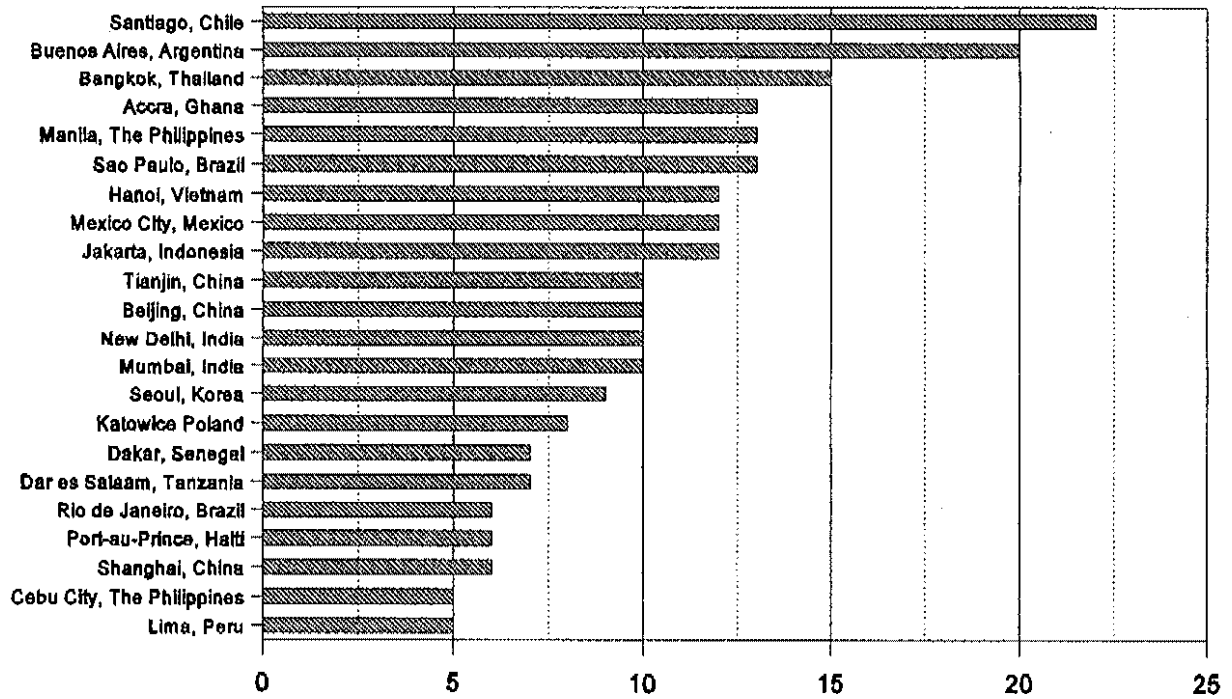
For example, many environmental projects in cities around the world have been funded by either CIDA or IDRC. Dozens of Canadian municipalities have "twinning" with cities in developing and transitional economies through the Federation of Canadian Municipalities' International Office, with financial support from CIDA.

Many companies have products and services, such as energy-efficient housing and Geographic Information Systems, which can contribute to sustainable urban development, but they tend not to focus on particular cities. As well, the geographic emphasis of marketing efforts by such companies is constantly changing.

LOCATIONS OF CANADIAN URBAN ACTIVITY, BY REGION



**CANADIAN ACTIVITIES IN URBAN REGIONS OF THE DEVELOPING WORLD
(TOP 22 URBAN REGIONS)**



4. GLOBAL CONTACTS AND PARTNERSHIPS

4.1 Introduction

Canadian contacts in cities and regions around the globe are important building blocks. They form a basis upon which to construct a new type of combined Canadian venture, a "city team", pursuing a coordinated long-term strategy which:

- establishes or strengthens deep personal, business and professional relationships in selected urban centres around the globe;
- links individual Canadian trade missions with these relationships, resulting in friendly faces as each new mission arrives;
- creates "clusters" of mutually-reinforcing innovation in given urban markets through combinations of demonstration projects, capacity-building, training, and locally-based Research and Development to adapt Canadian technologies to immediate requirements, as well as devising new products and services unique to their milieu;
- steadily moves beyond these centres to capture ongoing advantages of unique Canadian market strengths, much as Canadian "2x4" home-building technology has moved across Japan, urban transit technology has moved across Asia, and sewage treatment technology has begun to penetrate Latin America.

However, the scope and magnitude of the tasks at hand in cities are far beyond the capabilities and resources of any one country, and must increasingly be undertaken in partnership with development agencies, financial institutions, and experts from other developed economies, as well as with the talents and resources of the host country itself.

4.2 International Financial Institutions (IFIs)

IFIs offer a number of major opportunities to apply Canadian expertise to sustainable urban development, especially where the risks are too great for private sector capital. These institutions include:

- the African Development Bank;
- the Asian Development Bank;
- the Caribbean Development Bank;
- the European Bank for Reconstruction and Development;
- the Inter-American Development Bank;
- the World Bank Group.

These institutions lend and also contract for billions of dollars worth of equipment and services annually. In order to take proper advantage of these opportunities, Canadians need to follow the model of other successful Western nations: to package their expertise and to partner with other companies and organizations. Moreover the IFIs are becoming both more aware of the priority of urban environmental degradation and the need to integrate efforts across sectors.

For example, in the past, the World Bank responded to city development needs with individual projects or sector loans. These approaches are no longer considered functional by the Bank for cities facing multi-sectoral and multi-dimensional problems which are interlinked. The World Bank is developing and testing a new "partnership approach" to city development assistance called "City Development Strategies", which are quite similar to the "city team" strategies envisaged by the National Round Table on the Environment and the Economy Sustainable Cities Initiative.

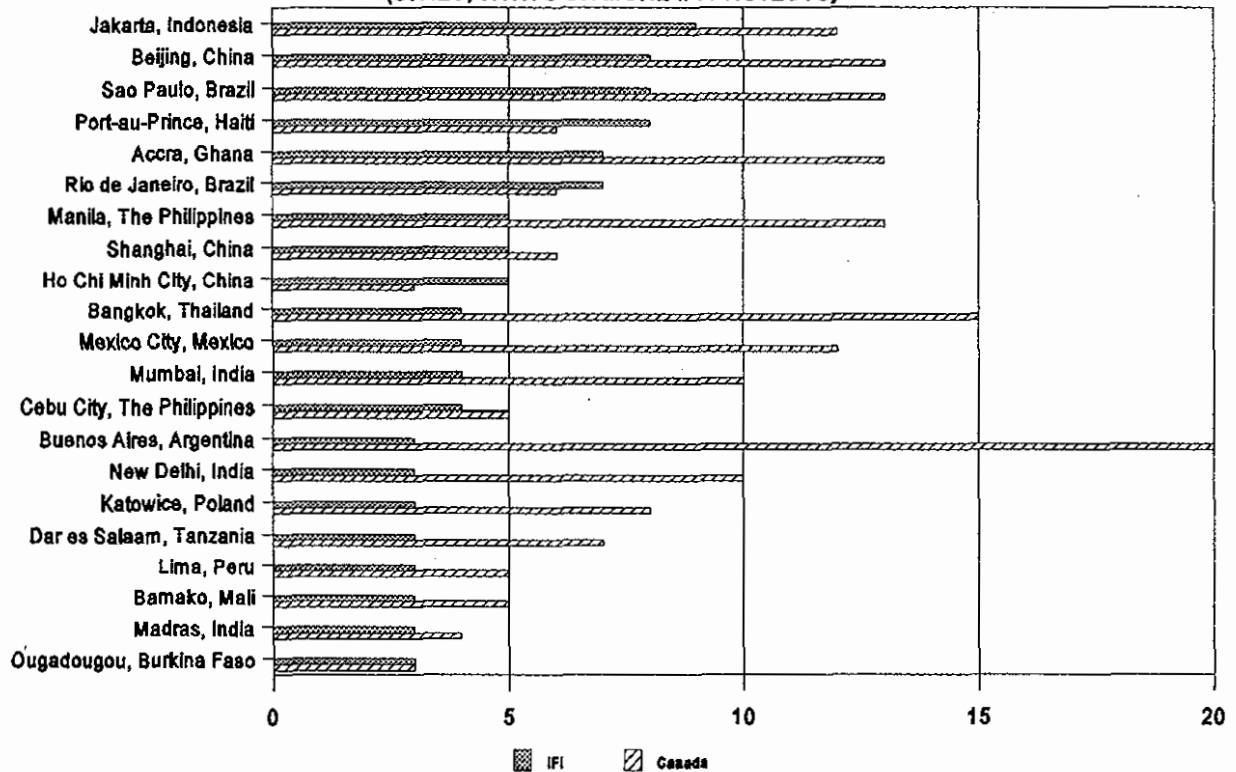
The Bank's vision of a City Development Strategy is a dynamic process that engages and secures the commitment of key stakeholders (businesses, local government, community groups and citizens) in a city to a long-term process to define their problems and opportunities concretely, to set priorities for actions, to develop strategies for moving forward and to participate in collective realization of their strategy. The desired result is a platform on which to base development decisions, investment or credit solicitations and engagement of outside partners.

The philosophy, mission, and comparative advantage of the Bank's Urban Partnership is to see cities as the principal unit of analysis to organize external assistance and advice by donors, development agencies, and other partners in a way that is strategically useful and can be readily assimilated by city leaders. The Urban Partnership can combine the talents and expertise of its clients, international donors, foundations, the private sector and NGOs, to provide an analytical, cross-sectoral focus on urban problems and to harness a wealth of intellectual, financial and practical resources for the benefit of the global urban community.

The Bank notes that many donors and sponsors outside the Bank, including the governments of Japan and Canada, have come forward with financial support for development of city strategies. The Bank has recently concluded an agreement with the United Nations Centre for Human Settlements to support a joint program of work to cover at least 20 city development strategies over the next three years, from 1999-2001.

COMPARING INTERNATIONAL FUNDING AND CANADIAN ACTIVITIES

(CITIES, WITH 3 OR MORE IFI PROJECTS)



4.3 International Development Agencies

The United Nations Development Programme and a variety of other organizations, including the UN Environment Programme and the UN Centre for Human Settlements have interesting projects directly concerned with sustainable cities. International development agencies can provide a link among various local, regional, national and international levels of society to address multi-faceted urban problems. They can also play an important role in facilitating partnerships among governments, local authorities and civil society and in supporting local community development that is transparent, responsive and accountable.

4.4 International Organizations on Sustainable Cities

4.4.1 International Council for Local Environmental Initiatives

There are a variety of international organizations which do not have the same national government involvement in a formal sense that the International Financial Institutions and the United Nations system do. Among the most important is one based in Canada, the International Council for Local Environmental Initiatives (ICLEI), which is the international environmental agency for local governments.

Local governments, in partnership with their residents and local businesses, are taking action on environmental issues through ICLEI, established in 1990 through a partnership of the United Nations Environment Programme, the International Union of Local Authorities (IULA), and the Center for Innovative Diplomacy.

The ICLEI World Secretariat is in Toronto, and there are offices in Freiburg, Germany; Tokyo, Japan; Harare, Zimbabwe; and Santiago, Chile. The Council serves as a clearing-house on sustainable development and environmental protection policies, programs, and techniques being implemented at the local level by local institutions. It initiates joint projects or campaigns among groups of local governments to research and develop new approaches to address pressing environmental and development problems, organizes training programs and publishes reports and technical manuals on state of the art environmental management practices.

ICLEI also advocates for local government before national and international governments, agencies and organizations to increase their understanding and support of local environmental protection and sustainable development activities.

By ICLEI's 10th anniversary in the year 2000, the organization aims to establish a world-wide system to achieve, measure, and report on tangible improvements in the global environment through the cumulative local performance improvements of ICLEI's member municipalities, more than 240 local governments of all sizes from around the world.

4.4.2 Metropolitan Environment Improvement Programme (MEIP)

The World Bank and the United Nations Development Programme launched the Metropolitan Environmental Improvement Program (MEIP) to assist four Asian urban areas (Mumbai, Colombo, Jakarta, Katmandu, and Metro Manila) with rapidly growing environmental problems. URBAIR is a program within the MEIP dealing specifically with urban air quality.

4.4.3

CITYNET

CITYNET is based in Yokohama, Japan. The full title is "The Regional Network of Local Authorities for the Management of Human Settlements". This is a multi-actor network of urban local governments, development authorities, and NGOs in the Asia-Pacific region. CITYNET acts as a facilitator at the regional level to promote the exchange of expertise, information, and experiences among its members based on TCDC (Technical Cooperation Among Developing Cities). Starting with 12 city members, CITYNET has grown to an international organization with 94 members, most of which are cities and organizations in developing countries in Asia.

CITYNET is one of the partners in the UNDP-funded Urban Management Programme for Asia and the Pacific (UMPAP) together with ESCAP, UMP-Asia/UNCHS, AP2000, and MEIP/the World Bank. In addition, CITYNET collaborates closely with other international organizations and United Nations agencies.

4.4.4

Metropolis

Metropolis has enabled the leaders of the world's 41 major metropolises to compare experiences and urban strategies, encourage social and technical innovation, implement co-operation programmes, and establish new avenues of citizens' participation. Montreal has established a training institute associated with this organization.

4.4.5

Asia Pacific Cities Forum

The main focus of the Asia Pacific Cities Forum, an international non-governmental organization based in the United States is to act as a catalyst in promoting the exchange of new ideas, and workable approaches to support sustainable development activities in cities in the Asia and Pacific region.

4.4.6

International Secretariat for Water

Based in Montreal, this organization seeks to promote interaction between civil society and governments on the local, regional, national and international levels. The goal is to initiate and facilitate cooperation, exchanges and the creation of partnerships for community-based water management.

4.4.7 International Centre for the Prevention of Crime (ICPC)

Also based in Montreal, the focus of this organization is to compile and diffuse information on successful crime prevention, and particularly on city-wide strategies concerned with youth and families at risk. It is also concerned with other basic human needs; human rights, democracy and good governance; and integration of women in development.

4.4.8 International Network On Water, Environment And Health, United Nations University, McMaster University

This international organization is based at McMaster University. Its focus is on the connections between water, environment and health, with a particular emphasis on the needs and concerns of the developing regions of the world. Program themes include aquatic ecosystem protection and management, water and wastewater treatment and remediation, environmental assessment, ecotoxicology, and water-related human health impacts.

4.4.9 International Winter Cities Secretariat

The Canadian committee of this international non-governmental organization is located in Edmonton, Alberta with others located abroad. Its main focus is an information exchange program for municipalities located in cold climate regions.

4.4.10 International Smart Cities Institute

Based in Toronto, this organization facilitates international cooperation among cities through information sharing and collaboration among its members, especially concerning the use and application of information and telecommunications technologies to develop or enhance their community's social, cultural and economic position.

4.4.11 Organization Of World Heritage Cities (OWHC)

This international non-profit, non-governmental organization is based in Quebec City. It is dedicated to technology and information transfer to assist member cities to adapt and improve their heritage management methods, networking, training, and advocacy. It also assists them in economic development, in both the formal and informal sectors and with municipal infrastructure.

5. CONCLUSIONS

5.1 Meeting the Challenge

Over the next twenty-five to thirty years, a combination of population and industrial trends will pose a new scale of environmental, social, and business challenge to humanity: *building, renewing and maintaining sustainable cities*, especially very large cities. A majority of the world's people will be living in urban regions for the first time in history. Perhaps a third will be living in those with populations ranging up to 10 million or more. Cities will thus be using much more energy, water, and land than ever before, and in more capital-, knowledge, and technology-intensive ways. By the same token, they could be generating *even more wealth* for more people than ever before.

However, governance, technologies and financing mechanisms now in use will need to *change substantially*. Otherwise, people living in the world's cities could find their economic promise dramatically undercut by health, safety, environmental and social problems, on a scale which beggars the imagination.

Everyone is now a part of the "global city". What happens elsewhere will affect Canadians very directly. A crash in the urban real estate and industrial markets of East Asia pushes our dollar down, interest rates up, and casts a pall over our whole economy. Catastrophic failures of cities to deliver to their populations lead to civil war, calling for international peace-keeping and reconstruction efforts to which Canada must contribute. Finally, as a trade-based economy, Canada cannot stand idle while its competitors position themselves to undertake major capital projects around the world, at the same time building up their environmental credentials and political credit for good global citizenship.

While there may be disagreements on details of the above points among experts, and different choices made as to strategy and priorities, they appear to have widespread support.

5.2 The Business Case for New Teaming Approaches to Sustainable Cities

From an export and investment perspective, the challenge ahead appears to pose practical requirements for:

- more seamless linkages between public and private sectors, so that all major aspects of urban client needs -- typically in municipal governments -- can be addressed;

- connections between "demand" and "supply" sides of urban infrastructure, industrial development and buildings, so that financially viable systems can be designed and implemented, e.g., linking energy and water savings with system design, financing and delivery of supply;
- combined marketing of multiple urban-related products and services together, for synergies of integrated sales/project development, at lower overhead for each participant;
- combined design, implementation and financing for Build-Own-Operate, Build-Own-Manage, and Build-Own-Transfer projects desired by municipalities engaged in privatizing urban services;
- combinations of linguistic, cultural, technical and social skills and talents to interact with clients over the long periods associated with major urban projects, e.g., joining development and capacity-building consultants in teams with engineering consultants;
- close linkages between innovation through demonstration projects and routine application to assure sophisticated and demanding urban markets and clients that they are receiving the most advanced and also most reliable solutions, e.g., through wider application of third-party certification and backing of supply contracts by the Canadian Commercial Corporation.

The "opportunity cost" of not integrating Canadian initiatives in given urban regions more fully is that otherwise useful and well-intentioned activities can readily be "swamped" in the momentum or inertia of larger cities. With integrated action, significant innovations can be most readily adopted and spread over an entire society from there. In addition, without the benefits of city-focused teams, Canadians may find themselves in the embarrassing position of working at cross-purposes or in ignorance of each other's work within the same geographic region and with the same administrative bodies.

In each case, the common theme is achieving a "critical mass" of urban-focused capabilities and of interventions to cause a real change for the better in both economy and environment at the same time. The opportunity to do so is at hand with the completion of this capability-mapping project.

APPENDIX 1: CONTENTS OF OTHER VOLUMES

Volume II: Organizations

Annex "A": Canadian Centres of Urban Expertise

Canadian Centre for Pollution Prevention
Canadian Universities Consortium
Canadian Urban Institute
Centre for Environmental Design Research and Outreach, Calgary
Centre for Human Settlements, British Columbia
Centre for Sustainable Regional Development, Victoria
Centre for Urban and Community Studies, Toronto
Centre for Water Resource Studies, DalTech
Corporation professionnelle des urbanistes du Québec
Département d'Études Urbaines et Touristiques, UQUAM
Department of Civil Engineering, McGill
Department of Geography, McGill
Department of Urban & Rural Planning, DalTech
École d'Architecture, Laval
Faculty of Architecture, Manitoba
Faculty of Environmental Studies, Waterloo
Faculty of Environmental Studies, York
Federation of Canadian Municipalities
Green Building Information Council
Green Communities Association
Groupe Interuniversitaire de Montréal
Institut d'Urbanisme, Montréal
Institute for Bioregional Studies, Charlottetown
Institute for Environmental Studies, Toronto
Institute of Urban Studies, Winnipeg
INRS-Urbanisation
Intergovernmental Committee on Urban and Regional Research
International Centre, College of the North Atlantic, St. John's
International Centre for Sustainable Cities, Vancouver
International Institute for Sustainable Development
McGill School of Architecture
McGill School of Urban Planning
Rooftops Canada Foundation
Station Expérimentale de l'Université du Québec à Montréal (SEPPE-UQAM)
Sustainable Development Research Institute, British Columbia
Transport Institute, University of Manitoba

Annex "B": Non-Governmental Organizations Involved in Urban Projects

Alternatives

Bureau de la coopération, CEGEP de Saint-Laurent
Bureau de la Coopération Internationale (BCI), Université d'Ottawa
Bureau de la Recherche et de la Coopération Internationale, Sherbrooke
Canadian Catholic Organization for Development and Peace (CCODP)
Care Canada
Carrefour Canadien International
Carrefour de Solidarité International de Sherbrooke
Centre Canadien d'Étude et de Coopération Internationale (CECI)
CESO, Canadian Volunteer Advisors to Business
Club 2/3
Coady Institute
CODE (Canadian Organization for Development through Education)
Collaboration Santé Internationale
Comité de Solidarité Tiers Monde de Trois-Rivières
CUSO
Development Workshop (DW)
Développement International Desjardins (DID)
Institute of Asian Research, British Columbia
Institute on Governance/Institut sur la Gouvernance
Jamaican Self-Help
Jeunesse Canada Monde/Bureau régional du Québec (JCM)
Oxfam - Québec
Pueblito
Save the Children - Canada
Solidarité Union Coopération (SUICO)
Terre sans Frontières (TSF)
Unitarian Service Committee of Canada (USC CANADA)
UNICEF Canada
World Vision Canada
YMCA Canada
YM/YWCA of Winnipeg
Other Organizations

Annex "C": Key Industry, Municipal and Professional Organizations

Air & Waste Management Association
Alliance of Manufacturers & Exporters
Asia Pacific Foundation
Association of Consulting Engineers of Canada
Bureau des relations internationales - Montréal
Canada-ASEAN Centre
Canadian Association of Energy Service Companies
Canadian Association of International Development Consultants
Canadian District Energy Association
Canadian Environment Industry Association
Canadian Environment Industry Association - British Columbia
Canadian Environment Industry Association - Ontario
Canadian Environmental Technology Advancement Corporation
Canadian Home Builders' Association
Canadian Institute of Planners
Canadian Manufactured Housing Institute
Canadian Society of Landscape Architecture
Environmental Services Association of Alberta
Green Building Information Council
Manitoba Environmental Industry Association
Montréal International
New Brunswick Environment Industry Association
Newfoundland Environmental Industry Association
Nova Scotia Environmental Industry Association
Prince Edward Island Environmental Industry Association
Réseau environnement - Québec
Royal Architectural Institute of Canada
Saskatchewan Environmental Managers Association
Toronto International Partnership
Transportation Association of Canada
Other Organizations

Annex "D": Governmental Organizations with Related Mandates and Services

Canada Mortgage and Housing Corporation
Canadian Commercial Corporation
Canadian International Development Agency
Environment Canada
Export Development Corporation
Foreign Affairs and International Trade Canada
Human Resources Development Canada
Industry Canada
International Development Research Centre
National Research Council of Canada
National Round Table on the Environment and the Economy
Natural Resources Canada
Public Works and Government Services Canada
Transport Canada
Western Economic Diversification Canada

Volume III: Companies

Annex "E": Canadian Companies

2000 Environmental Services
3L Filters Ltd.
A.B.N. Amro Bank Canada
A.G. Levinsohn Consulting Inc.
A-1 Airtek Inc.
AAB Building System Inc.
Aastra Telecom Inc.
ABL Environmental Consultants Ltd.
Acres International Limited
Adam Clark Company Ltd.
ADI Limited
ADMIC Controls
Advanced Global Marketing Inc.
Advatech Homes Canada Inc.
AGGLO Recovery Inc.
AGRA Earth and Environment Ottawa
AGRA Earth & Environmental Ltd. (Subsidiary of AGRA)
AGRA Inc.
AGRA Monenco Quebec Inc.
Ainley Graham and Associates International Trade and Development
Ainsworth Inc.

Annex "E": Canadian Companies (Continued)

Air Solutions
Albarrie Canada Limited
Alberta Research Council
Aldworth Engineering Inc.
Almita Manufacturing Ltd.
Alternative Fuel Systems Inc.
Amtech Chemicals Ltd.
Anthratch
Applied Ground Imaging Ltd.
Aqua Data Inc.
Aqua Pure Ventures Inc.
Aquamatrix Research Ltd.
ARA Consulting Group Inc.
Archimède 2000 Inc.
Architectura (Waisman, Dewar, Grout, Carter Inc.)
Armin A. Preiksaitis & Associates Ltd.
ARRAKIS Consultants Inc.
Arthur Andersen & Co.
Associated Engineering International Ltd.
Associated Tube Industries Inc.
ATCO Noise Management
Athena Sustainable Materials Institute
Atrion International Inc.
Autumn Industries Inc.
Avalon Mechanical Consultants
B.H. Levelton & Associates Ltd.
BA Consulting Group Ltd.
Baker McGarva Hart Incorporated
Banister Foundation Inc. (BFI)
Bayly Communications Inc.
BDE Consulting Group Inc.
Beak International Inc.
Beak International Ltd.
Beasy Nicoll Engineering Limited (BNEL)
Bechtel
Bell Sygma Inc.
Berlie Steel Products Ltd.
Beulah Tec
Bidell & Associates
Bing Thom Architects Inc.
Bitumar Inc.
Blue Heron Consulting Services

Annex "E": Canadian Companies (Continued)

Blue-Zones Technologies Ltd.
Bombardier Inc. Mass Transit Division
Boreal Laser Inc.
BOVAR Environmental
Brian G. Hart & Company
Bunting Coady Architects
By Design Consultants
C.S.P. Environmental Consultants, Ltd.
C.S. Systèmes de disposition de déchets et de récupération Inc.
CadhamHayes Systems Inc.
CAE Electronics Inc.
Callrich Eco Services Inc.
Cambridge Engineering and Planning
Camillus Engineering Consultants International Ltd.
Canadian Environmental Technologies Canadian Environmental Technology
Advancement
Corporation-West
Canadian Geo-Solar Inc.
Canadian International Builders Inc.
Canadian Waste Services Inc.
Canora (Asia) Incorporated.
Canrede
Cape Breton Environmental Systems
Cathexis Associates Inc.
CDS Research Ltd.
CEF Consultants Ltd.
Celdex Environmental Technologies
CEM Specialities Inc.
CEMS (Chemical Emission Management Services)
CENSOL Inc.
Chemex Labs Alberta Inc.
Chreod Ltd.
Christopher Cooke, Management Consultant
CIMAT Power Systems Inc.
Circul-Aire, Division of PM Wright
Cirrus Consultants
City Formation International (CFI) Inc.
Clifton Associates Ltd.
CML Technologies Inc.
Coastal BioAgresearch Ltd.
Cochrane Engineering Inc. / Cochrane Environmental Consultants Inc.
CODE Incorporated

Annex "E": Canadian Companies (Continued)

Coles Associates Ltd.
Colt Engineering Corporation
Commonwealth: An Atkinson Company
Commonwealth Historic Resource Management Limited
Conestoga-Rovers & Associates Ltd.
Connor Development Services Ltd.
Conor Pacific Environmental
Conserval Engineering Inc.
Consolidated Envirowaste Industries Inc.
Construction Fitzpatrick Canada Ltée.
CONSULTANTS C.R.E.N.A.
Contacto Group
Contemporary Information Analysis Limited
Continental Waste Conversion Inc.
Corporate Energy Solutions Limited (CEC)
Corush Sunderland Wright Limited
Cowater International Inc.
Crandall Engineering Ltd.
Creative Communities Research Inc.
Cree Regional Economic Enterprises Company Inc.
Cullbridge Marketing and Communications
Cumming Cockburn Ltd.
Custom Lighting Ltd.
CWMM Consulting Engineers Limited
D.G. Malcolm & Associates Inc.
D-Tech-T International Inc.
DAC International Inc.
Daniel Arbour & Associates
Dashwood Industries Ltd.
Davey International
David Naime & Associates Ltd.
Davidson Yuen Simpson Architects
Davnor Water Treatment Technologies Ltd.
Dectron Inc.
Degimi Environnement Inc.
Degrémont Infilco Ltd.
Delcan Corporation
Delta Catalytic Constructors Ltd.
Demeter Group
Descon Building Systems Inc.
Dessau International Limited
Diener Consulting Inc.

Annex "E": Canadian Companies (Continued)

Diesel Controls Ltd.
Dillon Consulting Ltd.
Distributions Gypco
Dominion Bridge
DS-Lea Consultants Ltd.
DST Consulting Engineers
du Toit Allsopp Hillier
Duchesne Pipe Ltd.
Dunster & Associates Environmental
Dutch Industries Ltd.
E.P. Engineered Pump Systems Limited
E.S. Fox
E.T. Jackson and Associates Ltd.
E2 Development Corporation
EARTH (Canada) Corporation
Eastern Power
ECO Fuel Systems Inc.
Eco Process and Equipment Inc.
Eco Trust Technologies Inc.
Eco Waste Solutions Inc.
Eco-Plus Ltd.
Ecolad Corporation
Ecolo Odor Control Systems Worldwide
Ecological Services for Planning
Ecologistics International Ltd.
EcoPlan International
Edgetech I.G. Inc.
EDM Environmental Design Management
EGF Associates
Electrolyser Corporation Ltd
Energie Controle 2001 Inc.
Energy Pathways Inc.
Energy Systems & Designs
Energy Training Centre, Seneca College Newmarket Campus
Enermodal Engineering Limited
Enertran Inc.
Engel Consulting Group
Engine Control Systems Ltd.
Engineering Associates Limited
ENREL Energy Group
Entreprises Vibec Inc.
Envirochem Management Systems Inc.

Annex "E": Canadian Companies (Continued)

Enviromega Inc.
EnvironLatin Consulting Services
Environmental Management Solutions
Environmental Technologies Inc.
Environmental Waste Management Services Inc.
Enviroservices Inc.
Envirowall Partition Systems Ltd.
Envision Sustainability Tools Inc.
EPEC Consulting Sask. Ltd.
Équipement Fédéral Québec Ltée
ESDEX Recycling Corporation
ESG International
ESSA Technologies Group Ltd.
ETV Canada Inc.
F&S Manufacturing
Facilities Planning Associates Ltd.
Fenco MacLaren Inc.
Ferguson Simek Clark
FGA Consultants Ltd.
Fibrehouse Limited
Five Seasons Comfort Limited
Flywheel Energy Systems Inc. (FESI)
FORAMEC INC.
Foremost Industries Inc.
FSI International Services Ltd.
G.P. Novatech Controls Inc.
G3 Consulting Ltd.
Gartner Lee Limited
Gasoil Systems Inc.
GEC ALSTHOM Energies Inc.
Gemcom Software International Inc.
General Scrap & Car Shredder Ltd.
Genesis Organic Inc.
Geomatics International Inc.
Giffels Associates Ltd.
Global Partners
Golder Associates Ltd.
Goodfellow Consultants Inc.
Graham Murchie & Associates
Greenisle Plastics
GreenWare Environmental Systems Inc.
Greenware Environmental Systems Inc.

Annex "E": Canadian Companies (Continued)

Griffiths Muecke Associates
Group West Systems Ltd
Groupe Chagnon International Ltée.
Groupe Espace-Temps / Space-Time Group
Groupe International Désourdy Inc.
Groupe Serrener Inc.
Grove Wood Heat Inc.
Guillrvin International
Guthrie Muscovitch Architects
Habart & Associates Consulting (B.C. Hydro International Limited)
Happy Harry's Used Building Materials
Harris Canada Inc.
Harris Hudema Consulting Group Limited
Hatch Associates Inc.
HEATH Consultants Ltd.
Hemson Consulting Ltd.
Hi Rise Recycling Systems, Inc.
Holistic Impax Group
Houlihan: Research and Planning
HuestisHolm Barristers and Solicitors
Hunt Industries
HVNetworks
Hycal Energy Research Laboratories Ltd.
Hydrogenics Corporation
Hydroxyl Systems
HYGREX Spehr Industries
Hyperspectral Data International
IBI Group Architects, Planners Engineers
Idealite Systems Incorporated
IER Planning, Research & Management
ILS Consulting
Image Inspection Services Ltd.
Imperial Design-Build Inc.
Innovan Enterprises
Inscape Design
Inter Disciplinary Solutions Inc.
International Water-Guard Industries Inc.
Inukshuk Planning & Development
Itres Research Ltd.
J.D. Mollard & Associates Ltd.
J.L. Richards & Associates Limited
Jacques Whitford Environmental Ltd.

Annex "E": Canadian Companies (Continued)

Jade Environmentally Friendly Inc.
Janin
Joe Deom Associates
John A. Neilson Architects Inc.
John Van Nostrand Associates Ltd.
John Winter Associates Ltd.
Judith Reeve & Associates
K. Ito and Associates
Kaede Housing Systems Limited
Kavanagh & Associates Limited
Keir Consultants Inc.
Kelly & Company.
Kenwest Enterprises Ltd.
Keystone Environmental Ltd.
KGS Group Inc.
Klohn-Crippen Consultants Ltd.
KMW Group
Kyllo Planning & Development Ltd.
La Cie de Pavage d'Asphalte Beaver, Division du Groupe Devesco Ltée
Labrie Equipment
Lakeshore Planning Group Inc.
Lambourne Environmental
Legwork Environmental Inc.
Leisureplan International Inc.
Les Produits Sparbeton / Sparlock Technologies Inc.
LGL Limited
Linnet Geomatics International Inc.
Lio and Associates
Lobbe Technologies Ltd.
Loewen Windows
Lynx Geosystems Inc.
MacViro Consultants Inc.
MADVAC
Makloc Buildings Inc.
Malone Given Parsons Ltd.
Manitoba Hydro.
Maple Reinders Environmental Ltd.
Markland Specialty Engineering Ltd.
Marshall Macklin Monaghan Limited
Martec Liquid Products Ltd.
Martin Liefhebber Architect Incorporated
Martindale Planning Services

Annex "E": Canadian Companies (Continued)

MASCON Engineering Limited
Matrix Energy Inc.
McElhanney Consulting Services Ltd.
McNeely Engineering Consultants Ltd.
Metropolitan Planning & Engineering Inc.
MGDrake Consulting
MG Environmental Limited
Michel Frojmovic, Planning Consultant
Microsep International Corporation
MNC Group Inc.
Monteith Zelinka Priamo Limited
MTS (Manitoba Telecom Services Inc.)
N.D. Lea International Ltd.
N-Viro Systems Canada Inc.
Nascor Inc.
Nautical Data International Inc.
New Era Engineering Corporation
Nexus International
Nicon Developments Limited
Nor' Wester Energy Systems Ltd.
Nortel (Northern Telecom)
North American Energy Systems
North - South Trade & Investment Ltd.
Northstar Trade Finance
Nova Scotia Power
Nu-Fab Building Products Limited
O'Halloran Campbell Consultants Limited
Oak Environmental Equipment Supply Ltd.
Ominitronix Ltd.
OMIRA Inc.
Opron Inc.
Optimus Consulting Services
Option Environment Inc.
Ottawa Office Environments
Page & Steele Architects Planners
Par Excellence Developments Inc.
Paragon Envirocycle Inc.
Paramount Rubber Recycling Ltd.
Patti Rao / Architect Planner
PCL Constructors Inc.
Pedro Pinental Architect
Perwit International

Annex "E": Canadian Companies (Continued)

Peter J. Smith & Company Inc.
Philip Services Corp.
Phillips, Farevaag, Smallemberg
Photron Canada Inc.
Plan:Net 2000 Limited
Planam Enr.
Planning and Engineering Initiatives Ltd.
Plasti-Fab Ltd.
Pluram International
Pollutech Environmental Limited
Polycrete Industries Inc.
Polyphalt Inc.
Pomerleau International Inc.
Porter Dillon Ltd.
Positron Inc.
Powermat Manufacturing Inc.
Praher Canada Products Ltd.
Prestige Homes
Proceco Ltd.
Proctor & Redfern Limited
Project Planning Limited
Pyrovac International Inc.
Quadra Planning Consultants Ltd.
Queneco International Inc.
R.J. Burnside & Associates Limited
R.V. Anderson Associates Limited
Radian Design & Supply Ltd.
RAMCO Group
Recovery Technologies Inc.
Recycled Solutions for Industry Inc.
Refrigerant Services Inc.
REIC Ltd.
Reid Crowther International Ltd.
Reonac Energy Systems Inc.
Rescan Environmental Services Ltd.
Ressources Kitaskino XXI Inc.
RFI (Resource Futures International)
Rhino Linings (Canada) Inc.
Rhino Systems Canada Inc.
Richard Kadulski, Architect
Richardson Associates (1993) Limited
RIXCOM

Annex "E": Canadian Companies (Continued)

Roche Ltee, Groupe Conseil
Rocvent Inc.
Rodex Technologies Inc.
Ron Sandrin-Litt, Development Planning
Rose Technology Group Ltd.
Roxul Inc.
Roy Consultants Group
Royal Building Systems (Cdn) Limited
Royal Plastics Group Limited
RYCO - ALBERICI LTD.
S.M. Group International
Sambrabec Inc.
San-Nor Concrete Products Limited
Sanexen Environmental Services Inc.
Sanitation Equipment Limited.
Sasktel International.
Save Energy Engineering Inc.
SEFRAM Inc.
SEG Engineering Inc.
Sendex Environmental Corp.
Seven-S Building Systems
SGA Consulting
Sheltair Group Inc.
Shelter Consultants Inc.
Shirlas Enterprises Ltd.
Siemens Canada Limited
SIGMA Engineering Ltd.
Simons International Corporation
Sintra Inc.
SNC-Lavalin Group Inc.
Société en développement et gestion de ressources (SDGR) inc.
Sodexen Inc.
Solar Plus
Solar Solutions RECD Inc.
Solcan Ltd.
Solenos SPD Inc.
Soltrac International Inc.
SOPREMA
Soprin ADS Inc.
Sorensen Gravely Lowes Planning Associates Inc.
SpillTech Environmental Clean-Up Inc.
Sprung Instant Structures

Annex "E": Canadian Companies (Continued)

Stanley Consulting Group
Stearns & Conrad Engineers
Stewiacke Building Centres
Strait Engineering Ltd.
Strogan Inc.
Sub-Tech Surface Technologies and Instrumentation Ltd.
Suimon Engineering Canada Ltd.
Swiftsure Enterprises Ltd.
Sypher
System Ecotechnologies Inc.
Systems Digigraph Inc.
Target Recycling Inc.
TEAMIC International - Canada
Tecsult Environnement Inc.
Teklogix Inc.
Teron Inc.
TerraChoice Environmental Services Inc.
Terrestrial & Aquatic Environmental Managers Ltd.
The Bayswater Consulting Group Inc.
The Benoit Group
The Delta Partners
The Municipal Group of Companies
The Orthoshop
The Planning Partnership
The Watt Stopper Inc.
Thermo-Cell Industries Ltd.
Titan-Komex Operations Ltd.
Torrie Smith Associates
Tremblay, Bois, Mignault & Lemay
Trigen-PEI
Trihedral Engineering Limited
Trojan Technologies Inc.
Two Row Architect
Ultra-Sun Industries Inc.
UMA Engineering Ltd. (Edmonton)
UMA Environmental
UniSeal
Universal Systems Limited
Urban Ecology Design Collaborative
Urban Resources Technologies Inc.
Urban Strategies Inc.
Urban Systems Ltd.

Annex "E": Canadian Companies (Continued)

Urgel Delisle et Associés Inc.
VanCity Credit Union
Vanport Sterilizers Inc.
Venerus International Purification Inc.
Versatech Products Inc.
Vista Panel Systems Limited
VXL CleanPower Technologies
Walker, Nott, Dragicevic Associates Ltd.
Walter & SCI Construction (Canada) Ltd.
Wardrop Engineering Inc.
Wastequip Cusco
Wastewater Technology International Corp.
Waterloo Hydrogeologic Inc.
Watsun Simulation Laboratory
Wavemill Energy Corp.
WaveRider Communications Inc.
WCI Waste Conversion
Wesco Distribution - Canada Ltd.
Westwind Resources Group Limited
Westwood Building Systems
Winfield Home Systems
Wintec EMC Energy Management Corporation
Wm. C. Thompson & Associates Ltd.
Worldwide Ozone Inc. Ozone Oxidizing Operations Inc.
Wright Environmental Management Inc.
Yamashita Planning Consultants
ZCL Composites Inc.
Zenon Environmental Inc.

Annexe «E» : Les Sociétés Canadiennes

A-1 Airtek Inc.
AGRA Monenco Québec Inc.
Aqua Data Inc.
Archimède 2000 Inc.
ARRAKIS Consultants Inc.
Atrion International Inc.
Berlie Produits Ltée.
Bombardier Inc.
C.S. Systèmes de disposition de déchets et de récupération Inc.
Canora (Asie) Inc.

Annexe «E» : Les Sociétés Canadiennes (continuée)

Celdex technologies environnementales
CIMAT Systèmes
Circul-Aire, division de PM Wright
Construction Fitzpatrick Canada Ltée
CONSULTANTS C.R.E.N.A.
Daniel Arbour et associés
Dectron Inc.
Degimi Environnement Inc.
Degrémont Infilco Ltée.
Dessau International Limitée
Distributions Gypco (1988) Inc.
Duchesne Pipe Ltée.
Eco Équipements Inc.
Energie Controle 2001 Inc.
Entreprises Vibec Inc.
Enviroservices Inc.
Équipement Fédéral Québec Ltée
FORAMEC INC.
GEC ALSTHOM Energies Inc.
Groupe Chagnon International Ltée.
Groupe Espace-Temps / Space-Time Group
Groupe International Désourdy Inc.
GSI Environnement inc.
Guillrvin International
Harris Canada Inc.
Janin
La Cie de Pavage d'Asphalte Beaver, Division du Groupe Devesco Ltée
Labrie Équipement
Les Produits Sparbeton Ltée
Ominitronix Ltd.
Option Environment Inc.
Planam Enr.
Pluram International
Polycrète Industries Inc.
Positron Inc.
Pyrovac International Inc.
Queneco International Inc.
Reonac Energy Systems Inc.
Ressources Kitaskino XXI Inc.
Roche Ltée, Groupe Conseil
S.M. Groupe International Inc.
Sambrabec Inc.

Annexe «E» : Les Sociétés Canadiennes (continuée)

Sanexen Services Environnementals Inc
Sintra Inc.
SNC-Lavalin Groupe Inc.
Société en développement et gestion de ressources (SDGR) inc.
Sodexen Inc.
Solenos SPD Inc.
Soltrac International Inc.
Soprema Inc.
Soprin ADS Inc.
Systèmes Digigraph Inc.
Tecsult Environnement Inc.
Tremblay, Bois, Mignault & Lemay
Urgel Delisle & associés inc.

Volume IV: Global Contacts

Annex "F": Multi-city Programs

Canada-Baltic Municipal Cooperation Program
Canada Southern Cone Environmental Technolog
Cities Feeding People Program
Development Of Management Skills For Urban Local Government
Economy And Environment Program For South East Asia (Eepsea
Energy Efficiency In Buildings Projec
Environment, Equity And Energy Efficiency (South Africa
Growth And Change In Medium-sized Cities (China
Healthy Cities And Villages (East And Central Africa)
Latin America Urban Water Management Network
Multipurpose Waste Recycling
Open Cities Project (China)

Annex "F": Multi-city Programs

Programme De Partenariat Universitaire En Développement Urbain
Redatam And Gis Generic Population Related Application Tool
SACDEL II - Training Support System For Local Development In Latin America
Small Grants For Population And Urban Development Research
Solid Waste Management Project
Support For Municipal Development Program - West
Sustainable Cities (Global)
University Partnership Program In Urban Development

Annex "F": Multi-city Programs (continued)

Urban Environmental Management Program - Asian Institute Of Technology
Vietnam-Canada Environment Project (Vcep)
Water And Sewage Human Resources Development
Water And Waste Management Project
Yangtze Basin Urban Environment Study: China

Annex "G": Cities and Urban Regions

Abidjan, Ivory Coast
Accra, Ghana
Addis Ababa, Ethiopia
Ahmedabad, India
Amman, Jordan
Bacolod City, Philippines
Bamako, Mali
Bandung, Indonesia
Bangalore, India
Bangkok, Thailand
Bangui, Central African Republic
Barranquilla, Colombia
Batangas, Philippines
Beijing, China
Bellville, South Africa
Belo Horizonte, Brazil
Ben Slimane, Morocco
Berkane, Morocco
Bocaue, Philippines
Bogor, Indonesia
Buenos Aires, Argentina
Cairo, Egypt
Calcutta, India
Cali, Colombia
Cape Town, South Africa
Cebu City, The Philippines
Cesky Krumlov, Czech Republic
Chenzhou, China
Chiang Mai, Thailand
Ciudad de Soyapango, El Salvador
Cochambamba, Bolivia
Coimbatore, India
Conakry, Guinea
Concepcion, Chile

Annex "G": Cities and Urban Regions (Continued)

Contagen, Minas Gerais, Brazil
Cotonou, Benin
Curitiba, Brazil
Daka, Senegal
Dalian, China
Danang, Vietnam
Dar es Salaam, Tanzania
Davao, The Philippines
Delhi, India
Dhaka, Bangladesh
Durban, South Africa
East London, South Africa
Eastern Cape, South Africa
Faridabad, India
Gandhinagar, India
Gao, Mali
Gaza/ West Bank, Palestinian Authority In Israel
Gitirama, Rwanda
Grati, Indonesia
Guadalajara, Mexico
Guangzhou, China
Guatemala City, Guatemala
Haiphong, Vietnam
Hanoi, Vietnam
Harare, Zimbabwe
Harbin, China
Havana, Cuba
Hemeraje, Thailand
Hermosillo, Mexico
Ho Chi Minh City, Vietnam
Hyderabad, India
Ibadan, Nigeria
Ibarra, Ecuador
Ismailia, Egypt
Ixcan / Sierra, Guatemala
Jakarta, Indonesia
Jeremie, Haiti
Jinan, China
Johannesburg, South Africa
Kampala, Uganda
Karachi, Pakistan
Kataayi, Uganda

Annex "G": Cities and Urban Regions (Continued)

Katowice, Poland
Kerala State, India
Kibungo, Rwanda
Kingston, Jamaica
Kuala Lumpur, Malaysia
Kyung Ki-Do, Republic of Korea
La Mercy, South Africa
La Paz, Bolivia
Lahore, Pakistan
Lanzhou, China
Lima, Peru
Luanda, Angola
Lusaka, Zambia
Machala, Ecuador
Madras, India
Manila, The Philippines
Maputo, Mozambique
Medellin, Colombia
Mexico City, Mexico
Monterrey, Mexico
Montevideo, Uruguay
Mopti, Mali
Moscow, Russia
Mumbai, India
Muntinlupa, The Philippines
Murambi, Rwanda
Mutare, Zimbabwe
Nairobi, Kenya
Nampula, Mozambique
Nanjiang, China
Natal, Brazil
New Delhi, India
Niamey, Niger
Ningbo, China
Nonthaburi Municipality, Thailand
Oaxaca, Mexico
Oilegon, Indonesia
Omolouc, Czech Republic
Ostrava, Czech Republic
Ouagadougou, Burkina Faso
Pasos, Honduras
Phnom Penh, Cambodia

Annex "G": Cities and Urban Regions (Continued)

Phuket, Thailand
Port-au-Prince, Haiti
Port-Bouët, Ivory Coast
Porto Alegre, Brazil
Porto Novo, Benin
Prerov, Czech Republic
Pt. Hendratna, Indonesia
Puebla de Zaragoza, Mexico
Pune, India
Qingdo, China
Quezon City, The Philippines
Rabat, Morocco
Rafah, Palestine
Recife, Brazil
Rio de Janeiro, Brazil
Rukara, Rwanda
Ryazan, Russia
San José, Costa Rica
San Luis Potosi, Mexico
San Salvador, El Salvador
Santa Fe de Bogota, Colombia
Santa Marta, Colombia
Santiago, Chile
Santo-Domingo, Dominican Republic
Sao Paulo, Brazil
Sarajevo, Bosnia
Seoul, Republic of Korea
Shanghai, China
Shenyang, China
Sichuan Province, China
Somoto, Nicaragua
Song Be, Vietnam
Spisska, Slovakia
St. Augustine, Trinidad
St. Petersburg, Russia
Sucre, Bolivia
Sumperk, Czech Republic
Surabaya, Indonesia
Temuco, Chile
Tianjin, China
Tunis, Tunisia
Udonthani, Thailand

Annex "G": Cities and Urban Regions (Continued)

Ujing Pandang, Indonesia
Ulsan, Republic of Korea
Umutara, Rwanda
Valparaiso, Chile
Vilnius, Lithuania
Warsak, Pakistan
Windhoek, Namibia
Witwatersrand, South Africa
Wuhan, China
Wuxi, China
Yakutsk, Russia
Yanji, China
Yaounde, Cameroon
Zaporizhzhia, Ukraine
Zlin, Czech Republic

Annex "H": International Organizations

Asia Pacific Cities Forum
International Centre For The Prevention Of Crime
International Council For Local Environmental Initiatives
International Network On Water, Environment And Health,
United Nations University, McMaster University
International Secretariat For Water/
Le Secrétariat International De L'eau
International Smart Cities Institute
International Winter Cities Secretariat
Metropolis
Organization Of World Heritage Cities