

Canada – A Strategic Choice

Canada as an investment destination
for environmental technology



Canada

Canada's environmental technology industry

The environmental technology industry is an emerging industrial sector comprised of companies and organizations that provide products and services that reduce human health risks and ecological damage, improve eco-efficiencies and cost-effectiveness in processes, and address environmental issues and problems. Companies are involved, in whole or in part, in the production of environmental goods, the provision of environmental services, or the undertaking of environment-related construction activities.

Canada's environment industry is large and growing, with \$18.4 billion¹ in revenues. Sales of environmental goods accounted for 55% of industry revenues, with services representing the other 45%. Export revenues were \$1.4 billion, with 78% of these sales being to customers in the United States. The Canadian industry comprises over 8,000 firms, with total employment in excess of 250,000.

Competitive strengths and capabilities

Within the global value chain, Canadian environmental firms have developed a number of product or technology-related specializations. These competitive strengths also translate into potential investment opportunities for firms looking to build on existing Canadian capabilities:

- **Waste management and remediation services** is the largest single segment of the Canadian environment industry. Inclusive of waste and water collection, treatment, disposal and remediation services, this sector represents almost one quarter of total environmental industry revenues, and half of industry revenues derived from services. Major Canadian firms in this industry segment include BioteQ, Onyx Industries, SM Group International, and Zenon Environmental.
- **Water and wastewater technologies** represent a particular Canadian specialty within the waste management sector. Canada has several large manufacturers of water purification and treatment systems, and numerous smaller firms working on emerging technologies. Leading Canadian firms in this segment include Aker Kvaerner Chemetics, Earth Tech, Ecodyne, Siemens Water Technology, and WaterGroup / Culligan.
- **Other environmental technology strengths:**
 - Renewable energy includes systems and equipment for solar energy, wind energy, wave energy, small-scale hydroelectric production, fuel cells and other alternative fuel technologies. This segment represented 14% of Canada's environmental technology goods exports in 2004, and has been growing rapidly in the past five years. Major firms active in this field in Canada include Acciona, Ballard Power Systems, DMI Industries, Finavera Renewables, and HSH Nordbank AG.
 - Environmental consulting services provide design and implementation services for environmental technology systems, as well as assessment and consulting services. This sector accounts for over half of all exports by Canadian environmental services firms. Leading firms in this sector operating in Canada include Golder Associates, Jacques Whitford, Stantec Consulting International, and Trow Associates.

¹ Statistics Canada, 2004. All dollars are expressed in Canadian dollars unless otherwise specified.

Leading environmental firms operating in Canada include:

AMEC Earth & Environmental
www.amec.com

Ballard Power Systems
www.ballard.com

BGP Inc.
www.infectrol.com

BioteQ Environmental Technologies
www.bioteq.ca

CanTest
www.cantest.com

CH2M HILL Canada
www.ch2mhillcanada.com

Conestoga-Rovers & Associates
www.craworld.com

Conserval Engineering
www.solarwall.com

Dessau-Soprin Inc.
www.dessausoprin.com

Earth Tech
www.earthtech.com

GL&V
www.glv.com

GreenWare Environmental Systems
www.greenware.com

Klohn Crippen Berger
www.klohn.com

RWDI Air
www.rwdi.com

Shred-Tech
www.shred-tech.com

SNC-Lavalin and SNC Research Corp.
www.snclavalin.com

Stantec Consulting International
www.stantec.com

Trojan Technologies
www.trojanuv.com

Wardrop Engineering
www.wardrop.com

WaterGroup / Culligan
www.watergroup.com

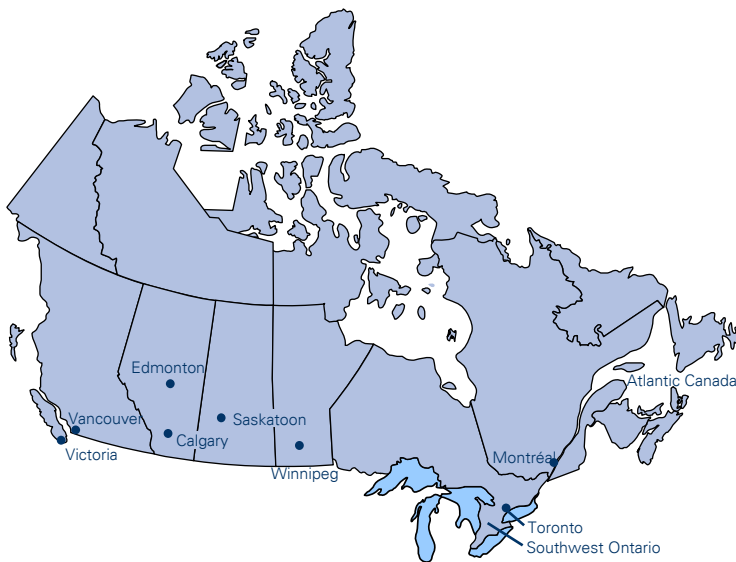
Key Canadian clusters

Toronto and Southwest Ontario form the heart of Canada's largest environmental technology cluster. With over \$8 billion in revenue in 2004, Ontario's environmental technology industry comprises more than 2,600 firms and 62,000 employees¹.

This cluster has particular strengths in water purification and wastewater treatment systems and technologies, including expertise developed through the Great Lakes Cleanup Program. Other strong capabilities within this cluster include air emission monitoring and control, plus industrial and hazardous waste treatment related to the large industrial base located in the region.

Leading firms in the Toronto and Southwest Ontario cluster include Earth Tech, Ecodyne, Siemens Water Technology and Trojan Technologies.

1. Statistics Canada, Environmental Accounts and Statistics Division, 2004.



Montréal, Quebec is Canada's second largest environmental cluster based on total revenues and establishments, representing nearly 20% of Canadian environmental revenues and firms. Major environmental firms present in Quebec include Dessau-Soprin, GL&V, Premier Tech, and Roche Ltée.

Atlantic Canada is home to the Wind Energy Institute of Canada, located in Prince Edward Island, which conducts research to advance the development, deployment and commercialization of wind technology. The Atlantic Canada cluster also has close links to natural resource industries in this region, including offshore oil and gas, as well as pulp and paper.

Saskatoon, Saskatchewan specializes in ecosystem management and environmental remediation, particularly in the areas of water supply, wastewater treatment, and groundwater.

Winnipeg, Manitoba, another leading cluster, comprises over 350 companies and around 5,400 employees. Specialized capabilities include: water and waste management, hybrid bus manufacturing, high-efficiency building products and renewable energy technologies. Major firms include: Wardrop Engineering Inc., UMA Engineering Ltd., Stantec Consulting Ltd., KGS Group and EARTH TECH Canada Inc.

Calgary-Edmonton, Alberta represents Canada's most intensive environmental technology cluster in terms of per-capita firms and revenues. The environmental technology cluster in Alberta, has 1,330 firms with more than 26,000 employees generating \$2.8 billion in annual revenue.

Key strengths of the Calgary-Edmonton cluster include water treatment, waste management, conservation, and soil remediation, particularly in the context of serving the environmental requirements of the oil and gas industry. In addition to local customers, the cluster also delivers niche exports to the US, Mexico, and China.

Major environmental firms operating in the Calgary-Edmonton cluster include AMEC Earth & Environmental, CCS Energy Services, Dynetek Industries Ltd., and Newalta.

Vancouver-Victoria, British Columbia has a primary focus on alternative energies, as well as strong capabilities in green design and construction. British Columbia is home to 1,300 environmental firms with more than 22,000 employees.

Hydrogen fuel cell firm Ballard Power Systems anchors the Vancouver-Victoria alternative energies cluster. BC firms are also developing projects and products using solar, geothermal, wave, small hydro, and biofuel energy sources, as well as related hardware and technologies. Alternative energy firms in British Columbia include Carmanah Technologies, DynaMotive Energy Systems, Plutonic Power, and Xantrex Technology.

Vancouver-Victoria firms developing and implementing green building concepts and technologies have advanced greatly in recent years, thanks in part to the University of British Columbia which has incorporated green building concepts into new construction since 1996. The venues for the upcoming 2010 winter Olympic and Paralympic Games in Vancouver are also expected to showcase local green building capabilities.



Environmental technology investment location drivers

To understand the main investment location drivers for the environmental technology industry, KPMG LLP (Canada) completed a series of in-depth confidential interviews with senior executives from leading environmental technology firms operating in North American and international jurisdictions. In these interviews, executives identified and ranked the most important location drivers considered by their firms when choosing among potential investment locations. Individual responses were then analyzed by MMK Consulting Inc., to determine and rank the top location drivers, as detailed below.

Top-ranked Investment Location Drivers	Canada's Value Proposition	Investor Benefits
1. Availability of skilled labour	<ul style="list-style-type: none"> Existing environment industry workforce of more than 250,000 Canadian universities graduate 16,000 engineers annually 	<ul style="list-style-type: none"> Ability to recruit both experienced and entry-level workers
2. Proximity to major markets	<ul style="list-style-type: none"> Major projects in Canada are creating strong demand for environmental technologies and services Seamless access under NAFTA to the US market 	<ul style="list-style-type: none"> Ability to benefit from involvement in global-scale projects Immediate access to major firms for collaboration and delivery Less travel time and lower travel and communication costs
3. Labour costs	<ul style="list-style-type: none"> Lowest labour costs among all G7 countries according to 2006 KPMG <i>Competitive Alternatives</i> study 	<ul style="list-style-type: none"> 11.5% savings on total labour costs (including benefits) relative to the United States
4. Tax incentives and exemptions	<ul style="list-style-type: none"> Federal and provincial R&D tax incentives that are among the most generous in the world R&D credits may be refundable for some locations and/or firms 	<ul style="list-style-type: none"> Lower after-tax cost of R&D Improved cash flow during critical early stage research
5. Environmental regulations	<ul style="list-style-type: none"> High international rankings for environmental stringency and sustainability Increasingly stringent Canadian environmental regulations are driving innovation 	<ul style="list-style-type: none"> Large and growing market exists for sales of new technologies and services
6. Corporate tax rates	<ul style="list-style-type: none"> Over a decade of progressive cuts to Canadian federal and provincial corporate taxes Corporate tax rates that are now generally lower than in the US, continental Europe, and Japan 	<ul style="list-style-type: none"> Corporate tax savings in most jurisdictions Improved net profit after tax
7. Highway accessibility	<ul style="list-style-type: none"> Coast-to-coast major highway network serving all major clusters Direct integration to US Interstate system at border crossings 	<ul style="list-style-type: none"> Flexible road-based options for movement of products, parts and personnel
8. Waterway and seaport accessibility	<ul style="list-style-type: none"> Major port facilities located on both the Pacific and Atlantic coasts 	<ul style="list-style-type: none"> Modern container and intermodal services Ready freight access to or from anywhere on the globe

Canada as an investment destination

The size and strength of Canada’s environmental technology industry is proof of its attractiveness for business investment. What value proposition does Canada provide to global investors in the environmental technology industry?

The following sections present Canada’s value proposition for environmental technology firms by comparing Canada’s leading environmental technology clusters – Southwest Ontario, Toronto, Calgary-Edmonton, and Vancouver-Victoria – to leading US clusters located in Los Angeles and Detroit, as well as key international clusters in the United Kingdom (Peterborough) and Japan (Yokohama).

1. Availability of skilled labour

Canada offers environmental firms an industry workforce totalling more than 250,000 employees. This deep talent pool provides a wide range of experienced staff, technicians, engineers, and scientists.

Canada also graduates approximately 16,000 engineers annually – more per capita than the United States. In addition, environment-oriented science courses are offered at universities throughout Canada, and college-level technical courses produce thousands more technicians each year at the certificate level. Therefore, a steady supply of bright and well-educated entrants into the workforce is assured.

Canada’s pool of engineering and scientific labour has been noted by two leading authorities on international competitiveness. The *IMD World Competitiveness Online* rates Canada’s supply of engineers on-par with the US, and ahead of both Japan and the United Kingdom (see chart at top right). The *World Economic Forum’s 2005-6 Global Competitiveness Report* ranks Canada ahead of both the US and the UK for the availability of engineers and scientists.

2. Proximity to major markets

Canada offers excellent proximity to major markets for environmental technology products and services. Within Canada, global-scale environmentally sensitive projects including the Alberta oil sands and Sydney tar ponds are creating high domestic demand for environmental technology services.

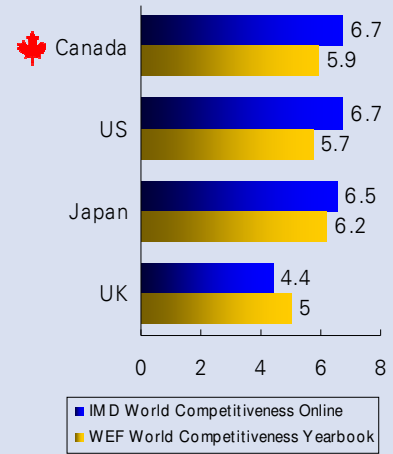
Canadian environmental technology clusters also provide good air, rail and highway access to US markets, and the North American Free Trade Agreement (NAFTA) provides ease of access to US markets from Canada.

3. Labour Costs

A KPMG comparison of international labour costs found that Canada’s environmental technology clusters offer significantly lower labour costs than in leading US clusters such as Los Angeles and Detroit (see chart at right). Labour cost savings relative to these US locations range from 8% to 19%. A significant component of Canada’s labour cost advantage relative to the United States is the lower cost of providing employee benefits, due mainly to Canada’s publicly funded healthcare system.

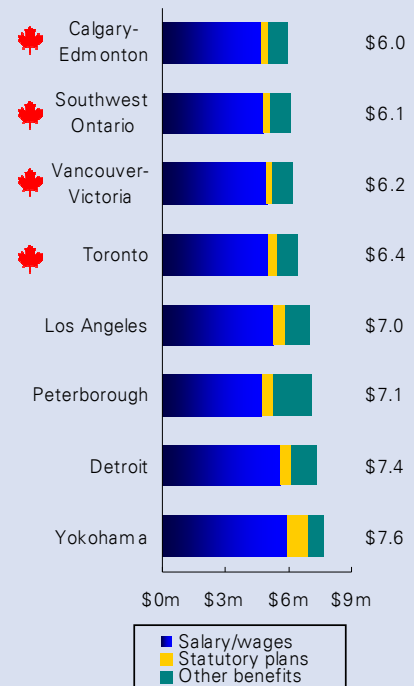
Labour costs in the Canadian clusters are also lower than in the international clusters compared – Peterborough, UK, and Yokohama, Japan. Compared to these international locations, the Canadian environmental clusters offer labour cost savings of between 10% and 21%.

**Availability of skilled labour
Engineers and scientists^{1,2}**



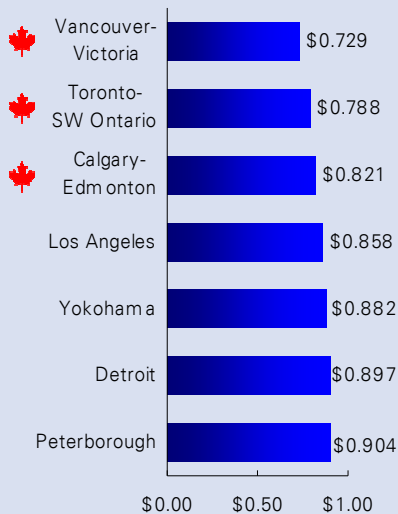
1: *IMD World Competitiveness Online*, 2006. Executive opinion survey “Qualified engineers are available in your labour market” based on an index from 0 to 10.
2: *World Economic Forum Global Competitiveness Report*, 2005-2006. Scientists and engineers in your country are: 1 = nonexistent or rare, 7 = widely available.

Annual labour costs, US\$m^{1,2}



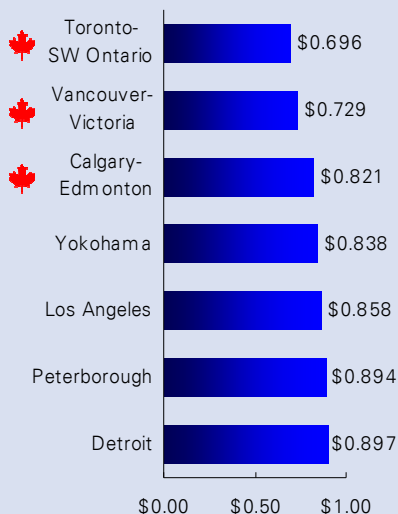
1: *Competitive Alternatives*, KPMG LLP, 2006. Total annual labour costs for 99.3 employees based on an average of 12 manufacturing, R&D, and service operations.
2: Data for Southwest Ontario is an average of 5 cities in that region. Data for Riverside-San Bernardino is used as a proxy for Los Angeles. Average of Leicester and Nottingham is used as a proxy for Peterborough, UK.

**After-tax cost of R&D
B-index for large firms¹**



1: The B-index measures the minimum present value of before-tax income that a firm needs to generate in order to cover the cost of the R&D investment and to pay the applicable corporate income taxes. The lower the index the greater is the incentive for a firm to invest in R&D. Source: *Canada's R&D Tax Advantages: An International Comparison*, JPW Innovation Associates, March 2007.

**After-tax cost of R&D
B-index for SME's¹**



1: The B-index measures the minimum present value of before-tax income that a firm needs to generate in order to cover the cost of the R&D investment and to pay the applicable corporate income taxes. The lower the index the greater is the incentive for a firm to invest in R&D. Source: *Canada's R&D Tax Advantages: An International Comparison*, JPW Innovation Associates, March 2007.

4. Tax incentives and exemptions

Canada's federal and provincial R&D tax credit programs are considered to be among the most generous in the world.

The OECD's standard measure for competitiveness of R&D tax incentives is the "B-index", which represents the amount of pre-tax income (or funding) required to undertake each dollar of R&D expenditure (after tax). Using this measure, Canada's environmental technology clusters offer a lower after-tax cost of R&D than any of the US and international clusters compared (see charts at left). Due to the large number of small and medium enterprises (SME's) operating in the environmental technology industry, B-indices are shown separately for large firms and SME's.

Canada also offers a wide range of environment-related incentives, either directly from government or in partnership with research organizations, including:

- Tax incentives for business investments in energy conservation and renewable energy, such as electricity generation, thermal energy, and wind energy.
- Tax and financial incentives for the incorporation of energy efficiency measures into industrial, commercial, institutional, and residential building designs.
- Funding assistance for emerging environmental technology applications in industries such as pulp and paper, iron and steel, oil and gas, and agri-food.
- Funding support to foster the development and early adoption of new technologies such as fuel cells and related technologies that support the transition to a hydrogen economy.
- Financial assistance in the demonstration and commercialization of environmental technologies.

5. Environmental regulations

Canada is a leader in environmental conservation and environmental standards, and is among the signatory nations to the Kyoto Protocol. With rapidly increasing public awareness of environmental issues, new environmental regulations will continue to drive demand for existing and new environmental technologies.

Environmental sustainability

The Yale Centre for Environmental Law and Policy ranks Canada fifth among OECD countries for environmental sustainability (see chart on next page). This ranking places Canada behind the Nordic countries, but far ahead of Japan (12th), the United States (17th) and the United Kingdom (20th).

Among the factors considered in this index, Canada scores strongly for its environmental systems, and for societal and institutional capacity to respond to environmental challenges. Within societal and institutional capacity, Canada's strongest score is in the science and technology sub-category, rating ahead of peer nations. Canada has already established good environmental systems, and has the desire and technical know-how to do more.

Stringency of environmental regulations

The World Economic Forum in its 2005-6 *Global Competitiveness Report* considered stringency of existing environmental regulations in 117 countries around the world, and rated Canada in 16th place globally. While environmental regulations in Canada are marginally less stringent than in most Western European countries and Japan, Canada rates as having more stringent environmental regulations than the United States, France, Italy, Spain, and all of the developing nations (see chart at right).

Overall, Canada is able to offer environmental technology firms a location where the environment is high on the public agenda, and where new domestic environmental standards are driving demand for new technologies.

6. Corporate tax rates

Progressive reductions in both federal and provincial tax rates in Canada over the last decade mean that corporate income tax rates are now generally lower in Canada than in both the United States and Japan (see chart at centre right). While tax rates vary somewhat between jurisdictions in Canada and the United States, Canada's relative tax position is significantly stronger for firms undertaking significant R&D activities (see also point 3 above).

Canada's 2007 federal budget included a number of new tax incentives that will benefit environmental products manufacturers:

- The rate of depreciation allowed on manufacturing buildings was increased from 4% to 10% – a significant benefit to manufacturers.
- The rate of depreciation allowed on manufacturing equipment was accelerated from 30% to 50% for new manufacturing machinery purchased before 2009.

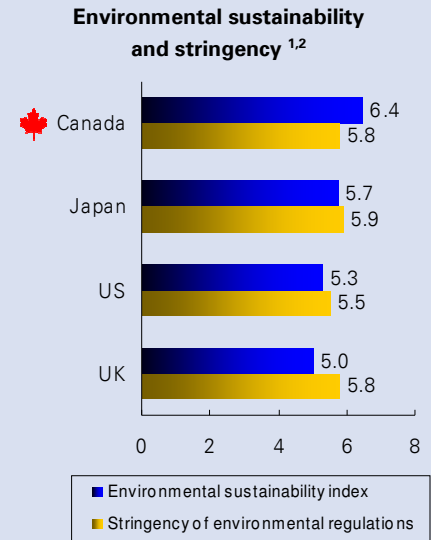
7. Highway accessibility

Canada's coast-to-coast major highway network serves all of the country's main environmental clusters with a combination of freeways and multi-lane highways.

The Canadian highway network provides direct integration to the US Interstate highway system at Canada/US border crossings. Joint Canada-US border clearance and security programs, including FAST (Free and Secure Trade, for the movement of goods) and NEXUS (for frequent travellers), are designed to minimize cross-border costs to businesses. Collectively, these systems provide firms with flexible road options for movement of parts, products and personnel.

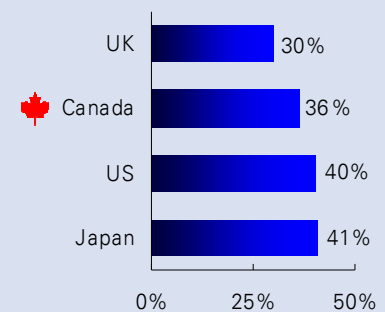
8. Waterway and seaport accessibility

Canada has ports on both the Pacific and Atlantic coasts, including major ports in Vancouver and Halifax. In addition, the Great Lakes St. Lawrence Seaway system provides direct marine access to the industrial heart of Canada, including Montréal, Toronto, and Southwest Ontario. Modern container and intermodal facilities at these major ports connect with US and Canadian rail and road carriers for delivery throughout North America. Overall, IMD *World Competitiveness Online* rates the quality of Canada's water transportation infrastructure as being close to that of the US, and well ahead of both Japan and the UK (see chart at right).



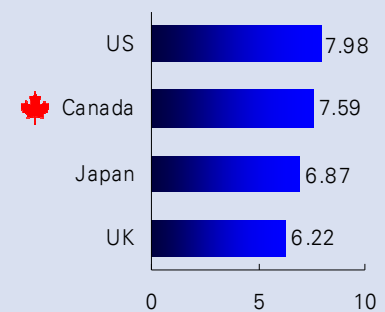
- 1: Environmental sustainability index : Yale Center for Environmental Law and Policy, 2005. Rescaled for comparability as the quoted index value divided by 10.
 2: Stringency of environmental regulations: *The Global Competitiveness Report 2005-6*, World Economic Forum: 1 = extremely lax, 7 = extremely stringent.

Corporate income tax rates¹



- 1: *Corporate Tax Rates 1993-2006*, KPMG International. Rates shown reflect average nominal 2006 tax rates.

Water transportation infrastructure¹



- 1: *World Competitiveness Online*, IMD, 2006. Executive opinion survey "Water transportation (harbours, canals, etc.) meets business requirements" based on an index scale from 0 to 10.

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The logo for Canada, featuring the word "Canada" in a serif font with a small crown above the letter 'a'.

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