



# Research and Development in Atlantic Canada

Atlantic Canada is well-known around the world for its outstanding centres of excellence in Research and Development (R&D). The region has an extensive network of specialized centres and research facilities that concentrate on both traditional and advanced technology industries. Among those industries are ocean technology, e-commerce, forestry, aquaculture, offshore exploration, agri-food, biotechnology and advanced telecommunications. The region invests over \$800 million annually in research and development in a wide range of areas, and allocates more than 1,900 person-years to R&D.

R&D in Atlantic Canada benefits from an alliance of industry, government and academic partners. This strong partnership enables the region to stand out as a leader in innovation and to develop new value-added products and services that industry partners can take to world markets.

## BUSINESS COSTS

According to *Competitive Alternatives: KPMG's guide to international business costs, 2006*, Atlantic Canada is the most cost competitive region within the G7 countries, particularly when it comes to R&D. In addition to generous research and development tax incentives, the region benefits from low health care costs, a cost of living that is 25 to 65% lower than other regions in North America, and the lowest costs for labour and electricity in North America.

## COMPARATIVE BUSINESS COSTS INDEX\*

AVERAGE OF THREE R&D BUSINESS CASES:  
BIOMEDICAL R&D, CLINICAL TRIALS AND PRODUCT TESTING

NEW YORK, NY	121.3	ATLANTIC CANADA	CHARLOTTETOWN, PE	84.0
DETROIT, MI	106.0		HALIFAX, NS	77.6
SAN DIEGO, CA	106.2		MONCTON, NB	76.2
BOSTON, MA	115.8		ST. JOHN'S, NL	77.3
CHICAGO, IL	103.2		SYDNEY, NS	76.5
PHOENIX, AZ	102.3		TRURO, NS	72.3
ATLANTA, GA	94.8		PICTOU, NS	72.6

source: *Competitive Alternatives: KPMG's guide to international business costs, 2006 Edition.*  
\* Business costs are expressed as an index, with the United States average being assigned the baseline index of 100. A cost index of less than 100 indicates lower costs than those in the U.S.

## CHARACTERISTICS

Atlantic Canada is home to numerous post-secondary and research institutions. The majority of these centres and institutions have developed globally renowned research facilities that attract students and researchers from around the world. In 2005, Science Watch confirmed that Dalhousie University in Nova Scotia had more citations per research paper in Materials Science, Psychology and Psychiatry than any other research facility in Canada.

As a complete package, there is no better place to conduct research and development than Atlantic Canada. The region's telecommunications infrastructure is second to none, it produces more post-secondary graduates per capita than anywhere else in North America, and has the best business cost environment in G7 countries.

When it comes to Clinical Trial Management, Moncton, NB and St. John's, NL are the number 1 and number 2 ranked featured cities among G7 countries, with a more than 28% cost advantage over the U.S.

Canada 

## RESEARCH AND DEVELOPMENT IN ATLANTIC CANADA

### VARIOUS UNIVERSITY AND PRIVATE RESEARCH CENTRES IN ATLANTIC CANADA

#### Agriculture and Agri-food

- Nova Scotia Agricultural College, Truro, NS
- Peat Research and Development Centre Inc., Moncton, NB
- University of Prince Edward Island, Charlottetown, PE

#### Aquaculture

- Canadian Aquaculture Institute, Charlottetown, PE
- Coastal Zones Research Institute, Shippagan, NB
- Dalhousie University, Halifax, NS
- Memorial University of Newfoundland, St. John's, NL
- Nova Scotia Agricultural College, Truro, NS
- The Huntsman Marine Sciences Centre, St. Andrews, NB
- University of Prince Edward Island, Charlottetown, PE

#### Environmental Technology

- Acadia University, Wolfville, NS
- Dalhousie University, Halifax, NS
- Memorial University of Newfoundland, St. John's, NL
- Mount Allison University, Sackville, NB
- St. Francis Xavier University, Antigonish, NS
- Université de Moncton, Moncton, NB
- University of New Brunswick, Fredericton, NB

#### Fisheries

- Dalhousie University, Halifax, NS
- Memorial University of Newfoundland, St. John's, NL
- The Huntsman Marine Sciences Centre, St. Andrews, NB

#### Health and Medical

- Atlantic Cancer Research Institute, Moncton, NB
- Dalhousie University, Halifax, NS
- Memorial University of Newfoundland, St. John's, NL
- University of New Brunswick, Fredericton, NB
- University of Prince Edward Island, Charlottetown, PE

#### Information Technology

- Acadia University, Wolfville, NS
- College of Geographic Sciences, Annapolis Valley, NS
- Memorial University of Newfoundland, St. John's, NL

#### Life Sciences

- Dalhousie University, Halifax, NS
- Memorial University of Newfoundland, St. John's, NL
- University of Prince Edward Island, Charlottetown, PE

#### Material Sciences

- Dalhousie University, Halifax, NS

#### Ocean Technology

- Canadian Centre for Marine Communications, St. John's, NL
- Centre for Cold Ocean Resources Engineering, St. John's, NL
- Memorial University of Newfoundland, St. John's, NL

#### Oil and Gas

- Acadia University, Wolfville, NS
- Cape Breton University, Sydney, NS
- Memorial University of Newfoundland, St. John's, NL
- Petroleum Research Atlantic Canada, Halifax, NS
- St. Francis Xavier University, Antigonish, NS

#### Social Research

- Acadia University, Wolfville, NS
- Memorial University of Newfoundland, St. John's, NL
- Université de Moncton, Moncton, NB
- University of Prince Edward Island, Charlottetown, PE

Organizations that boost an already active research environment include Technology Partnerships Canada, the Canadian Foundation for Innovation, the Scientific Research and Experimental Development Program, and the Natural Sciences and Engineering Research Council of Canada.

Research and development efforts in Atlantic Canada are enhanced by the Atlantic Innovation Fund (AIF), a federally managed program that promotes innovation and advances in the region's universities, research institutes and private sector businesses.

### BUSINESS ENVIRONMENT

Atlantic Canada's extensive research and development infrastructure is backed by cutting-edge institutions, preferential business costs, a world-class digital telecommunications network and extensive government support programs.

The region is served by a number of major telecommunications companies, including Aliant Telecom, Allstream, Rogers, Eastlink and Group Telecom.

### VARIOUS FEDERAL RESEARCH INSTITUTES IN ATLANTIC CANADA

#### AGRICULTURE AND AGRI-FOOD

(Research institutes administered by Agriculture and Agri-food Canada)

- Atlantic Cool Climate Crop Research Centre
- Atlantic Food and Horticulture Research Centre
- Crop and Livestock Research Centre
- Potato Research Centre

#### BIOTECHNOLOGY

(Research institutes administered by the National Research Council)

- Institute for Marine BioSciences
- Institute for Nutrisciences and Health

#### DEFENCE

- Defence Research and Development Canada

#### FISHERIES AND AQUACULTURE

(Research institutes administered by Fisheries and Oceans Canada unless otherwise noted)

- Bedford Institute of Oceanography
- Gulf Fisheries Centre
- Northwest Atlantic Fisheries Centre
- St. Andrew's Biological Centre
- Institute for Marine BioSciences - National Research Council

#### FORESTRY

- Atlantic Forestry Centre - Natural Resources Canada

#### HEALTH AND MEDICAL

- Institute for BioDiagnostics - National Research Council
- Institute for Nutrisciences and Health - National Research Council

#### INFORMATION TECHNOLOGIES

- Institute for Information Technology - National Research Council

#### MINING AND MINERAL SCIENCES

- CANMET Mining and Mineral Sciences Laboratories - Natural Resources Canada

#### OCEAN TECHNOLOGIES

(Research institutes administered by Fisheries and Oceans Canada unless otherwise noted)

- Bedford Institute of Oceanography
- Gulf Fisheries Centre
- Northwest Atlantic Fisheries Centre
- Mactaquac Fish Culture Station
- Institute for Ocean Technologies - National Research Council
- St. Andrews Biological Station

## RESEARCH AND DEVELOPMENT IN ATLANTIC CANADA

Atlantic Canada has numerous business parks with infrastructure specifically designed to meet the unique needs of R&D companies.

Collaboration is integral in Atlantic Canada's research and development sector. The CA\*net 3 and 4 research networks connect all four provinces to the international research network. This high-capacity network promotes technology transfer and partnerships and allows users to participate in research and innovation projects regionally, nationally and globally.

The region is serviced by four international airports and a four-lane highway that stretches from Halifax, Nova Scotia, to the New England corridor through the New England Thruway, the I-95. Atlantic Canada is situated within one-day's drive of half of North America's population and is the geographical gateway to the United States and Europe. It also benefits from a plentiful, reliable and competitively priced energy supply (gas, oil and electricity), and a low corporate and property tax rate structure. In total, Atlantic Canada offers the R&D community a high degree of global integration in a low-cost, business-friendly, low-risk environment.

### LEADERSHIP

Both private and public research sectors in Atlantic Canada are receiving worldwide recognition for their advancements in the world of R&D. Following are a few of many examples that show why Atlantic Canadian companies and research institutions are attracting global attention.

#### **National Research Council – Institute for BioDiagnostics**

Medical researchers at the National Research Council's Institute for BioDiagnostics have developed an innovative laser-based diagnostic technique that will enable cardiac surgeons to gauge the effectiveness of bypass surgery while the patient is still on the operating table.

The medical community's response to this intra-operative coronary angiography has been so overwhelming that NRC created a spin-off company, Novadaq, to market the technology. An agreement with the University of Rochester, New York, has enabled Novadaq to develop and globally commercialize the resulting proprietary nerve imaging technologies in the field of prostatectomy.

#### **Agriculture and Agri-Food Canada – Crop and Livestock Research Centre**

Research at this Centre focuses on alternative non-chemical methods for controlling insect pests. The biology, ecology, biological control (predators, and pathogen – *Beauveria bassiana*) and management of insect pests are the main areas of investigation.

#### **Springboard Atlantic**

Springboard Atlantic, a fourteen member university network of Industrial Liaison & Technology Offices in Atlantic Canada, is working with universities to enhance their efficiency and effectiveness of technology transfer. Springboard Atlantic is also working on promoting and accelerating the commercialization of university technologies in partnership with the private sector.

#### **Genome Atlantic**

Genome Atlantic was established in 2000 to finance and manage a regional program of technology infrastructure and research and development projects in genomics and proteomics in Atlantic Canada. Genome Atlantic works with university, government and industrial partners in the regional life sciences cluster to conduct genomics research projects of relevance to the Atlantic provinces.

To date, Genome Atlantic and its partners have invested \$30 million in four large-scale research projects and one technology platform, the Atlantic Genome Centre. Current projects are in the areas of agriculture, health, the environment and aquaculture.

The Government of Canada is contributing up to \$6.45 million over three years towards an \$18.2 million genomics research project on cod aquaculture in Atlantic Canada.

#### **THE UNIVERSITÉ DE MONCTON'S SCIENTIFIC PARK**

Located in Moncton, New Brunswick, the Scientific Park brings high-technology businesses and research institutions together to develop and transfer new technologies and products.

The Scientific Park provides infrastructure designed to accommodate research and development initiatives put forward by the science and technology sector. The Park also provides software development capacity for the business community. This "clustering" creates synergies and access to expertise and equipment rarely available in the knowledge-based industry.

The New Brunswick and Prince Edward Island Research Grid connects research centres, schools and international peer networks, allowing for comprehensive analysis, technology transfer and partnerships. The high-capacity and readily accessible grid facilitates world-class research.

## RESEARCH AND DEVELOPMENT IN ATLANTIC CANADA



### PROVINCES AND ABBREVIATIONS

- NB** - NEW BRUNSWICK
- PE** - PRINCE EDWARD ISLAND
- NS** - NOVA SCOTIA
- NL** - NEWFOUNDLAND AND LABRADOR

If you would like more information on this sector, please contact:

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**Catalogue number:** IU89-4/3-11-2004E

**ISBN:** 0-662-37774-5 **ACO:** 2006-09

The paper used for this document contains 10% post-consumer fibre. Vegetable-based inks were used in the printing process.



### Dalhousie University - The Aquatron Laboratory

The Aquatron Laboratory is a unique research laboratory that supplies, operates and maintains facilities for aquatic and marine researchers both within and outside Dalhousie University. The laboratory's research encompasses aquaculture as well as marine fisheries. An example of a project undertaken in the lab is the study of the characteristics and mechanisms of adaptation in the vertebrate retina.

### National Research Council - Institute of Nutrisciences and Health

Scientists at the Institute of Nutrisciences and Health are dedicated to developing and applying nutritional advances and discoveries to optimize health. They are specifically focused on the impact of nutraceuticals and bioactives on neurological, obesity-related disorders and on infection and immunity. An example of a project undertaken at the institute is the examination of neuro-inflammation that occurs in diseases such as Alzheimer's and Multiple Sclerosis as a means of developing an in vitro T-cell model to better understand how these cells contribute to the development of certain T-cell mediated diseases.

### EDUCATION AND TRAINING

Atlantic Canada is home to 17 universities and numerous colleges and post-secondary training centres. The region boasts a very high rate of post-secondary graduates per capita in North America.

The region's universities also attract a substantial number of research grants and awards annually, due to their outstanding academic quality and broad range of research opportunities.

### RESEARCH AND DEVELOPMENT FOR RENEWABLE ENERGY

The Wind Energy Institute of Canada, located in North Cape, Prince Edward Island, is adding to the development of wind power generation in Canada and wind energy-related products and services for Canadian and export markets. This multi-million dollar institute is focusing on four key areas of work: testing and certification, research and innovation, industry training and public education, and technical consultation and assistance.

One resulting project is the \$10.3 million Prince Edward Island Wind-Hydrogen Village Project. Activities in this area are demonstrating solutions for a range of energy applications, including installation of a hydrogen energy station, a hydrogen storage depot, and a wind-hydrogen and wind-diesel integrated control system to power the North Cape Interpretive Centre Complex, the Atlantic Wind Test Site, as well as other homes and buildings in the North Cape area.

Prince Edward Island aims to supply a very significant portion of its energy needs from renewable sources by the end of the decade. Moreover, wind energy is now part of the global energy plan in the other Atlantic provinces.

### RESEARCH AND DEVELOPMENT IN ACTION

#### North Atlantic Biopharma Inc., St. John's, NL

The scientists at North Atlantic Biopharma Inc. have uncovered a medicinal use for seal oil and seal by-products. They have developed a seal-oil based Total Parenteral Nutritional emulsion to deliver much needed nutrients to traumatic and post-surgery patients. Researchers have demonstrated that seal oil has added benefits over vegetable and fish oil based emulsions — it's more chemically stable, contains omega 3 fatty acids and has anti-inflammatory properties.



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