2009

Invest in Canada
INDUSTRIAL CHEMICALS

Canada

CHEMICA

CANADIAN INDUSTRIAL CHEMICALS SECTOR

RECENT INVESTMENTS IN CANADA

- Minnesota-based **3M Company** invested more than $28 million in Ontario in its 2007 manufacturing expansion.
- In 2007, **LANXESS** of Germany invested US$100 million to expand its manufacturing operations in Ontario and increase its butyl rubber production capacity.
- In 2008, Norway's **Renewable Energy Corporation** announced the construction of a $1.2 billion plant in Quebec to produce polysilicon.
- Anglo-Dutch **Royal Dutch Shell** expanded its multibillion dollar manufacturing operations in Alberta in 2007.

MAJOR GLOBAL INVESTORS IN CANADA

BASF AG

E.I. DuPont de Nemours and Company

ExxonMobil

Hexion

Ineos

LANXESS

Shell Chemicals

The Dow Chemical Company

LEADING CANADIAN COMPANIES

Agrium Inc.

ERCO Worldwide

Methanex Corpoation

NOVA Chemicals Corporation

Petro-Canada

Raymor Industries Inc.

The global chemicals industry represents shipments worth approximately US$2.1 trillion annually and engages an estimated workforce of over 7 million people worldwide. North American output is worth US$525 billion annually, representing approximately 25 percent of global sales.

The chemicals industry is Canada's third-largest manufacturing industry in terms of exports. In the last decade, Canadian chemical exports have more than doubled, reaching $32 billion in 2008.[1] During the same period, industrial chemicals exports have grown at a rate of 6.2 percent per year, climbing to $18.4 billion in 2008. Nine of the ten largest chemical companies in the world have operations located in Canada.

The industrial chemicals subsector comprises 590 firms and employs more than 18,400 people in Canada. At the same time, Canada's research and development (R&D) expenditures in this area amounted to $197 million in 2007.

Key Capabilities

The Canadian petrochemical and resins industry represents a significant segment, with shipments of $20.5 billion and exports of $13.4 billion in 2008 produced by 350 manufacturing establishments. Substantial reserves of natural gas have provided a readily available source of competitively priced feedstock and allowed for low-cost production of ethylene and its derivatives. Large and efficient extracting plants, modern ethylene crackers, and derivative plants that are among the largest in the world, have also enabled Canada to obtain important economies of scale. The development of northern gas reserves and the use of materials produced by the upgrading of oil sands bitumen could provide new feedstock sources for the manufacturing of petrochemicals and resins.

Inorganic chemicals. Canada's abundant natural resources and access to large quantities of reliable, low-cost electricity, which are essential for the production of many inorganic chemicals, make it a top choice in this segment.

Biotechnology is increasingly being used to create organic chemicals. Some of these chemicals are commercially produced from biomass feedstocks such as corn, soy and wheat. As technologies based on the use of biowaste become more viable, Canada is well positioned to become a key player given the resources provided by its large agricultural and forest industries.

Environmental action. Industry, governments and non-governmental organizations in Canada have a strong record of working collaboratively to achieve the desired environmental or health outcome in a manner that also recognizes the need for industry to remain internationally competitive. Voluntary actions on the part of industry have also proven to be successful in achieving a desired outcome. For example, members of the Canadian Chemical Producers' Association have been voluntarily reducing and reporting on their emissions to the environment for the past 15 years. Over that time the industry has shown dramatic reductions in a wide range of emissions to air, land and water.

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Unless otherwise noted, all values are in Canadian dollars.

1 Statistics Canada 2008.

Ontario

Ontario is Canada's largest chemical producer, its leading petroleum-refining region, the hub of the nation's plastics industry and home to seven of the ten largest chemical companies. Total chemical industry shipments for Ontario were valued at $21.4 billion in 2007, with petrochemicals and other industrial chemicals representing nearly $10 billion.

Sarnia is Canada's largest cluster of chemical, allied manufacturing and R&D facilities. This region offers well-developed infrastructure for petrochemical production, providing large underground salt storage caverns, nearby petroleum refineries, access to natural gas liquids feedstocks, a tanker terminal for offshore shipments, excellent transportation networks and access to crude oil and oil-based liquids. Companies with manufacturing facilities in Sarnia include Dow Chemical Canada, Imperial Oil, INVISTA, NOVA Chemicals and Shell Canada.

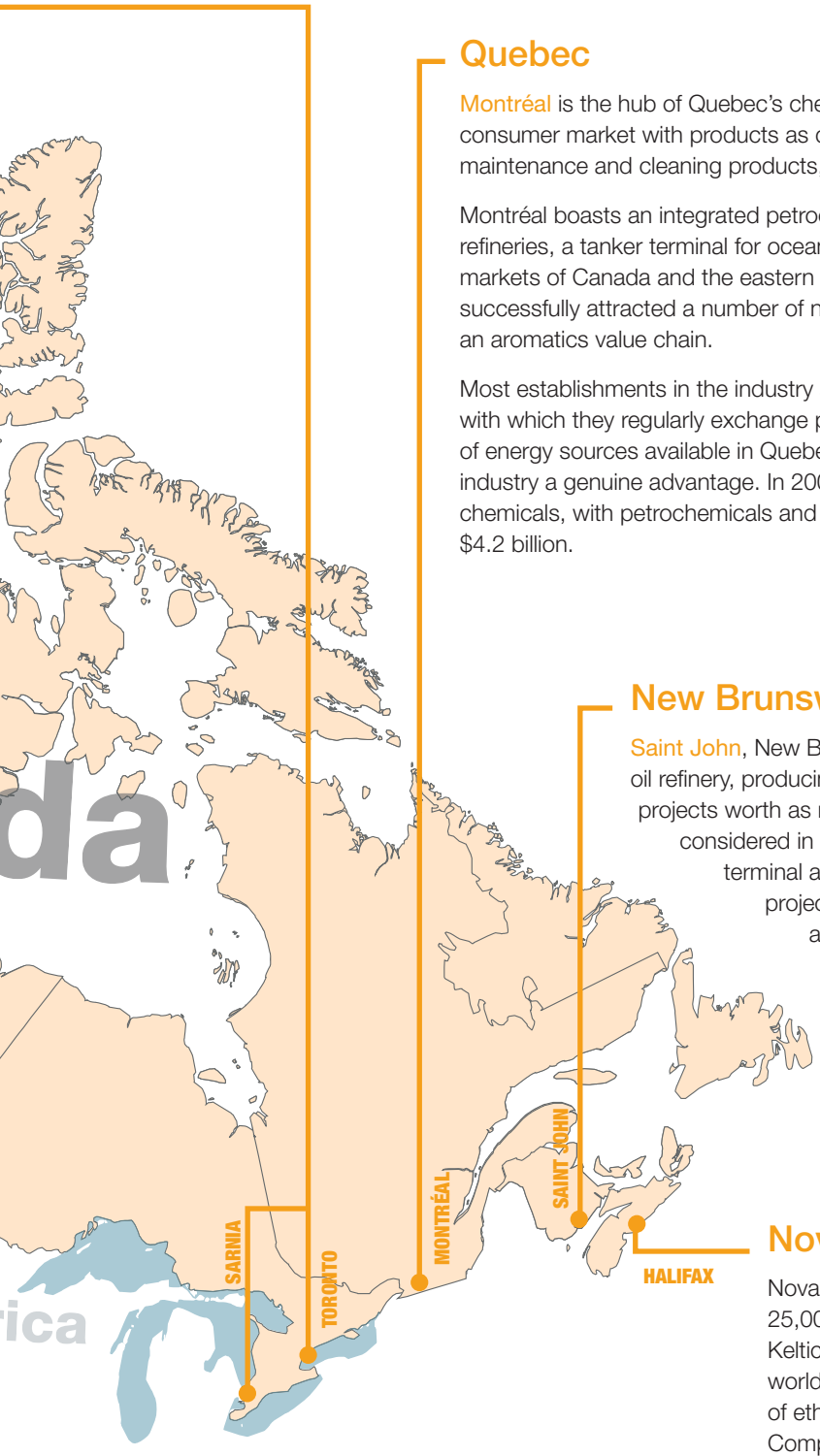
Toronto hosts a variety of chemical companies that produce lubricants, paints, medical gases, laundry detergents, adhesives and more. As a thriving business and financial centre, Toronto is also the location for the Canadian corporate headquarters of industry leaders such as Bayer, BASF, DuPont Canada and Unilever.

Alberta

Alberta is the largest petrochemical manufacturing region in Canada. The industry employs more than 7,700 people and is home to two of the largest petrochemical plants in the world. The province's industrial chemicals industry, which includes petrochemicals, accounted for shipments of $10.7 billion and exports of $6.2 billion in 2007.

Alberta's chemical industry has four main segments: petrochemicals, fertilizers, inorganic chemicals, and specialty and fine chemicals. The petrochemical industry in Alberta continues to grow, with substantial increases in production capacity for ethylene, polyethylene, ethylene glycol and linear olefins.

The provincial government is working closely with industry to build the business case for increasing the value of its oil sands reserves by moving up the value chain into refined petroleum products and petrochemicals, in order to meet the growing North American and international demand. By developing an integrated upgrading, refining and petrochemical complex within the Edmonton region, Alberta is poised to become one of the largest and most competitive chemical producing regions in the world.



Quebec

Montréal is the hub of Quebec's chemical industry, which supplies the consumer market with products as diverse as adhesives, textiles, paint, maintenance and cleaning products, electronics and cosmetics.

Montréal boasts an integrated petrochemical cluster that offers petroleum refineries, a tanker terminal for ocean shipments and close access to the large markets of Canada and the eastern and central United States. The region has successfully attracted a number of new investments in recent years, building an aromatics value chain.

Most establishments in the industry are located close to the refining industry, with which they regularly exchange products and raw materials. The diversity of energy sources available in Quebec stabilizes prices, which gives the industry a genuine advantage. In 2007, Quebec shipped $9.5 billion of chemicals, with petrochemicals and other industrial chemicals accounting for $4.2 billion.

New Brunswick

Saint John, New Brunswick is home to Canada's largest, most modern oil refinery, producing some of the cleanest fuels in North America. Major projects worth as much as $20 billion are currently under way or being considered in New Brunswick, including a new liquefied natural gas terminal and supporting pipeline, a significant refurbishment project at NB Power's Point Lepreau generating station, a new potash mine in Sussex and potentially the construction of a second oil refinery and a second nuclear generating station. These new projects are helping the province create the right conditions to attract investments in the industrial chemicals sector.

Nova Scotia

Nova Scotia's manufacturing labour force taps into the 25,000 employees working in the natural and applied sciences field. Keltic Petrochemicals is currently assessing a new $4.5 billion world-scale petrochemical complex in Nova Scotia that could consist of ethylene, polyethylene, propylene and polypropylene plants. Companies affiliated with Keltic are also considering an adjacent cogeneration plant and a receiving terminal for liquefied natural gas.

CHEMICA

METHODOLOGY

This benchmarking study assesses the competitiveness of a number of Canadian clusters against competing international business locations. Based on an investor's perspective, the research and analysis uses a representative investment project prototype (an operation that manufactures polypropylene—see profiles on page 5) to assess criteria that corporate decision makers typically examine when evaluating location alternatives for foreign investment.

This international location benchmarking exercise was conducted by IBM-Plant Location International (IBM-PLI), a renowned global location consultancy. IBM-PLI performed objective research to assess the comparative cost and quality of doing business in various locations, simulating the approach used by investors when screening candidates for corporate investment projects. The benchmarking study examined 250 to 300 financial and qualitative location indicators in the assessment of each industry subsector.

To assess the quality of a location's operating business environment, data were collected from a variety of sources for the different subfactors in each of the categories featured in the operating environment table (page 5). Data for the qualitative assessment were translated into comparable scorings (zero to 10) for each category and subfactor using a weighted scoreboard approach. Weights were assigned to each location category and subfactor to demonstrate their relative importance in the location selection process. These weights are specific to each industry subsector and are based on IBM-PLI's experience in helping investors make strategic decisions when choosing locations.

A high-level financial analysis was also conducted to take into account major location-sensitive investment and operating costs and revenues for each representative project profile. Cash flow projections have been calculated and discounted over a 10-year period, incorporating anticipated inflation rates, to determine their net present value, and to assess the profitability of the project in each of the benchmarked locations.

» benchmarking the comparative cost and quality of doing business in global locations

Shell Canada's Jumping Pound Gas Complex (Alberta, Canada)

INVESTMENT LOCATION BENCHMARKING

REPRESENTATIVE PROJECT PROFILE

GENERAL DESCRIPTION OF OPERATIONS

Manufacturing of polypropylene.

KEY PROJECT DRIVERS

- » Presence of industry base
- » Reliability of power supply
- » Highway and network congestion
- » Proximity to key markets
- » Presence of experienced petrochemical industry manufacturing employees
- » Presence of petrochemical-related student population

OPERATING COST ANALYSIS PROJECT REQUIREMENTS FOR FINANCIAL MODELLING

LABOUR

(HEADCOUNT = 125)

Skilled Operators: 87

Lab Technicians: 8

Engineers: 8

Management and Administration: 22

MACHINERY AND EQUIPMENT

C$ 200,000,000

SALES

C$ 100,000,000

PROPERTY

Land: 12 acres

Building: 200,000 sq. ft.

UTILITIES

Power:

(Monthly Consumption) 2,150,000 kWh

Gas:

(Monthly Consumption) 10,000 Mcf

OPERATING ENVIRONMENT

GENERAL BUSINESS ENVIRONMENT » 5%*	» Economic and financial stability; » Political stability; » Quality of support from local government & development agencies; » Business permitting procedures; » Availability of financial support & incentives
LOCAL POTENTIAL TO RECRUIT SKILLED STAFF » 20%*	» Presence of experienced petrochemical employees, including manufacturing related; » Presence of student population; » Overall size of labour pool; » Overall tightness in the labour market (unemployment)
PRESENCE OF INDUSTRY/CLUSTER » 30%*	» Presence of industry base; » Market proximity; » Importance of R&D
FLEXIBILITY OF LABOUR & REGULATIONS » 5%*	» Industrial relations/attitude of unions; » Hiring & firing flexibility; » Working time regulations; » Work permits
INFRASTRUCTURE & COMMUNICATIONS » 30%*	» Reliability of power supply; » Highway network & congestion; » Quality & reliability of IT & telecommunications; » Public transport
REAL ESTATE » 5%*	» Availability of large industrial sites
LIVING ENVIRONMENT » 5%*	» Cost of living; » Attractiveness for young international recruits; » Attractiveness for expatriates

NOVA Chemicals petrochemical facilities in Corunna (Ontario, Canada)

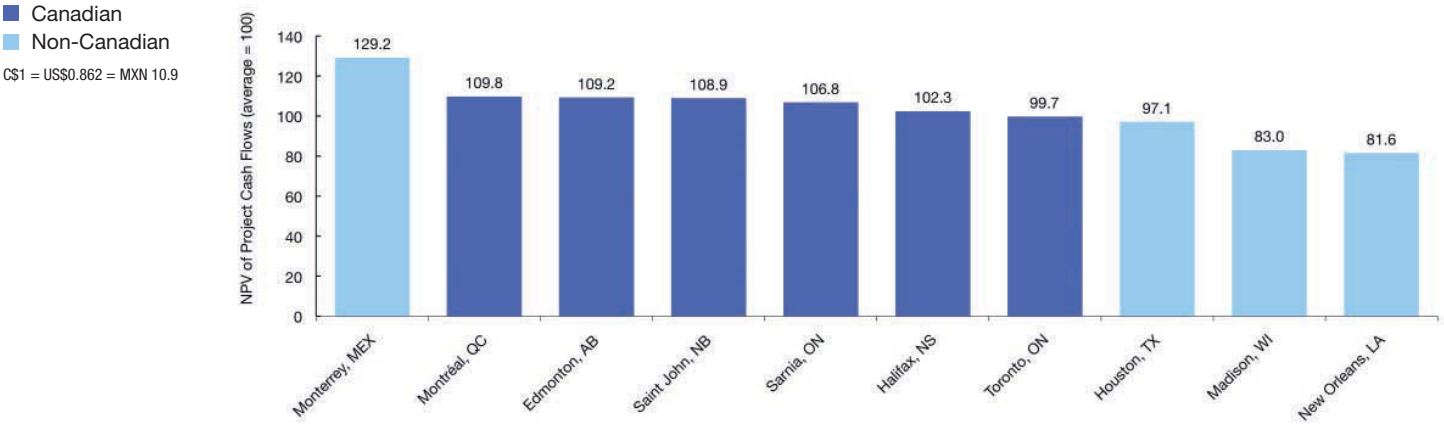
*Factor category weight; corresponding location factors are ranked in order of importance.

Polyethylene film processing, NOVA Chemicals

CANADA'S VALUE PROPOSITION

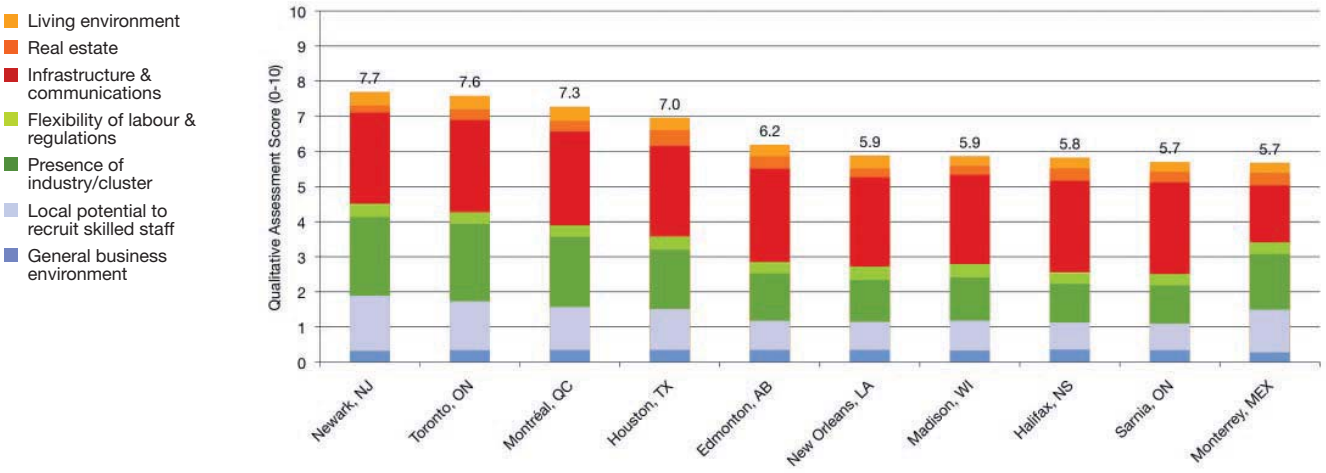
Canada is home to large and mature industrial clusters offering strong qualitative operating environments and very attractive operating costs with good profit levels. Smaller emerging clusters also offer appealing high-profitability investment opportunities in Canada.

COST ASSESSMENT*



According to IBM-PLI's location benchmarking study, Canadian cities offer a significant cost advantage compared to U.S. locations. Among locations with large and mature chemicals clusters, Montréal and Edmonton's profitability levels are the most appealing, though Saint John, Sarnia, Halifax and Toronto also offer higher profitability levels than any of their U.S. counterparts. Canada's cost advantage can be attributed to lower labour costs, low corporate tax rates and utility costs.

QUALITATIVE ASSESSMENT OF OPERATING ENVIRONMENT*

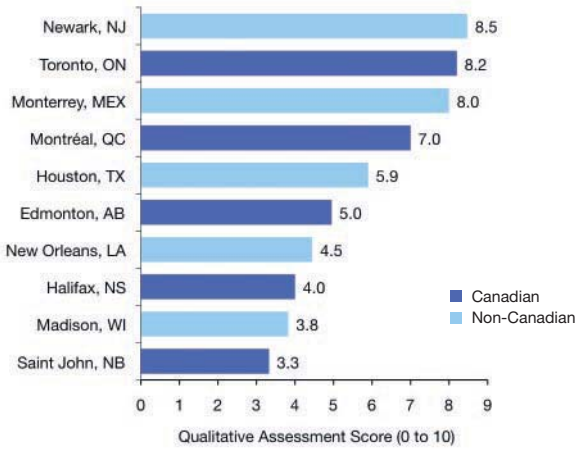


Canada offers foreign investors compelling advantages in location and logistics, coupled with a strong manufacturing base in the chemicals industry. Large and medium-sized Canadian locations provide attractive operating environments, primarily due to their size and concentration of the specialized resources required for the chemicals sector. Overall, based on the qualitative assessment score, Canada's two largest cities, Toronto and Montréal, together with Edmonton, rank among the top five North American locations analysed, while Halifax and Sarnia place in the top ten.

*Unless otherwise noted, graphs represent IBM-PLI assessment scores.

CANADA'S VALUE PROPOSITION

Market proximity (highest-ranking cities)*



Markets of opportunity

Proximity to market is a key consideration for industrial chemical companies looking to invest or expand their operations. Taking into account the representative prototype, this benchmarking study evaluates the number of petroleum product wholesaler-distributors available in the vicinity of the potential petrochemical facility, as well as the presence of relevant manufacturing firms that represent a potential market. Among North American locations assessed, five Canadian locations rank in the top 10.

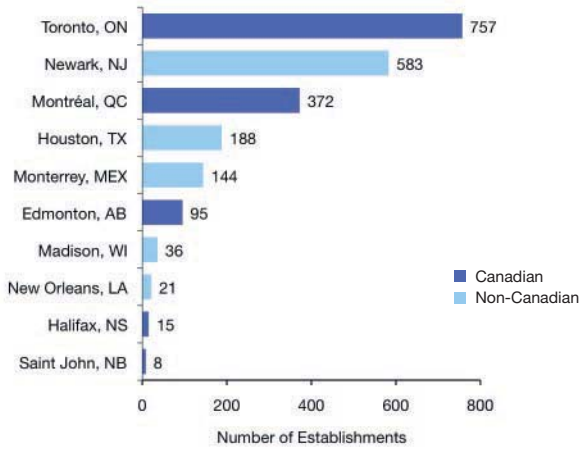
Indeed, Canada's industrial chemical sector provides a diverse manufacturing base that offers important cross-sector advantages, supplying critical components for use in a broad range of industries, including large automotive and aerospace sectors.

A solid industry base

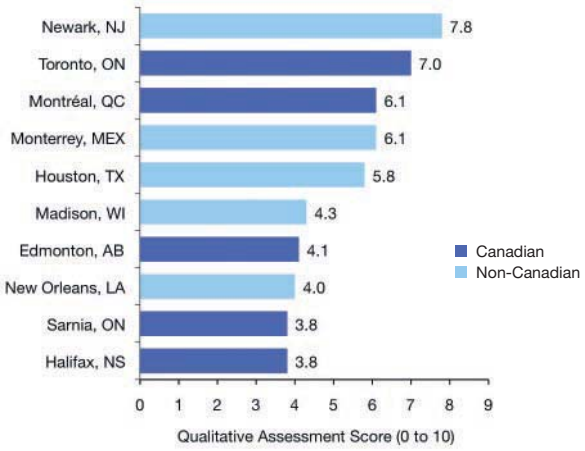
Canada's industrial chemical sector ultimately feeds into, and benefits from, related manufacturing, including a $19.7 billion plastics industry. In fact, Canada is home to nearly 2,700 plastics companies, including numerous small and medium-sized enterprises as well as many local and multinational companies located in Ontario and Quebec.

Canada's proximity to the United States also contributes to the scale of the Canadian chemical industry. As a member of the North American Free Trade Agreement (NAFTA), Canada is the preeminent gateway to the vast U.S. market, the ultimate destination for 80 percent of Canada's consumer and industrial chemicals and 90 percent of its plastics exports.

Number of establishments classified as plastic product manufacturing (highest-ranking cities)**



Qualitative assessment of potential to recruit staff (highest-ranking cities)*



A skilled and motivated workforce

Canada is home to an exceptionally well-educated, talented and diverse workforce. Canada is first in the world when it comes to higher education and third in the world for secondary school enrolment, far ahead of its North American Free Trade Agreement partners, the United States (26th) and Mexico (53rd).[2]

The benchmarking study reveals that most of the Canadian locations analyzed also offer a large talent pool with skills in the industrial chemicals sector. In absolute numbers, Toronto and Montréal rank highly, having a solid base of experienced employees and a specialized student population. As a mature chemical cluster, Edmonton also provides a large labour force with relevant skills, while Sarnia ranks among the strongest locations in North America, when considering concentration of workforce in this industry.

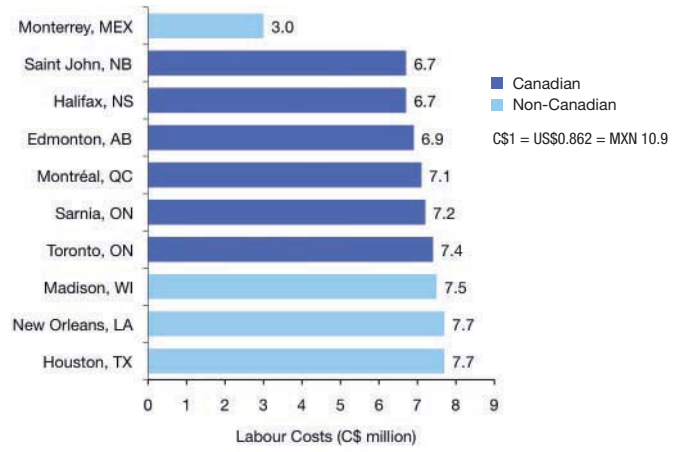
*Unless otherwise noted, graphs represent IBM-PLI assessment scores. **Statistics Canada, US Census Bureau, Mexican National Statistics Agency. 2 IMD World Competitiveness Yearbook 2007.

Advantageous labour costs

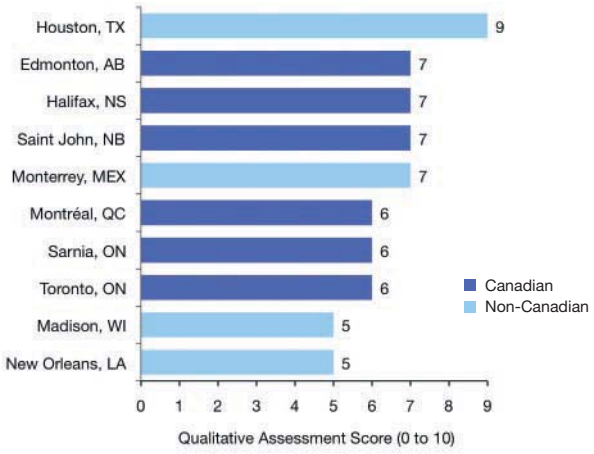
Labour costs for employees working in Canada's industrial chemicals sector are very competitive with those from other clusters in advanced economies. All six Canadian cities assessed in this study rank among the most attractive cost options within North America, led by the Atlantic cities of Halifax and Saint John.

An important component of Canada's labour cost advantage relative to the United States stems from the lower costs of providing employee benefits. Canada's national healthcare system implies that most medical insurance costs are publicly funded, rather than paid by the employer, resulting in significant savings.

Estimated annual labour costs (highest-ranking cities)**



Availability of large industrial sites (highest-ranking cities)*



Availability of large industrial sites

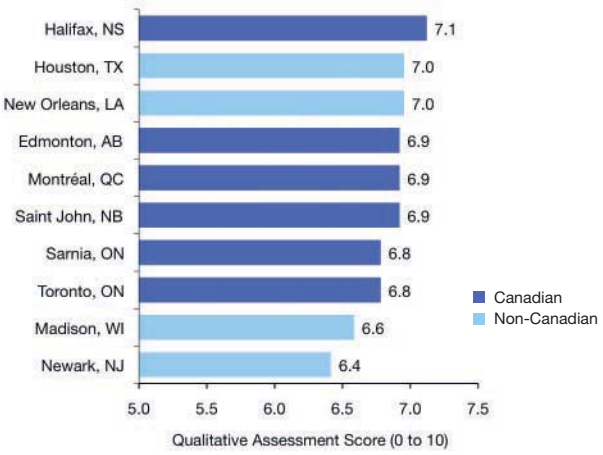
The availability of land suitable for the development of chemical processing and manufacturing plants proves to be a strong asset for all of the Canadian cities evaluated in this study when compared to other locations within North America. Canada also offers competitive land and construction costs, making locations such as Saint John, Halifax and Sarnia some of the most affordable investment locations in North America.

A conducive business environment

Thanks to its solid and dynamic economy, low corporate tax rates, quality support from local governments and development agencies, business permitting procedures, privacy regulations, information security, and protection of intellectual property rights, Canada has fostered a business environment that allows companies to invest and flourish.

As the leader in GDP growth among G7 countries over the last decade, and with the world's soundest banking system,[3] Canada provides a stable and strong business environment that offers tremendous growth potential and peace of mind for business investment. In fact, all Canadian cities evaluated obtain high marks in this assessment, which is based on measures published by the IMD, the Economist Intelligence Unit and the World Economic Forum. Halifax ranks particularly well because of its very supportive local development network.

General business environment (highest-ranking cities)*



*Unless otherwise noted, graphs represent IBM-PLI assessment scores. ** IBM-PLI calculations based on Watson Wyatt 2007/2008 & Economic Research Institute (ERI) 2008.
3 World Economic Forum Global Competitiveness Report 2008-2009, October 2008.

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Catalogue Number FR5-38/9-2009E-PDF
ISBN Number 978-1-100-12051-5

Dupont chemical plant (Ontario, Canada)