



MACHINERY MANUFACTURING

Canada's competitive advantages



Innovation in Canada

Canada is a world-leading centre for research and innovation in industrial manufacturing equipment. Innovation networks and capability include:

- NSERC's¹ Canadian Network for Research and Innovation in Machining Technology has the world's most advanced virtual machining technology (VMT), which enables the manufacture of innovative products without resorting to costly physical trials.
- National Research Council Industrial Materials Institute (NRC-IMI) performs R&D on advanced materials and manufacturing technologies. R&D activities include greener materials and manufacturing processes, lightweight materials and advanced technologies, and composites.
- Preliminary gross domestic expenditure on R&D in Canada in 2011 is \$30 billion, one of the highest levels in the world².

INNOVATION CASE STUDIES

Laser Depth Dynamics

Laser Depth Dynamics is a spin-off company of PARTEQ Innovations, focusing on the development of industrial laser depth control equipment for major manufacturing sectors, including automotive and aerospace. The optical measurement technology was developed by two physicists at Queen's University in 2012. It provides a way to measure, in real time, how far into a material (metal, semiconductors, plastics, or even tissue) a laser beam has penetrated.

Alstom

In 2011, France-based Alstom opened its Global Technology Centre located in Alstom's North American hydro headquarters in Quebec. The centre will serve as the company's global hub for innovation in hydro retrofit processes and technology. Alstom staff will work with industry and academic partners to focus on methods that expand the lifecycle of existing plants and increase generating output through the retrofitting and updating of existing equipment.

Dieffenbacher

Dieffenbacher, a German multinational company, has a major facility in Windsor which produces machines required for a proprietary, highly efficient production process known as Direct Long Fibre Thermoplastics (LFT-D). The process combines an innovative compounding methodology with compression moulding. Previously, Dieffenbacher satisfied global demand for LFT-D equipment through its German facilities.

LEADING CANADIAN COMPANIES

- Absolute-North Drilling Solutions
- Automation Tooling Systems
- Brandt Industries
- Buhler Industries
- CME Blasting and Mining Equipment
- Cubex
- Exco Technologies
- Foremost Industries
- Hayden Diamond Bit Industries
- Husky Injection Molding Systems
- ICP Solar
- MoldMasters
- Morris Industries
- Origin International
- QSolar
- Reko International
- Rem Enterprises
- RMS-Ross Corporation
- Samco Machinery
- ShawCor
- The Pitchard Group
- Valiant Machine & Tool

¹ Natural Sciences and Engineering Research Council (2010)

² Statistics Canada, Research and Development Expenditure (2012)



Solar photovoltaic inverter assembly line at Fronius Canada, Mississauga, Ontario.
Photo courtesy of Fronius Canada Ltd

Foreign direct investment in Canada

Canada is an attractive international destination for FDI in the machinery manufacturing industry:

- Foreign Direct Investment (FDI) in Canada's machinery manufacturing industry reached an accumulated \$5.8 billion in 2010, an increase of 75% from 2005³.
- Almost 60 foreign companies established greenfield FDI operations in machinery, metals and engines/turbines in Canada between 2003 and 2011⁴.
- 40% of these FDI projects are related to the machinery manufacturing industry⁵.

RECENT INVESTORS IN CANADA

Valvitalia

Valvitalia, an Italian manufacturer of valves and actuators for the oil and gas industry, announced that it is to establish an assembly and testing facility in Edmonton, Alberta. The facility will handle all of the company's actuator business in North and South America.

Fronius

Fronius, a large German firm, is the world's fourth largest solar inverter producer. In response to the very attractive Ontario Feed-In Tariff program, Fronius opened a Solar Electronic Division in 2010, selling its first string inverters for photovoltaic systems. In March 2011, Fronius Canada commenced the assembly of its IG Plus inverters in Mississauga, Ontario. Fronius aims to become a major player in the Canadian solar market.

Systemair AB

Systemair AB, a Swedish ventilation company, increased its capacity at its facility in Bouctouche, New Brunswick. The existing facility produces ventilation products for wholesale customers in Canada and the US.

MASABA Mining Equipment

MASABA Mining Equipment, a US-based supplier of aggregate, mining and agriculture equipment, opened a new facility in Brampton, Ontario. The new facility is required due to increased demand for MASABA equipment and services in the Canadian market.

FOREIGN INVESTORS IN CANADA

- Alstom
- Atlas Copco
- Boart Longyear
- Bosch Rexroth
- Canam Group
- Caterpillar
- CNH Global
- Crown Energy
- Dieffenbacher
- Enerflex Systems
- Eriez Minerals Flotation Group
- Flextronics
- Fronius
- Gardner Denver
- GEA Rainey Corporation
- General Electric
- Goulds Pumps
- Hitachi
- Ingersoll-Rand
- John Deere
- KukaRoboter
- Marubeni Corporation
- MASABA
- Ridder Drive Systems
- Siemens
- Snap On Tools
- Systemair
- Tesco Corporation
- Valvitalia
- Weir Canada

³ Statistics Canada (2010)

⁴ fDi Markets database, fDi Intelligence, Financial Times Ltd

⁵ fDi Markets database, fDi Intelligence, Financial Times Ltd

Machinery manufacturing industry in Canada

TESTIMONIAL

"[Canada] is an ideal location for us. Here we have access to a highly skilled workforce and are close to many of our major clients and partners. [Canada's] location on the border with the US is also an advantage for us. Establishing a plant [in Canada] is a strategic decision that we have never regretted, and which we continue to support through new investment and innovation."

Colin Folco

General manager,
for Dieffenbacher North America

Canada's machinery manufacturing industry is comprised of some 7,674 companies, with revenues of \$26.8 billion⁶.

Machinery manufacturing revenues are forecast to increase by almost 30% by 2015⁷. In 2010, the value-added of machinery manufacturing grew by 9.4%⁸. Canada exported more than \$21.5 billion⁹ of machinery manufacturing equipment in 2010, more than the US on a per capita basis¹⁰.

Canadian machinery manufacturing benefits not only from access to the US and other foreign markets; but also from very high local demand from industries such as agriculture, aerospace, automotive, chemicals, plastics, minerals, oil and gas. Canada is renowned as being a global leader in many of these industries. In 2010, total capital expenditure in machinery and equipment in Canada was estimated at \$103 billion, an increase of 2% compared to 2009. Preliminary figures are forecasting a further 7% rise in 2011¹¹.

Mining, oil and gas field machinery manufacturing

Extractive machinery is a key strength of the Canadian machinery manufacturing industry. Canada is home to the third largest oil reserves in the world, next to Saudi Arabia and Venezuela¹². Canada has the potential to double its current levels of production. The mining, oil and gas extraction industry spent approximately \$9.1 billion on machinery and equipment in 2011¹³. In 2010, exports of extractive machinery totalled \$1.8 billion.

Metalworking machinery manufacturing

Metalworking machinery manufacturing is another key strength of Canada, closely related to the strong aerospace and automotive industries. Canada is the world's sixth largest exporter of automotive products and fifth largest exporter of aerospace products¹⁴. Canada's manufacturing industry spent approximately \$14 billion on machinery and equipment in 2011, an increase of 15% from the previous year¹⁵. In 2010, Canada exported \$1.3 billion of metalworking machinery goods.

Agricultural machinery manufacturing

Canada is the world's sixth largest exporter of agricultural products, helping to drive growth and innovation in the agricultural machinery manufacturing sector. Canada is at the forefront of the sector producing 'intelligent' farming equipment, including world-class air seeders, advanced spraying systems, precision GPS seeding technologies and harvesting machinery. The agriculture industry spent approximately \$3.7 billion on machinery and equipment in 2011¹⁶. The turnover of Canada's agricultural machinery sector is \$5.63 billion per annum¹⁷. In 2010, Canada exported \$1.4 billion of agricultural machinery manufacturing goods to the rest of the world.

⁶ Industry Canada, Canadian Industry Statistics – Machinery Manufacturing (NAICS 333)

⁷ The Conference Board of Canada, Canada's Machinery Manufacturing Industry (Spring 2011)

⁸ Industry Canada, Canadian Industry Statistics – Machinery Manufacturing 333 (2011)

⁹ Industry Canada, Trade Data Online (2010)

¹⁰ fDi Intelligence estimates based on International Trade Association, TradeStats (2010)

¹¹ Statistics Canada, Capital expenditures for machinery and equipment by sector (2011)

¹² Alberta Canada, Alberta Oil Sands Industry (Quarterly Update Winter 2011/12)

¹³ Statistics Canada, Capital expenditures for machinery and equipment by sector (2011)

¹⁴ Invest in Canada, Flagship Report (2010)

¹⁵ Statistics Canada, Capital expenditures for machinery and equipment by sector (2011)

¹⁶ Statistics Canada, Capital expenditures for machinery and equipment by sector (2011)

¹⁷ Agricultural Manufacturers of Canada

CANADA'S KEY STRENGTHS

Duty-free manufacturing tariff regime

Canada is the first country in the G-20 to offer a tariff-free zone for industrial manufacturers. Canada has implemented a major new initiative that will see tariffs on all manufacturing inputs reduced to zero by 2015.

Logistics and market access

According to the World Bank, Canada has the 11th best logistics infrastructure in the world out of 155 countries¹⁸. Canada has a highly developed transport infrastructure and duty-free access to the US, Mexico and many other global markets.

Machinery-intensive industries

The Canadian economy is specialized in machinery-intensive industries – agriculture, minerals, oil and gas, utilities, construction and manufacturing (AMUCM) account for approximately 30% of GDP¹⁹ and companies in these activities spend almost \$41 billion on machinery and equipment (40% of total machinery and equipment expenditure in Canada)²⁰.

Research and development

Canada's Scientific Research and Experimental Development (SR&ED) tax incentive program is the largest R&D support program aimed at the private sector. Distinct advantages of the SR&ED program include deducting the full cost of R&D machinery and equipment²¹.

SKILLS AND RESEARCH

Canada ranks second in higher education achievement among members of the Organisation for Economic Co-operation and Development (OECD). There is a very large skilled workforce in the machinery manufacturing industry, with more than 130,000 Canadians employed in the industry²².

Canada has a world-class higher education system with 22 Canadian universities appearing in the top 500 universities of the world²³. Canada's universities offer a number of engineering programs at undergraduate, graduate and PhD level. Specialized programs include the new Master of Engineering in Design and Manufacturing, designed to advance both technical and business skills of practicing engineers.

In 2010, more than 63,000 students were enrolled in accredited engineering programs across Canada. A further 21,000 were enrolled in masters or doctoral engineering programs, an increase of 10% from 2009. A total of 11,450 undergraduate degrees in engineering were awarded in 2010²⁴, more than the US on a per capita basis²⁵. Research in the industry is led by a number of research groups, including:

- NSERC's²⁶ Canadian Network for Research and Innovation in Machining Technology
- National Research Council Industrial Materials Institute (NRC-IMI)
- Prairie Agricultural Machinery Institute (PAMI)
- Tech Futures
- Centre for Industrial Research

TESTIMONIAL

"General Electric has operated successfully in Canada for over 100 years, and we continue to grow and invest in the country. Building on a competitive corporate tax rate, a friendly business climate and great relationships with the federal and provincial governments, we have recently announced global centres of excellence and important collaborative research projects in energy, water and healthcare. For us, Canada is a country of enormous opportunity."

Elyse Allan

President and CEO,
General Electric Canada

¹⁸ World Bank, International Logistics Performance Index (2010)

¹⁹ Statistics Canada, GDP at basic prices (2010)

²⁰ Statistics Canada, Capital expenditures for machinery and equipment by sector (2011)

²¹ Invest in Canada: Do Your Research in Canada (2012)

²² Statistics Canada, Employment, Earnings and Hours (2011)

²³ Shanghai Jiao Tong University, Academic Ranking of World Universities (2011)

²⁴ Engineers Canada, Canadian Engineers for Tomorrow (2010)

²⁵ US Department of Education, National Center for Education Statistics (2010)

²⁶ Natural Sciences and Engineering Research Council

Clusters for machinery manufacturing²⁷

ALBERTA

Key strengths

Alberta has the world's third largest proven crude oil reserves and is a leader in extractive machinery and technologies. In 2010, extractive machinery exports accounted for 30% of total machinery manufacturing exports. The province is home to Tech Futures and the Centre for Welding and Joining located at the University of Alberta.

Sector size

Capital expenditure on machinery and equipment totalled \$21 billion in 2010. The machinery manufacturing industry employs 14,125 people and in 2010 exports totalled \$2.8 billion.

Leading companies

There are 1,059 machinery manufacturing companies in Alberta. Leading companies include Care Industries, Hyduke Energy Services, KUDU Industries, LJ Welding and Machine, Master Flo Valve, McCoy Corporation, Propak Systems, Risley Equipment, Standens, Thermo Design Engineering, Top-Co and Weldo-Beales Manufacturing.

BRITISH COLUMBIA

Key strengths

BC is the second largest exporter of metallurgical coal in the world²⁸, creating huge demand for extractive machinery.

Sector size

Capital expenditure on machinery and equipment totalled \$11 billion in 2010. The sector employs 9,600 people and in 2010 exports of machinery manufacturing from BC totalled \$1.2 billion.

Leading companies

There are 822 machinery manufacturing companies in BC. Leading companies include Eriez Minerals Flotation Group, RMS-Ross Corp and Tennant Company.

MANITOBA

Key strengths

Manitoba has key strengths in agriculture equipment manufacturing. In 2010, agricultural machinery exports accounted for 46% of the total machinery manufacturing exports. The province is home to the Prairie Agricultural Machinery Institute (PAMI) which conducts R&D, international standard testing and quality assurances for the sector.

Sector size

Capital expenditure on machinery and equipment totalled \$3 billion in 2010. The machinery manufacturing industry employs 4,425 people and in 2010 exports totalled \$906 million.

Leading companies

There are 222 machinery manufacturing companies in Manitoba. Leading companies include Ag Shield Manufacturing, Agri-Tec International, Buhler Industries and MacDon Industries.



SASKATCHEWAN

Key strengths

Agriculture equipment manufacturing is a key strength of the Saskatchewan economy. In 2010, agricultural machinery exports accounted for almost 70% of total machinery manufacturing exports. The Prairie Agricultural Machinery Institute in the province conducts R&D, international standard testing and quality assurances for the sector. There are two universities focused on agriculture development and technology. Canada's Farm Progress Show is the country's largest show in any industry. Almost 40% of all agriculture manufactures in Canada are in Saskatchewan with globally renowned products in dry-land zero-till farming technology.

Sector size

Capital expenditure on machinery and equipment totalled \$5 billion in 2010. The machinery manufacturing industry employs 4,180 people and in 2010 exports were \$546 million.

Leading companies

There are 379 machinery manufacturing companies in Saskatchewan. Leading companies include Brandt Industries, Flexi-Coil (CNH Global), Morris Industries and Bourgault Industries.

NEW BRUNSWICK

Key strengths

The seafood and mining sector are key strengths to New Brunswick's economy, but sectors such as aerospace, e-business, food and beverage, engineering and environmental also play an important role. In 2010 ventilation, heating, air-conditioning and commercial refrigeration equipment accounted for almost 34% of total machinery manufacturing exports.

Sector size

Capital expenditure on machinery and equipment totalled \$2 billion in 2010. The machinery manufacturing industry employs 1,145 people and in 2010 exports totalled \$49.9 million.

Leading companies

There are 88 machinery manufacturing companies in New Brunswick. Leading companies include Systemair AB, Imperial Manufacturing Group and Urban Machinery.

NEWFOUNDLAND AND LABRADOR

Key strengths

Newfoundland and Labrador has key strengths in extractive machinery manufacturing. In 2010, mining machinery exports accounted for almost 60% of the total machinery manufacturing exports in Canada.

Sector size

Capital expenditure on machinery and equipment totalled \$1 billion in 2010. The machinery manufacturing industry employs 180 people and in 2010 exports totalled \$22.3 million.

Leading companies

There are 14 machinery manufacturing companies in Newfoundland and Labrador. Leading companies include Esco Corporation.

NOVA SCOTIA

Key strengths

Nova Scotia is home to 40% of Canada's military assets, presenting opportunities for defence, security and aerospace machinery manufacturers.

Sector size

Capital expenditure on machinery and equipment totalled \$2 billion in 2010. The machinery manufacturing industry employs 1,000 people and in 2010 exports totalled \$135 million.

Leading companies

There are 65 machinery manufacturing companies in Nova Scotia. Leading companies include Michelin.

PRINCE EDWARD ISLAND

Key strengths

In 2010, engine, turbine and power transmission equipment accounted for 66% of total machinery manufacturing exports, due to the strength of the aerospace sector, which represents 30% of all exports from PEI.

Sector size

Capital expenditure on machinery and equipment totalled \$292 million in 2012. The machinery manufacturing industry employs 160 people and in 2010 exports totalled \$24.4 million.

Leading companies

There are 16 machinery manufacturing companies in Prince Edward Island. Leading companies include Honeywell.

QUEBEC

Key strengths

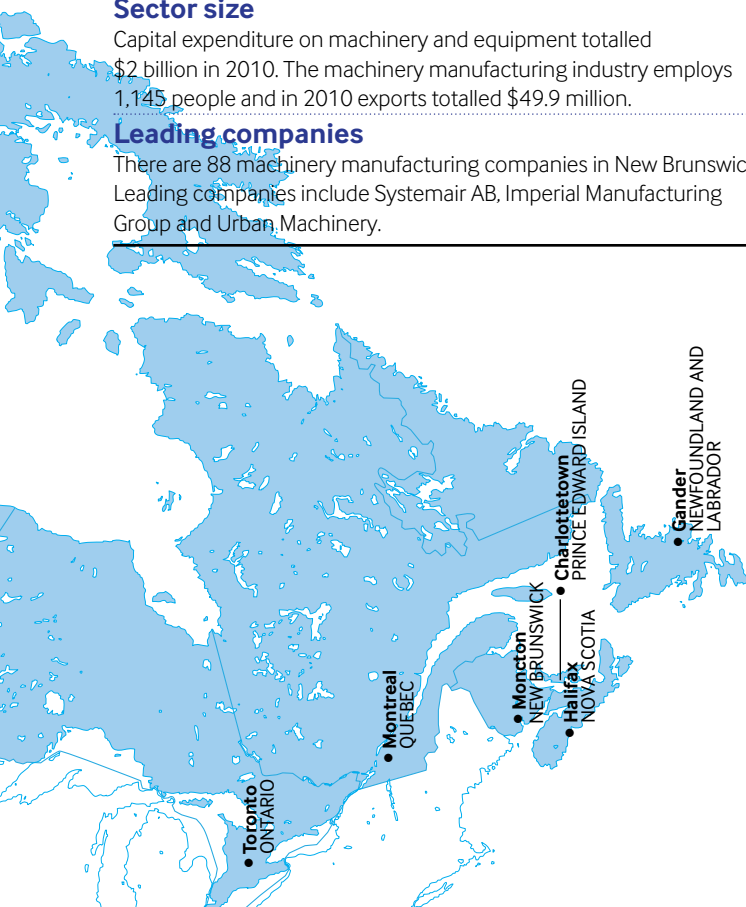
In 2010 engine, turbine and power transmission equipment account for almost 40% of total machinery manufacturing exports in Canada. The province is home to Quebec's Centre for Industrial Research, the National Research Council's Advanced Materials Design and Diagnostics laboratories (Industrial Materials Institute).

Sector size

Capital expenditure on machinery and equipment totalled \$19 billion in 2012. The machinery manufacturing industry employs 30,020 people and in 2010 exports totalled \$4.3 billion.

Leading companies

There are 1,562 machinery manufacturing companies in Quebec. Leading companies include Alstom and Gardner Denver.



ONTARIO

Key strengths

Ontario accounts for nearly half of all machinery companies and exports in Canada. The large automotive industry (Toyota, Honda, Chrysler, GM and Ford) in the province creates particularly high demand for metalworking machinery.

Sector size

Capital expenditure on machinery and equipment totalled \$38 billion in 2010. The machinery manufacturing industry employs 66,205 people and in 2010 exports totalled \$11.6 billion.

Leading companies

There are 3,593 machinery manufacturing companies in Ontario. Leading companies include Dieffenbacher, Gardner Denver, Husky Injection Molding Systems, Reko International Group and Snap-On Tools.

²⁷ Capital Expenditure on machinery and equipment from Statistics Canada Table 029-0005 (2011); Employment data from Statistics Canada – Canadian Census; Export data from Industry Canada – Trade Data Online (2010); Company data from Industry Canada (2010)

²⁸ Trade and Invest British Columbia, Natural Resources

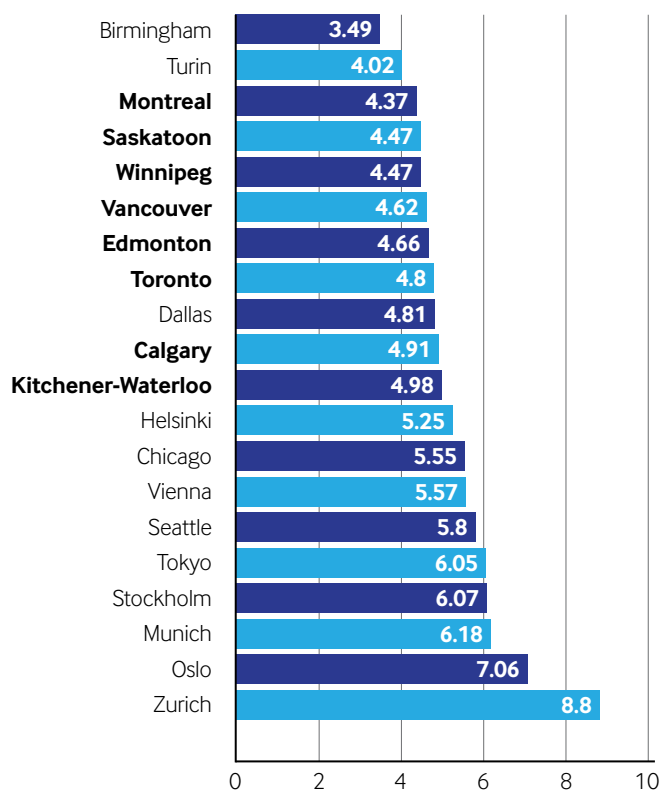
Canada's cost advantages

ADVANTAGE: LABOUR COST SAVINGS

Based on a typical machine tools and equipment manufacturing facility, Canadian cities are very cost competitive, with labour cost savings ranging from \$1 million to \$4 million per annum compared to US, Europe and Japan.

Total labour costs (\$million)

This chart shows total labour costs for a typical machine tools and equipment manufacturing facility with a total head count of 110 people. Labour costs include employee salary plus statutory employer social security contributions. Private healthcare costs are also included for US and Canadian cities.



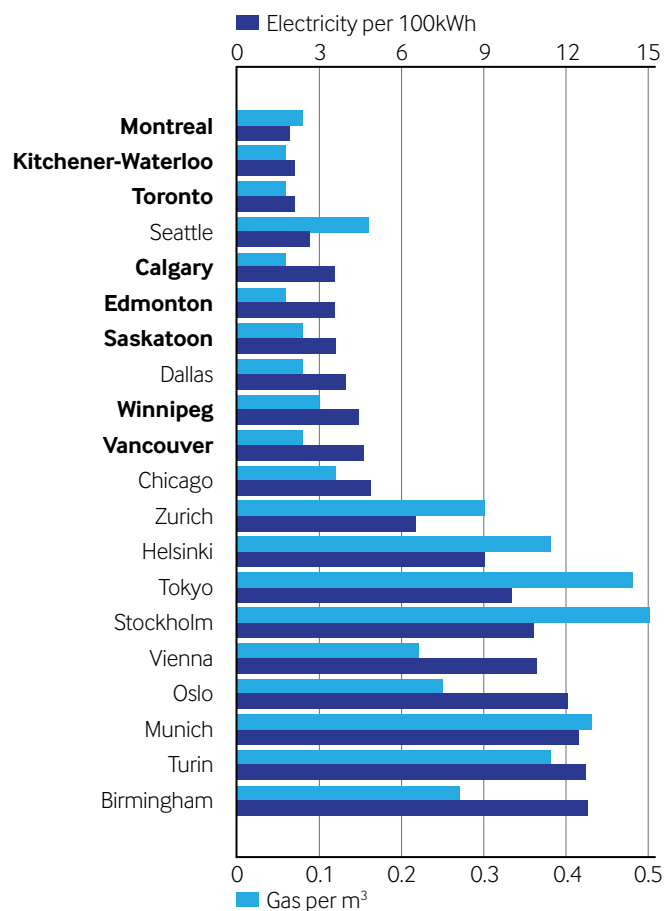
Source: fDi Benchmark Database, fDi Intelligence from the Financial Times (2012)

ADVANTAGE: MOST COMPETITIVE UTILITY COSTS

Electricity costs in Canada can be up to one-fifth of the cost of US and even cheaper when compared to Europe. Natural gas costs are less than half of the US and up to seven times cheaper than in Europe. This creates substantial cost savings for companies.

Utility costs per unit (\$)

The graph shows the unit cost for industrial electricity and gas.



Source: Eurostat, US Energy Information Administration and major energy providers (2010/2011)

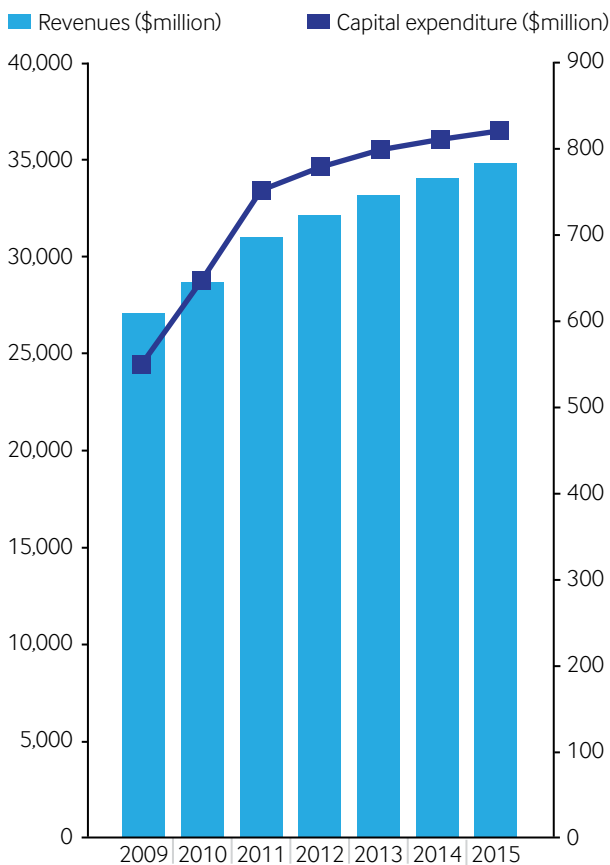
Canada's competitive advantages

ADVANTAGE: SIZE AND GROWTH OF THE MACHINERY INDUSTRY

Revenues from Canada's machinery manufacturing industry are forecast to grow by almost 30% from 2009 to 2015, reaching \$35 billion. Capital expenditure is forecast to increase by 50% over the same period.

Revenue and capital expenditure in Canada's machinery manufacturing industry

The chart shows revenue and capital expenditure in Canada's machinery manufacturing industry, for the period 2009 to 2015. Data for 2011-2015 are forecasts.



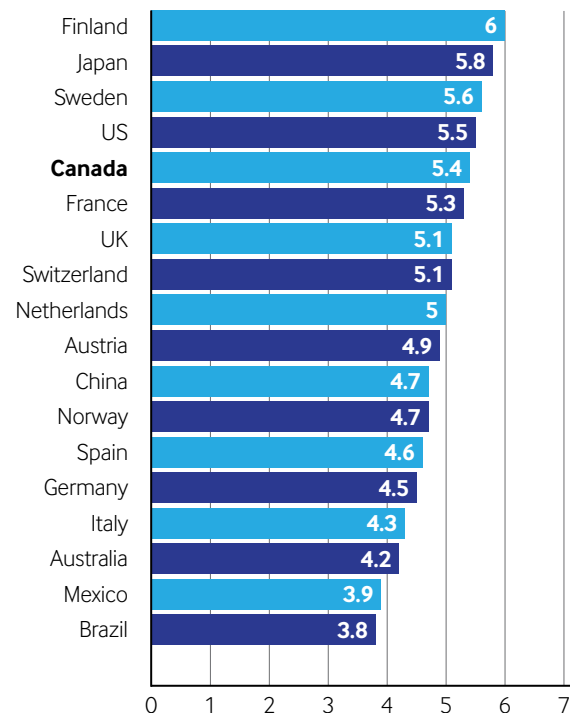
Source: The Conference Board of Canada, Canada's Machinery Manufacturing Industry (2011)

ADVANTAGE: AVAILABILITY OF SKILLED LABOUR FORCE

Canada has high availability of skilled scientists and engineers ranking seventh globally in the World Economic Forum's Global Competitiveness Report.

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

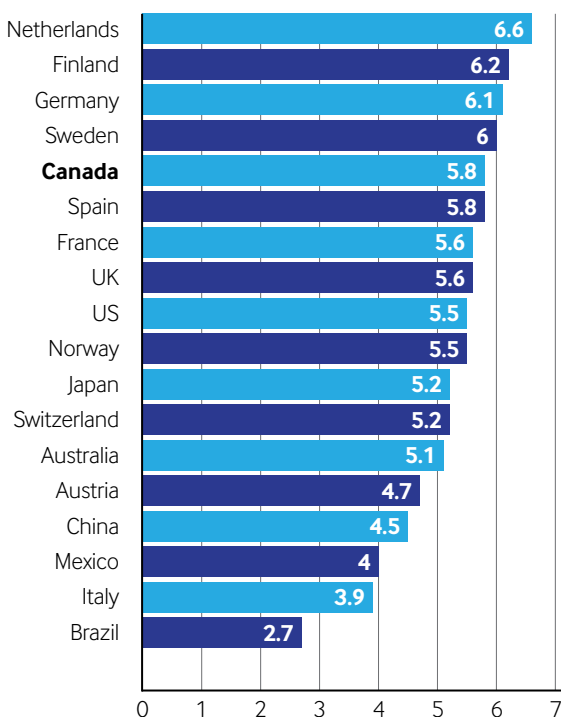
Canada's competitive advantages

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 the US and Mexico. Major ports include Vancouver, Montreal, Halifax, Port Cartier, Sept Iles/Pointe Noire, Saint John and Quebec City.

Port infrastructure quality

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



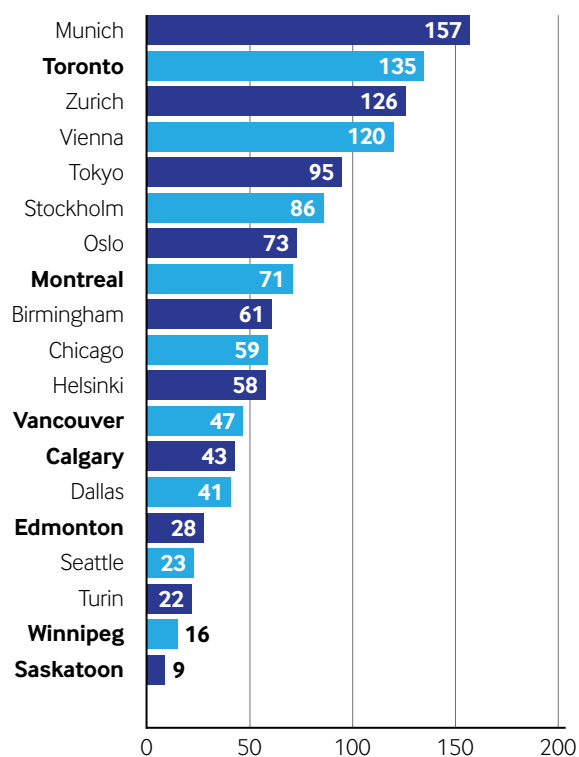
Source: World Economic Forum Global Competitiveness Report 2011-12

ADVANTAGE: ACCESS TO INTERNATIONAL MARKETS

Canada has a world-class airport infrastructure, with international airports close to most major machinery manufacturing clusters in Canada. The country's international airports in Toronto, Montreal, Vancouver and Calgary offer a large number of international connections.

Number of international destinations

This chart shows the number of international destinations served by proximate airports (within 50 mile radius of the location).



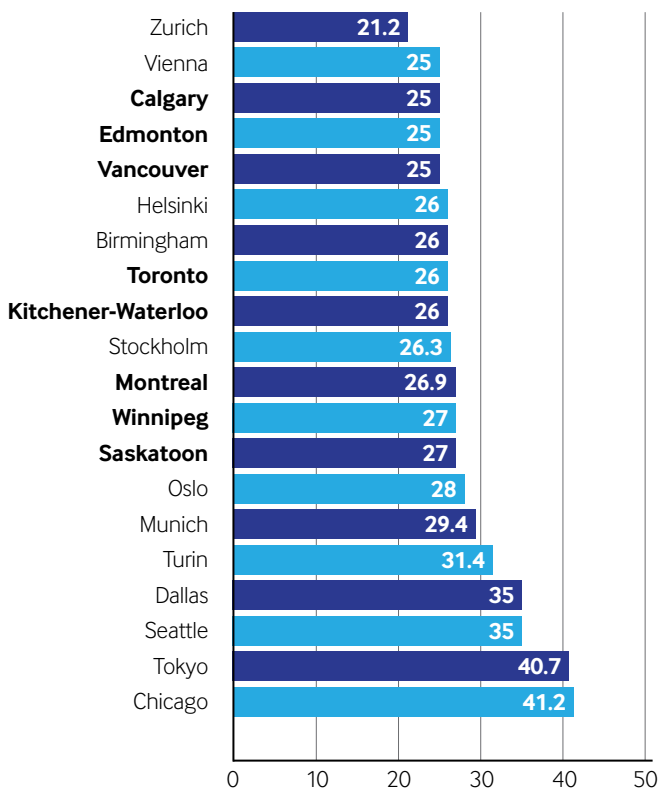
Source: OAG Flight Guide (2011)

ADVANTAGE: FAVOURABLE CORPORATE INCOME TAX

Canada offers highly competitive corporate tax rates. Companies locating in Canada can expect to pay substantially lower tax than in the US, Italy and Germany.

Corporation tax (%)

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



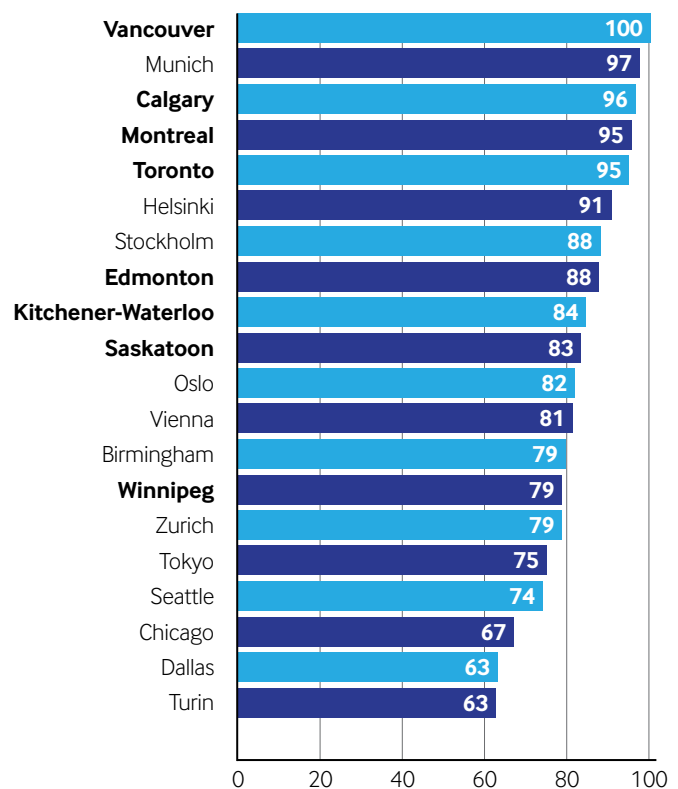
Source: KPMG (Country and Canadian Provinces; 2012) and The Tax Foundation (US States; 2011)

ADVANTAGE: OUTSTANDING QUALITY OF LIFE AT AFFORDABLE COST

Canadian cities have the highest quality of living 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 and cost of living.

Attractiveness of cities

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



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

Why Canada?

Canada is a place where businesses can achieve excellence on a global scale.

A welcoming business environment

Canada is the best place to do business in the world. Source: *Forbes Magazine*, October 2011

A growing economy

Canada has been the top performer among the G-7 in GDP growth over the 2008-11 period.

Source: *Consensus Economics*, April 2012

A highly educated workforce

Canada has the highest proportion of post-secondary graduates among members of the the Organization of Economic Co-operation and Development (OECD). Source: *Education at a Glance 2011*, OECD

Financial stability

Over the past four years, Canada's banking system has repeatedly been declared the soundest in the world. Source: World Economic Forum (WEF)

Low tax rates

Canada's combined federal-provincial statutory corporate income tax rate of 26% is more than 13% below the U.S. and among the lowest when compared to G-7 countries.

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

Scientific research and experimental development

Canada offers some of the most generous R&D tax incentives in the industrialized world, with combined federal and provincial tax credits that can currently save foreign investors, on average, up to 30 cents on the dollar invested in R&D in Canada. Canada also has the G-7's lowest costs in R&D-intensive sectors (up to 10.7% lower than the US).

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

NAFTA

The North American Free Trade Agreement (NAFTA) gives investors access to nearly 457 million consumers and a combined continental GDP of about US\$17.2 trillion.

Canada continues to seek more free trade agreements with economic and emerging powers to increase trade. Source: World Bank, World Development Indicators Database

A great place to invest, work and live

Canada is one of the most multicultural countries in the world and it provides world-class universities, a universal health care system, clean and friendly cities and spectacular scenery.

Source: United Nations Development Programme, Human Development Report 2010, Economic Intelligence Unit, Global Liveability Report 2011





Invest in Canada

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