



CHEMICALS AND PLASTICS

Canada's competitive advantages

Canada 

Foreign direct investment in Canada's chemicals and plastics industry

FOREIGN INVESTORS IN CANADA

- Amcor
- Air Liquide
- BASF
- Cabot
- CEPESA
- Cytec Industries Inc.
- DIC Corporation
- Deutsche Bahn
- The Dow Chemical Company
- E.I. du Pont de Nemours
- ExxonMobil
- Imatogil Group (IMG)
- INEOS
- International Petroleum Investment Co. (IPIC)
- K+S Group
- Kemira
- Koch Industries
- Korea Gas Corporation (KOGAS)
- LANXESS
- Praxair
- Royal Dutch Shell
- Süd-Chemie
- Total
- Yara International

- Nearly 90 foreign companies established greenfield* foreign direct investment (FDI) projects in the chemicals and plastics sector in Canada between 2003 and 2011.¹
- FDI in Canada's chemicals and plastics industry reached an accumulated \$34.04 billion** in 2011.²
- Basic chemicals is the largest sub-sector, accounting for 41% of total chemicals and plastics greenfield FDI, followed by paints, coatings, additives & adhesives (16%) and packaging materials (12%).³

RECENT INVESTMENT EXAMPLES

Amcor

Plastics packaging supplier Amcor Rigid Plastics, a subsidiary of Australia-based Amcor, expanded operations at its Brampton, Ontario plant in 2012, to boost production of extrusion blow-moulded polypropylene bottles. The expansion adds 30 new jobs to the Brampton facility and two other locations.

CEPSA

CEPSA Química, a subsidiary of Spanish energy company CEPESA, is expanding its Montréal, Quebec plant capacity, which produces purified terephthalic acid, an input used in polyester manufacturing. CEPESA also has a plant in Bécancour, Quebec, producing active cleaning agents for biodegradable household and industrial detergents.

Kemira

In 2012, Kemira, a Finland-based chemicals company specializing in water quality and quantity management, opened a Research & Development (R & D) laboratory in Edmonton, Alberta, on the University of Alberta campus, to address water consumption, reuse and recycling by the in situ oil sands extraction industry.

Praxair

U.S.-based Praxair has invested in a new carbon dioxide and liquid nitrogen distribution and storage facilities at its Dawson Creek, British Columbia and Grande Prairie, Alberta locations. The company is also upgrading its air separation facilities in Prentiss and Fort Saskatchewan, Alberta.

Sun Chemical

Ink manufacturer Sun Chemical, a subsidiary of Japan-based DIC Corporation, opened a new state-of-the-art ink manufacturing plant in Laval, Quebec in 2012. The \$3.1m investment will help Sun Chemical serve customers across Quebec and Eastern Ontario, through stronger customer service, improved efficiency, and reduced costs.

Yara International

Norway-based fertilizer producer Yara International announced plans to expand its world scale ammonia and urea manufacturing facilities in Belle-Plaine, Saskatchewan, more than doubling production capacity.

* Greenfield FDI is defined as overseas investment in a new physical project or expansion of an existing project which creates new jobs and capital investment and with majority-ownership by the foreign investor. Mergers and acquisitions (M&A) and other equity investments are not included.

** Unless otherwise noted, all values in this publication are in Canadian dollars.

Content is based on the latest available information at time of publication.

Cover image: NOVA Chemicals, Corunna (Ontario) facility

¹ fDi Markets database, fDi Intelligence from the Financial Times Ltd (2012)

² Statistics Canada, Trade and Economic Statistics; NAICS 325: Chemical manufacturing (includes pharmaceuticals) and 3261: Plastic product manufacturing, \$28,612 and \$5,429 billion respectively (2011)

³ fDi Markets database, fDi Intelligence from the Financial Times Ltd (2012)

Chemicals and plastics innovation in Canada

INNOVATION SNAPSHOT

- Canada is at the forefront of research and development in chemicals and plastics, with a track record of successful innovation. Between 2003 and 2011, over 8,190 chemical related patents were granted by the United States Patent and Trademark Office to inventors based in Canada; and over 7,950 patents were granted in plastics related activities.⁴
- Canada's Scientific Research and Experimental Development (SR & ED) tax incentive program provides, for foreign investors, combined federal and provincial tax credits that can be worth up to 30% of qualifying R & D expenditures.⁵
- Business enterprise research and development (BERD) expenditures for chemicals and plastics totalled over \$1 billion in 2010.⁶

Case Study: LANXESS

German-based rubber and specialty chemicals leader LANXESS located their global R & D centre for butyl rubber in London, Ontario. Canada's largest global butyl rubber R & D centre, the butyl elastomers R & D centre is located at the London Research Park which is shared with more than 60 innovative start-up companies. The facility focuses on materials research and emerging technologies, and has produced the first quantities of 'bio-butyl', rubber made from biomass instead of petroleum-based raw materials.

Case Study: Chemical Reactor Engineering Centre (CREC), University of Western Ontario

The University of Western Ontario's Chemical Reactor Engineering Centre provides expertise to companies on reactor engineering and chemical processes. Based in London, Ontario, CREC focuses on novel reactor modeling and optimization of chemical processes, sharing its internationally recognized knowledge with industry. Sponsors include The Dow Chemical Company, E.I. du Pont de Nemours and Petrobras.

Case Study: Ostara Nutrient Recovery Technologies

Vancouver-based Ostara Nutrient Recovery Technologies is a clean water company that recovers valuable nutrients from used water streams. The company's innovative proprietary technology, the Pearl[®] Process, recovers otherwise polluting nutrients, phosphorus and nitrogen, from municipal and industrial water streams, and transforms them into a slow release, eco-friendly fertilizer marketed as Crystal Green[®]. In each of the last three years, Ostara's new generation technology has earned the company a place in the Global Cleantech 100; a list of the top 100 private companies in clean technology. The company was recognised as one of the World Economic Forum's Technology Pioneers for 2011.⁷

Case Study: Magna-NRC Composite Centre of Excellence

Magna International, the largest automotive supplier in North America, has partnered with the National Research Council (NRC) of Canada to create a Composite Centre of Excellence in Concord, Ontario. Innovation in automotive manufacturing has created demand for lighter, safer, more durable, more affordable, environmentally friendly and fuel efficient vehicles with a higher composite content. The R & D centre is equipped with leading-edge moulding equipment for thermoplastic composites, facilitating the development of lightweight and durable automotive parts using composites such as direct long fibre thermoplastics and sheet moulding compounds.

LEADING CANADIAN COMPANIES

- ABC Group
- Agrium
- Canexus Corporation
- Canuck Compounders
- Chemtrade Logistics
- ERCO Worldwide
- GreenField Ethanol
- Intertape Polymer Group
- IPL
- Methanex Corporation
- NOVA Chemicals
- Ostara Nutrient Recovery Technologies
- Raymore Industries
- Royal Building Products
- ShawCor
- Wentworth Tech
- Wipak
- The Woodbridge Group

⁴ I/Di Intelligence estimates based on United States Patent and Trademark Office (2012)

⁵ Canada Revenue Agency, Income Tax Interpretation Bulletin, Scientific Research and Experimental Development Expenditures (2003)

⁶ Statistics Canada, Business enterprise research and development (BERD) characteristics, by industry group based on the North American Industry Classification System (NAICS), NAICS 325: Chemical manufacturing (includes pharmaceuticals); and 3261: Plastic product manufacturing (2011)

⁷ Empowering People and Transforming Society, The World Economic Forum's Technology Pioneers 2011

Canada's chemicals and plastics industry

TESTIMONIALS

"LANXESS chose to invest in Canada because of its highly qualified and talented workforce, its innovative R & D centres and commitment to producing next-generation products."

Axel Heitmann
Chairman, LANXESS

"[Canada] provides a supportive business environment with an excellent base for innovative and collaborative research; therefore it was a good fit for our first overseas research and development centre, with close proximity to North America and European markets. We are confident this partnership will help us achieve our broader corporate objective of delivering innovative products based on solid scientific research to our customers."

Sanjaya Mariwala,
Managing Director, OmniActive Health Technologies

The chemicals and plastics industry contributed nearly \$20 billion to the Canadian economy in 2011⁸ and accounted for 158,600 direct jobs.⁹

In 2010, chemicals and plastics accounted for over 13% of value added in Canadian manufacturing, with revenue growth in both sectors higher than the manufacturing industry average.¹⁰

Chemicals

Canadian chemical manufacturing exports totalled over \$31 billion in 2011¹¹ and the industry contributed \$12.9 billion to Canadian gross domestic product (GDP).¹² By 2020, chemical production in Canada is forecast to increase by 27%; a higher rate than the predicted growth in the U.S. and Western Europe.¹³ Canada's expertise spans across the oil and gas extraction, mining and refining industries, petrochemical production (including natural gases and lubricants), biochemicals, agricultural chemicals and fertilizers, and the manufacture of synthetic resins, adhesives, sealants, paintings and coatings.

Plastics

The plastics industry contributed \$6.4 billion to the Canadian economy in 2011, an increase of 2.6% on the previous year.¹⁴ Export growth in the sector was nearly 10% in 2011, with export revenues worth over \$7 billion.¹⁵ Key uses include motor vehicle parts, plastic bags, films and sheet plastics, as well as aerospace components, wind turbines, and building products for civil and industrial infrastructure.

CANADA'S KEY STRENGTHS IN CHEMICALS AND PLASTICS

Abundant raw materials

With the third largest reserves of oil and the seventh of gas worldwide, as well as a large petroleum refining industry, Canada provides abundant and low-cost feedstocks for the petrochemical industry. Canada is also the world's third largest producer of hydroelectricity¹⁶, providing investors with low-cost, reliable renewable energy. Abundant minerals and biomass are also available across the country, making Canada a top investment choice for the organic chemicals, inorganic chemicals and plastics sectors.

Access to large, nearby markets

By locating in Canada, chemicals and plastics producers are within one day's trucking distance of 190 million consumers, over 55% of the North American population-based market and 60% of its polymer processing market.¹⁷ The Canada-U.S. Joint Border Action Plan breaks down regulatory barriers in order to maintain an efficient manufacturing sector, while producers located in western Canada can also easily access Asian markets through the Asia-Pacific Gateway Corridor.

⁸ Statistics Canada, Gross Domestic Product by Industry, 2002 to 2011, NAICS 325: Chemical manufacturing (includes pharmaceuticals); and 3261: Plastic product manufacturing (2011)

⁹ Statistics Canada, CANSIM, Table 281-0024, Employment (SEPH), NAICS 325: Chemical manufacturing (includes pharmaceuticals); and 3261: Plastic product manufacturing (2011)

¹⁰ Canadian Industry Statistics, Manufacturing Revenues and Manufacturing Value-Added, NAICS 325: Chemical manufacturing (includes pharmaceuticals); and 3261: Plastic product manufacturing (2010)

¹¹ Industry Canada, Trade Data Online, Trade by Industry, NAICS 325: Chemical Manufacturing (includes pharmaceuticals) (2011)

¹² Statistics Canada, Gross Domestic Product by Industry, 2002 to 2011, NAICS 325: Chemical Manufacturing (includes pharmaceuticals) (2011)

¹³ American Chemical Council, Global Chemicals Outlook 2012, p.14

¹⁴ Statistics Canada, Gross Domestic Product by Industry, 2002 to 2011, NAICS 3261: Plastic product manufacturing (2011)

¹⁵ Industry Canada, Trade Data Online, Trade by Industry, NAICS 3261: Plastic product manufacturing (2011)

¹⁶ International Energy Agency, Key World Energy Statistics, 2012, p.19

¹⁷ Chemicals in Canada, Business case 2012, p.2

Extensive infrastructure

Canada has an extensive pipeline system for hydrocarbons with large salt storage caverns for raw materials. Numerous industrial parks for the chemicals and plastics industries across Canada offer investors an attractive site location, excellent transport links and cost savings. Industrial parks are well-connected and provide shared infrastructure, including pipeline connections as well as road, rail, air, and sea links, storage facilities, existing industrial space and waste treatment facilities. Industrial parks are often located close to existing raw materials (e.g. polymer plants, refineries, and extractive industries), support services (e.g. engineering), and customers.

R & D and government support

Canada's research capabilities in the chemicals and plastics industries are supported by low costs and generous R & D tax treatment that is more favourable than in the U.S. and most other OECD countries; and various industry-specific R & D programs are available to investors. Canada is effectively a free trade zone, having committed to eliminating all tariffs on manufacturing inputs and machinery and equipment by 2015.

New developments

Canada's extensive pipeline system is growing, providing additional opportunities for growth in the petrochemical and polymer industries. Key developments include Alberta's first large scale carbon dioxide capture and distribution system, and a new pipeline linking the nearby Marcellus Shale Basin to Sarnia, Ontario. Large shale gas resources are already under development in British Columbia and Alberta, with more coming in other provinces including New Brunswick.

In the inorganic chemical sector, Canada is poised to play a large role in the growth of the global potash industry. German fertilizer supplier K+S Group is building a potash mine in Saskatchewan to take advantage of the province's massive proven reserves, with planned annual capacity of 2.86 million tonnes of potassium chloride by 2023.¹⁸

Canada's massive agricultural base offers new opportunities for biochemicals and biofuels production:

- Enerkem Alberta Biofuels, a waste-to-biofuels producer, is producing methanol and ethanol from municipal waste supplied by the City of Edmonton.
- BioAmber, a biochemicals manufacturer, has announced plans for its first commercial-scale bio-succinic acid plant in Sarnia, Ontario. Some of the succinic acid will be converted into 1,4-butanediol (BDO) using technology licensed from E.I. du Pont de Nemours.

SKILLS AND RESEARCH

Canada employs over 81,000 people in the chemicals sector and over 77,000 in plastics.¹⁹ Canada is equipped with a highly skilled labour force for the chemicals industry; the industry is the most knowledge intensive manufacturing industry in Canada, having the largest proportion of workers with tertiary education.²⁰

The country has a world-class higher education system with 22 Canadian universities ranked in the top 500 universities worldwide.²¹ Canadian universities offer programs in chemistry and chemical engineering at undergraduate, graduate and PhD levels, and eight Canadian universities rank among the top 200 universities for chemistry.²² Canada has expertise in chemicals and plastics research with a number of specialized institutes, programs and research groups including:

- Sustainable Chemistry Alliance (Sarnia, ON)
- Centre for Advanced Coatings Technologies (University of Toronto – Toronto, ON)
- Centre for Advanced Polymer Processing and Design (McMaster University – Hamilton, ON)
- Composites Research Network (University of British Columbia – Vancouver, BC)
- Sustainable Technologies for Energy Production Systems Network (Regina, SK)
- Alberta Centre for Surface Engineering and Science (University of Alberta – Edmonton, AB)
- Institute for Advanced Materials (McGill University – Montréal, QC)

¹⁸ K-plus-s.com, Expansion of potash capacities, Green Light for Legacy Project in Canada, 2011

¹⁹ Statistics Canada, CANSIM, Table 281-0024, Employment (SEPH), NAICS 325: Chemical manufacturing (includes pharmaceuticals); and 3261: Plastic product manufacturing (2011)

²⁰ Statistics Canada, 2006 Census, Total labour force by highest certificate, diploma or degree, 2006

²¹ Shanghai Jiao Tong University, Academic Ranking of World Universities 2011

²² Shanghai Jiao Tong University, Academic Ranking of World Universities 2011

Chemicals and plastics clusters

BRITISH COLUMBIA

Key strengths:

Chemicals: There are 362 chemical companies²³ in British Columbia, with a workforce of over 4,500 people.²⁴ Chemical manufacturing exports totalled \$974 million in 2011.²⁵ Western Canada is well located to access Asian markets, and investors locating in British Columbia can profit from Port Metro Vancouver, Canada's largest and busiest port.

Plastics: There are 268 plastic companies in British Columbia,²⁶ and plastic exports totalled \$291.7 million in 2011.²⁷ British Columbia supports a large number of companies in plastic bottle manufacturing due to its sizeable food and beverage processing industry.

Leading companies:

Chemicals: Canexus Corporation, ERCO Worldwide, FMC Corporation, Ironwood Clay Company, Methanex

Plastics: Aqua-Pak, Columbia Plastics, Layfield Flexible Packaging, Portola Packaging, Royal Building Products

ALBERTA

Key strengths:

Chemicals: There are 355 chemical companies²³ in Alberta, with a workforce of over 7,200 people.²⁴ Chemical manufacturing exports totalled \$7.4 billion in 2011.²⁵ Principal sub-sectors are petrochemicals, fertilizers, inorganic chemicals and specialty and fine chemicals. The province is committed to adding value to its oil sands reserves through development of its petroleum and petrochemical refinery technologies, with incentive schemes such as the Bitumen Royalty-In-Kind (BRIK) Program and Incremental Ethane Extraction Program. Alberta has production capacity for methanol, ethylene, polyethylene, ethylene glycol, and linear olefins, with growing opportunities in this area.

Plastics: There are 205 plastics companies²⁶ in Alberta with plastic product exports that totalled \$219.6 million in 2011.²⁷ Alberta's natural gas reserves and derivatives are used to produce commodity-grade thermoplastic resins, used to make plastic bags, bottles and pipes.

Leading companies:

Chemicals: Agrium, Alberta Envirofuels, Canadian Fertilizers, Celanese, Dow Canada, Enerkem Alberta Biofuels, ERCO Worldwide, INEOS, MEGlobal, Methanex, NOVA Chemicals, Orica, Shell Canada

Plastics: Ingenia Polymers, FLAIR Flexible Packaging, Plasti-Fab, Ply Gem

SASKATCHEWAN

Key strengths:

Chemicals: There are 51 chemical companies²³ in Saskatchewan, with a workforce of over 1,200 people.²⁴ Chemical manufacturing exports totalled \$1.02 billion in 2011.²⁵ Saskatchewan specializes in chemical production using local potash and agricultural waste as a feedstock; PotashCorp, located in Saskatoon, is the world's largest fertilizer enterprise by capacity.

Plastics: There are 33 plastics companies²⁶ in Saskatchewan, with plastic product exports that totalled \$25 million in 2011.²⁷

Leading companies:

Chemicals: Agrium, AkzoNobel, Chemtrade Logistics, ERCO Worldwide, K+S Potash Canada, Mosaic, PotashCorp, Yara International

Plastics: Premium Spray Products Canada, Royal Building Products, WD Plastics



MANITOBA

Key strengths:

Chemicals: There are 89 chemical companies²³ in Manitoba, with a workforce of over 2,900 people.²⁴ Chemical manufacturing exports totalled \$911 million in 2011.²⁵ Manitoba offers low cost electricity and natural gas to its developing inorganic chemical cluster. Canexus' Manitoba facility is the largest sodium chlorate producer in the world. Manitoba is also home to Koch Fertilizer Canada, a subsidiary of Koch Fertilizer LLC, one of the world's largest producers and marketers of fertilizers.

Plastics: There are 99 plastics companies²⁶ in Manitoba, with plastic product exports that totalled \$272.6 million in 2011, of which film, sheet and bag manufacturing exports accounted for \$182 million.²⁷ Winnipeg is home to the corporate office of Winpak, a global manufacturer of packaging materials for use in the food, beverage, and pharmaceutical industries.

Leading companies:

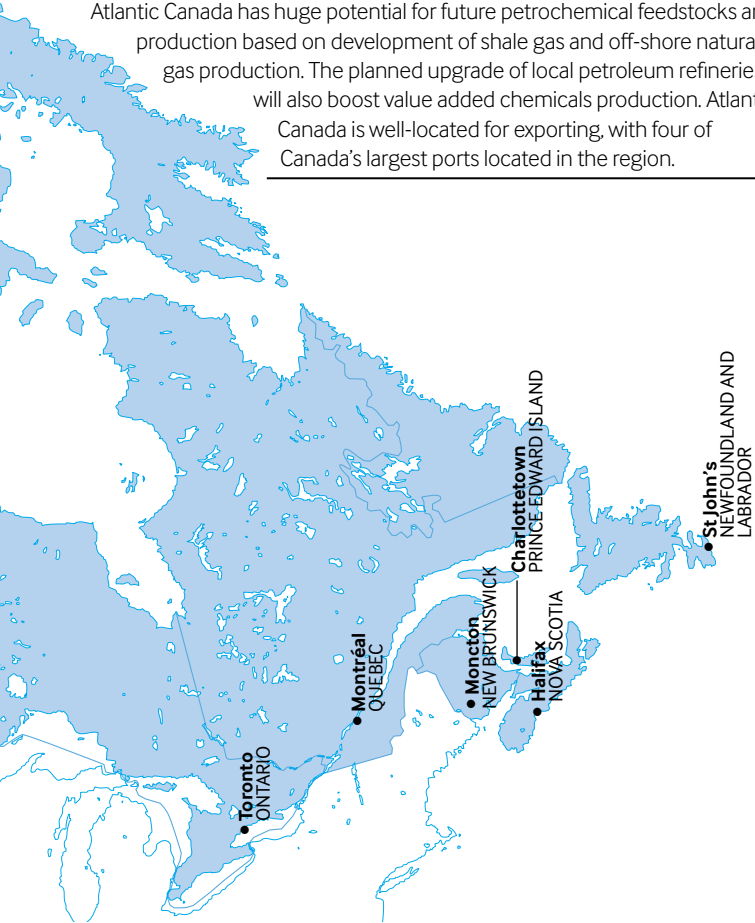
Chemicals: Apotex Fermentation, Canexus Corporation, Koch Fertilizer Canada, Monsanto Canada, Guertin Coatings, Sealants and Polymers

Plastics: Acrylon Plastics, Color Ad Packaging, Jeld-Wen of Canada, Melet Plastics, Polar Ray-O-Max Windows Canada, Reliance Products, Winpak

ATLANTIC CANADA

Key strengths:

Chemicals: There are 110 chemical companies²³ in Atlantic Canada whose manufacturing exports totalled nearly \$200 million in 2011.²⁵ Although natural gas and Liquefied Natural Gas (LNG) are readily available, Atlantic Canada has huge potential for future petrochemical feedstocks and production based on development of shale gas and off-shore natural gas production. The planned upgrade of local petroleum refineries will also boost value added chemicals production. Atlantic Canada is well-located for exporting, with four of Canada's largest ports located in the region.



Plastics: There are 80 plastic companies²⁶ in Atlantic Canada, and plastic product exports totalled \$195.3 million in 2011.²⁷

Leading companies:

Chemicals: Akcros Chemicals, BioVectra, Corridor Resources, Imperial Oil, Irving Oil, SWN Resources Canada

Plastics: Baileys Plastic Fabrication, Concept Plastics, Exco Automotive Solutions, Northeast Equipment, PolyCello, RPS Composites

ONTARIO

Key strengths:

Chemicals: There are 1,229 chemical companies²³ in Ontario, with a workforce of over 42,000 people.²⁴ Chemical manufacturing exports totalled \$16.4 billion in 2011.²⁵ Chemical companies from around the world have operations in Ontario, including seven of the top ten global players. Ontario is Canada's largest chemical producer, with products spanning the entire value chain. Clusters in Sarnia, the Greater Toronto Area (GTA) and Eastern Ontario offer crude oil and petroleum refineries, NGL fractionation capacity, natural gas pipelines, Natural Gas Liquids (NGL), and allied manufacturing plants. Ontario's chemical industry is also actively exploring bioindustrial opportunities.

Plastics: Ontario is a hub for Canada's plastics industry with a substantial customer base. There are 1,101 plastics companies²⁶ in Ontario employing nearly 40,000 people.²⁸ Plastic products exports totalled \$4.7 billion in 2011.²⁷ Over 60% of North American vehicle manufacturing and over half of North American packaging markets are located in Ontario and the northeast U.S. Eastern Canada's plastics cluster includes resin producers, masterbatch suppliers, merchant compounders, mould makers, and machinery suppliers.

Leading companies:

Chemicals: BASF Canada, Bayer, The Canadian Salt Company, Dow Canada, DuPont Canada, Imperial Oil, INVISTA, Jungbunzlauer, LANXESS, National Silicates, NOVA Chemicals, Shell Canada, Unilever

Plastics: ABC Group, IPEX, Horizon Plastics, Royal Building Products, Vision Group, Wentworth Tech, The Woodbridge Group

QUEBEC

Key strengths:

Chemicals: There are 834 chemical companies²³ in Quebec, with a workforce of 21,000 people.²⁴ Chemical manufacturing exports totalled \$4.4 billion in 2011.²⁵ Quebec's petrochemicals industry is centred around Montréal, and major petrochemical firms specialize in aromatics, cosmetics and personal care products, paints, coatings and adhesives.

Plastics: Quebec is home to a strong plastics industry with 644 plastics companies²⁶ that account for nearly one quarter of Canada's plastics producers²⁹ and employment in plastics production.³⁰ Plastic products exports totalled \$1.4 billion in 2011.²⁷ Quebec's plastics industry primarily serves the packaging, building materials, and transportation (automotive) markets.

Leading companies:

Chemicals: Arkema Canada, Canexus Corporation, CEPESA Química, ERCO Worldwide, Kronos, Olin, Raymor Industries, Selenis Canada, St-Jean Photochemicals, Süd-Chemie

Plastics: Camoplast Solideal, MAAX, Intertape Polymer Group, IPL, Plastik MP

²³ Canadian Industry Statistics (CIS), Number of Establishments in Canada by Type and Region: December 2011, NAICS 325: Chemical manufacturing (includes pharmaceuticals)

²⁴ Employment data: Statistics Canada: Employment (SEPH), unadjusted for seasonal variation, by type of employee for selected industries classified using the North American Industry Classification System, NAICS 325: Chemical manufacturing (includes pharmaceuticals) (2011)

²⁵ Industry Canada, Trade Data Online, Trade By Industry, NAICS 325: Chemical manufacturing (includes pharmaceuticals) (2011)

²⁶ Canadian Industry Statistics (CIS), Number of Establishments in Canada by Type and Region: December 2011, NAICS 3261: Plastics product manufacturing

²⁷ Industry Canada, Trade Data Online, Trade by industry, NAICS 3261: Plastics product manufacturing (2011)

²⁸ Statistics Canada: Employment (SEPH), unadjusted for seasonal variation, by type of employee for selected industries classified using the North American Industry Classification System, NAICS 3261: Plastics product manufacturing (2011)

²⁹ Statistics Canada, Canadian Business Patterns Database, 2011

³⁰ Canadian Plastics Industry Association, 2012

Canada's cost advantages

ADVANTAGE: COMPETITIVE SALARY COSTS

The cost of salaries paid to chemical engineers and highly skilled production operatives in Canada is lower than cities in the U.S., Germany and the Netherlands.

Annual labour costs of a chemical engineer and a production operative (\$)

This table shows the annual labour costs for a chemical engineer and a production operative (highly skilled). Labour costs include employee salary plus statutory employer social security contributions. Private healthcare costs are also included for U.S. and Canadian cities.

| City | Chemical engineer (\$) | Production operative – highly skilled (\$) |
|---------------------|------------------------|--|
| Saint John | 103,100 | 54,419 |
| Lyon | 107,078 | 52,037 |
| Rotterdam | 111,726 | 50,919 |
| Montréal | 111,729 | 55,186 |
| Saskatoon | 119,004 | 55,245 |
| Winnipeg | 119,200 | 56,361 |
| Halifax | 121,647 | 55,628 |
| Vancouver | 125,568 | 56,196 |
| Edmonton | 127,400 | 56,461 |
| Berlin | 131,824 | 67,277 |
| Toronto | 132,452 | 57,688 |
| Antwerp | 133,089 | 70,001 |
| Calgary | 137,970 | 57,993 |
| Sarnia | 138,223 | 58,838 |
| Dusseldorf | 143,539 | 69,159 |
| Detroit | 148,452 | 56,550 |
| Minneapolis | 153,330 | 56,343 |
| Tokyo | 159,743 | 49,742 |
| Houston | 163,676 | 56,923 |
| Northern New Jersey | 176,506 | 59,490 |

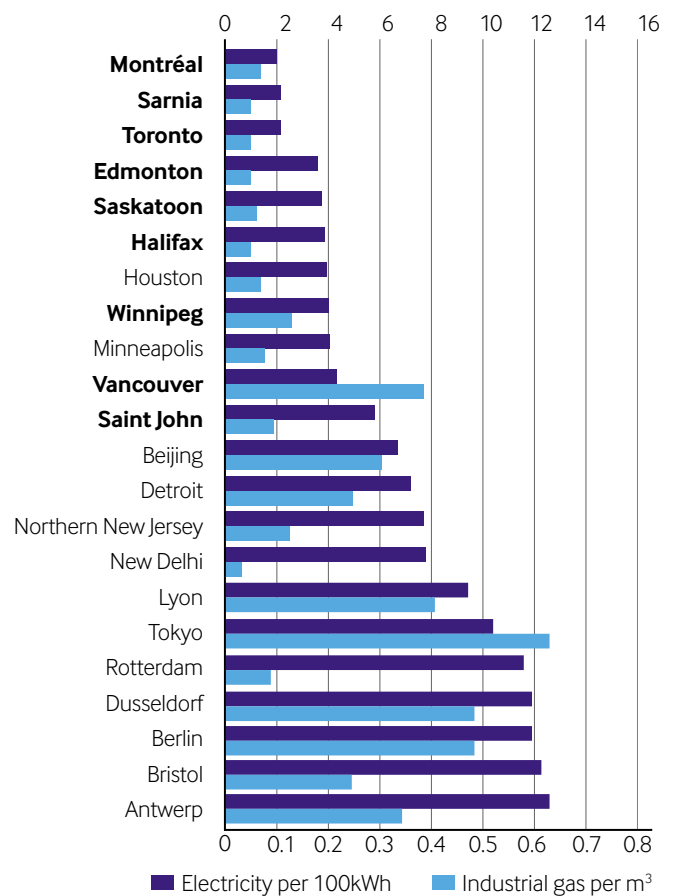
Source: fDi Benchmark Database, fDi Intelligence from the Financial Times Ltd (2012)

ADVANTAGE: MOST COMPETITIVE UTILITY COSTS

Electricity costs in Canada are less than half of the U.S. and even cheaper when compared to Japan and Europe. Natural gas costs are less than the U.S., Japan and Europe. This creates substantial cost savings for companies.

Utility costs per unit (\$)

This table shows unit costs for industrial electricity and gas.



Source: Eurostat, US Energy Information Administration and major energy providers (2011-2012)

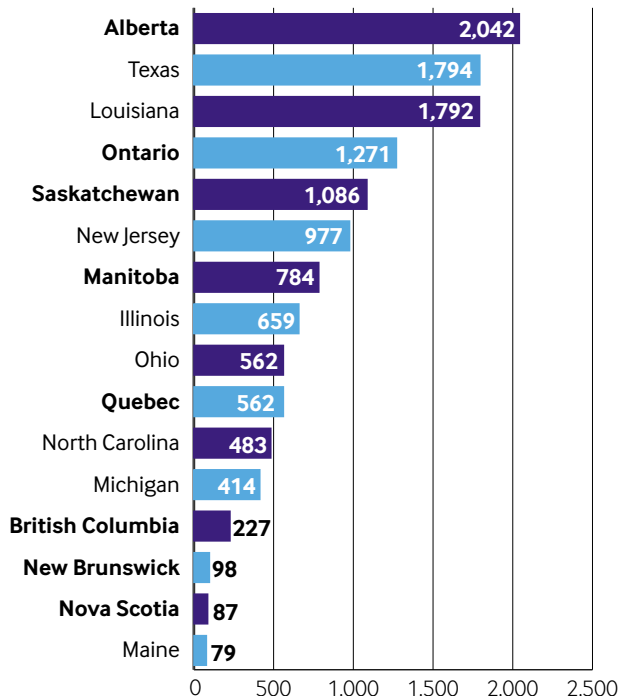
Canada's competitive advantages

ADVANTAGE: A LEADING EXPORTER OF CHEMICALS

In 2011, Canadian chemical manufacturing exports totalled US\$31.6 billion – an increase of 17% from 2010.³¹ The U.S. remains the primary market for Canadian chemical manufacturing exports, accounting for almost 80% of total Canadian chemical manufacturing exports in 2011. On a per capita basis, Canada (US\$946) has exported more than the U.S. (US\$628).

Chemical manufacturing exports per capita (US\$)

This chart shows total chemical manufacturing exports on a per capita basis in Canadian provinces and U.S. states.



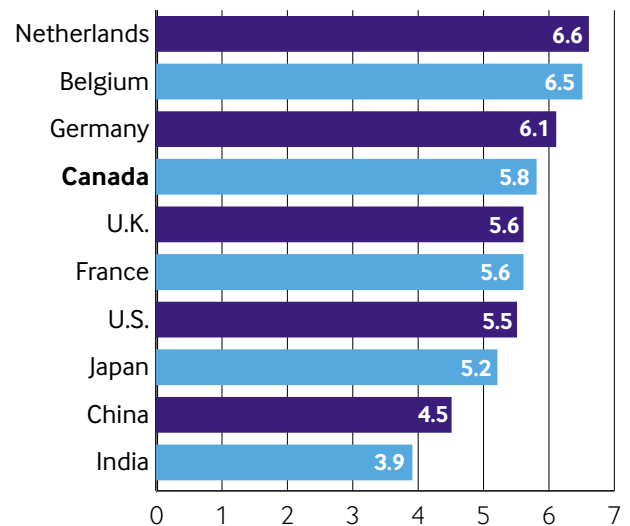
Source: fDi Intelligence based on Industry Canada – Trade Data Online and TradeStats Express (NAICS 325: Chemical Manufacturing – includes pharmaceuticals)

ADVANTAGE: HIGHLY DEVELOPED PORT INFRASTRUCTURE

Canada's port infrastructure is ranked 14th in the world according to the World Economic Forum's Global Competitiveness Report. Canada is ranked above France, the UK and the U.S. Major ports include Vancouver, Montréal, Halifax, Port Cartier, Sept-Îles/Pointe-Noire, Saint John and city of Québec.

Port infrastructure quality

This chart shows the port infrastructure quality. (1=extremely underdeveloped, 7=well developed and efficient by international standards).



Source: World Economic Forum Global Competitiveness Report 2011-2012

³¹ Industry Canada, Trade Data Online – Trade by Industry NAICS code 3251-3253; 3255-3259 (2011)

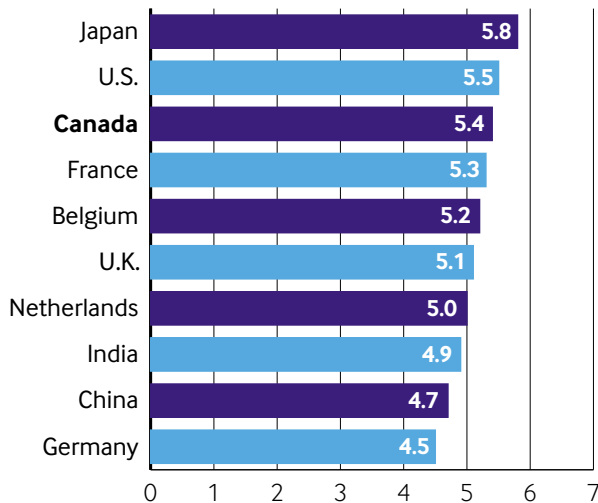
Canada's competitive advantages

ADVANTAGE: AVAILABILITY OF SKILLED LABOUR FORCE

According to corporate executives, Canada has a supply of skilled labour for chemicals operations, ranking seventh globally in the World Economic Forum's Global Competitiveness Report for its availability of scientists and engineers.

Availability of scientists and engineers

This chart shows the availability of scientists and engineers. (1 = non-existent, 7 = widely available).



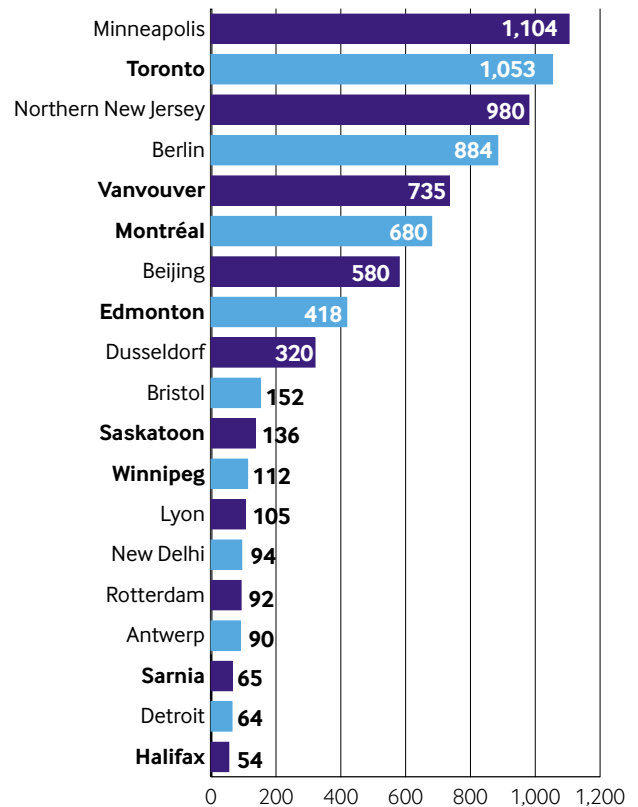
Source: World Economic Forum Global Competitiveness Report 2011-12

ADVANTAGE: CHEMICAL INNOVATION

Canadian cities have very high levels of research and innovation in the chemical sector, as reflected by the number of chemical patents granted in Canadian cities.

Number of patents in chemicals

This chart shows the estimated number of chemical related patents granted between 2003 and 2011 by the United States Patent and Trademark Office to researchers based in each city.



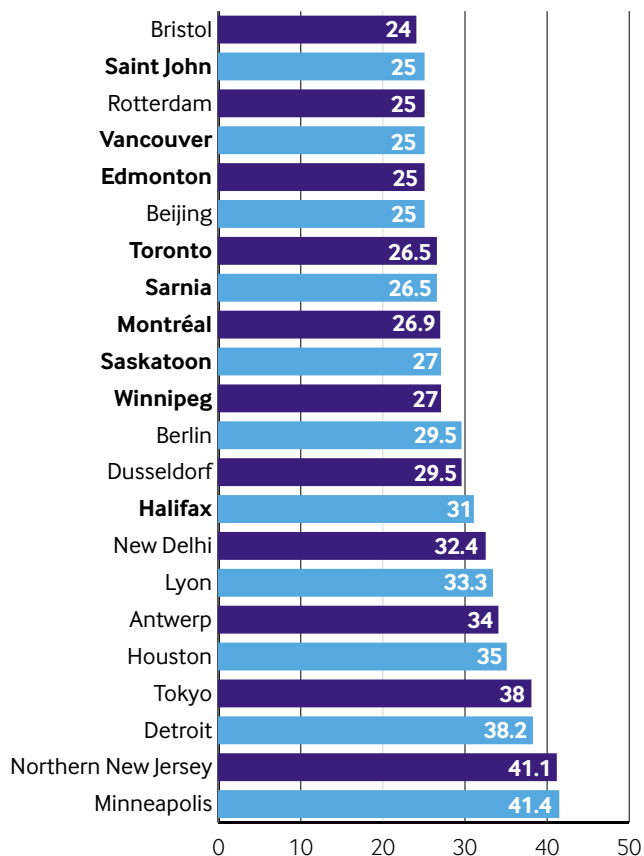
Source: fDi Intelligence estimates based on the United States Patent and Trademark Office (2012)

**ADVANTAGE:
FAVOURABLE CORPORATE INCOME TAX**

Canada offers among the most attractive corporate income tax levels of any comparable country. Companies locating in Canadian cities can expect to pay lower corporate income taxes than in the U.S., Japan, Belgium, France, and India.

Corporate tax (%)

This chart shows the corporate income tax rates payable by companies. Figures are expressed as tax payable as a percentage of companies' gross profit.



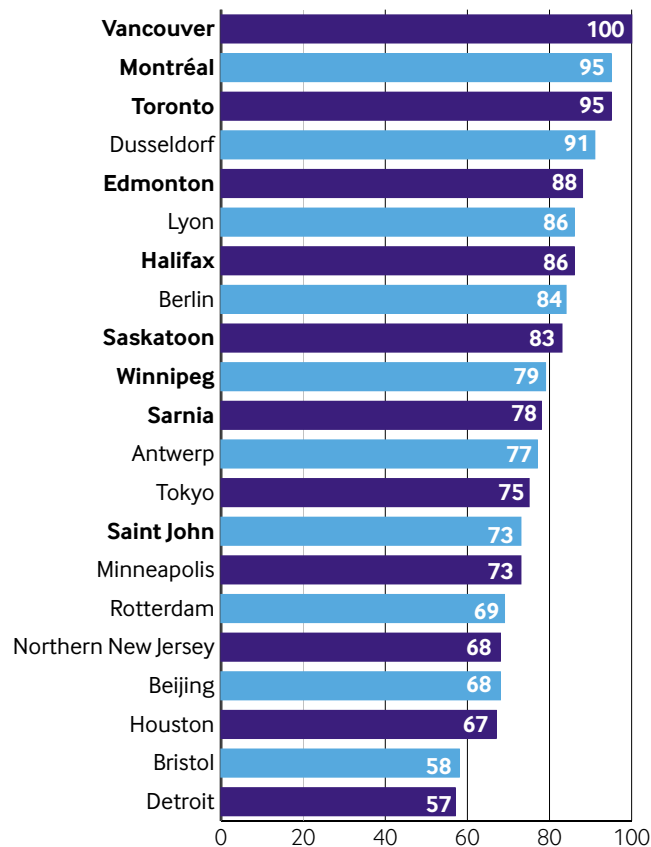
Source: KPMG (Countries and Canadian Provinces; 2012) and Tax Foundation (U.S. States; 2011)

**ADVANTAGE:
OUTSTANDING QUALITY OF LIFE AT AN
AFFORDABLE COST**

Canadian cities offer the highest quality of life in the world. Vancouver was rated the most liveable city in the world by the Economist Intelligence Unit in 2011 and also tops the fDi Intelligence index. Canadian cities are highest ranking when considering both quality of life and cost of living.

Attractiveness of cities

This chart shows the overall attractiveness of cities based on combining their quality of life and cost of living, with a 50% weight attached to each.



Source: fDi Intelligence from the Financial Times (2011). Vancouver = 100

Invest in Canada to achieve global excellence

A welcoming business environment

Canada is the best country for business in the G-20.

Source: Forbes Magazine, November 2012

A strong growth record

Canada led all G-7 countries in economic growth, on average, over the past decade (2002 – 2011).

Source: World Bank

A highly educated workforce

Canada's workforce is the most highly educated among members of the Organization for Economic Co-operation and Development (OECD), with half of its working-age population having a tertiary level education.

Source: Education at a Glance 2012, OECD

Financial stability

For the fifth consecutive year, the World Economic Forum has declared Canada's banking system to be the soundest in the world.

Source: Global Competitiveness Report 2012-2013, World Economic Forum (WEF)

Low business costs and tax rates

Canada's combined federal-provincial statutory general corporate income tax rate of 26% is below the level of most other G-7 countries, and about 13 percentage points lower than that of the United States.

Source: Department of Finance Canada and the OECD Tax Database 2012

Scientific research and experimental development

Canada offers one of the most generous R & D tax incentives in the industrialized world, with combined federal and provincial credits that can currently save firms, up to 30 cents on a dollar invested in R & D in Canada. R & D-intensive sectors in Canada also enjoy the lowest costs in the G-7, with a cost advantage that is 10.7 per cent lower than that in the United States.

Source: Department of Finance Canada and KPMG Competitive Alternatives, 2012

NAFTA

The North American Free Trade Agreement (NAFTA) gives investors access to a vast lucrative market of nearly 461 million consumers and a combined continental GDP of about US\$18 trillion. Canada is the first among G-20 members to make itself a tariff-free zone for manufacturers by eliminating tariffs on manufacturing inputs and machinery and equipment.

Source: World Bank, World Development Indicators Database, 2012, and Department of Finance Canada

A great place to invest, work, and live

In 2011, Canadians enjoyed the second highest standard of living in the G-20, as measured by gross domestic product (GDP) per capita, according to the World Bank. Along with being one of the most multicultural countries in the world, home to world-class universities, offering a universal health care system and clean and friendly cities, Canada ranked second among G-7 countries in 2011 on the United Nations Human Development Index.

Source: Statistics Canada; United Nations Human Development Report, 2011; World Bank

TESTIMONIAL

"Canada has a very competitive corporate tax rate and governments that are supportive of business -- two key factors in Cytec's recent decision to expand its Canadian operations."

René Lemay

Site Manager, Cytec Canada



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