

GLOBALLY-RECOGNIZED CLUSTERS IN THE TORONTO REGION: WIND & TURBINE TECHNOLOGIES

THE TORONTO REGION IS ...

- Located in south central Ontario, a province that is committed to renewable energy sources to protect the environment and create a vibrant green economy:
 - Canada's two largest wind farms are located in Ontario and, by the end of 2009, nearly 1,200 megawatts of wind capacity will be on-line
 - Ontario has invested about \$4 billion in new renewable energy projects already in place or under construction
- Part of a sophisticated electricity infrastructure and a growing demand for clean, reliable electricity generation:
 - Government of Ontario enacted the *Green Energy Act (GEA)* which aims to increase investment in renewable energy projects and increase conservation
- A growing hub of more than 75 companies that provide wind, turbine and alternative energy products and services, including: Brookfield Power, GE Canada, Helix Synergy, Hybridyne Power Systems Canada Inc., Hydro One, John Deere Wind Energy, Northwind Solutions, Schneider Power Inc., and Wenvor Technologies Inc.
- Ranked # 7 in North America for number of publications on the subject of wind, turbine and alternative energy technologies, and ranked #10 in citations and numbers of citations per publication
- Home to 45 university programs in environmental science, engineering and sustainable and renewable energy that produce a highly-educated and highly-skilled workforce:
 - More than 2,700 university graduates (all levels) in 2007

A Growing Demand for Clean, Reliable Electricity Generation



Canada has approximately 1600 MW of installed capacity – enough to power about 480,000 homes.

Canadian Wind Energy Association

ADVANTAGES

- A world-leading economic region:
 - Ranked #1 for the soundness of its banking system by World Economic Forum (*Global Competitiveness Report 2008-2009*)
 - Ranked #3 in North America by MasterCard's Worldwide Centres of Commerce (2008)
 - Ranked #7 Top City Regions of the Future by Foreign Direct Investment magazine (2009)
 - Ranked #10 of the World's Top Global Cities (Global Cities Index (2008)
 - Ranked #10 most economically powerful city by Forbes.com (July 2008)
 - Ranked #11 of 62 in the 2009 Global Financial Cities Index
- 7.4 million people live in the Toronto Region, making it the 4th largest urban region in North America
- Immigration responsive to company needs:
 - Uncapped number of work permits available to foreign workers
 - Process for intra-company transfers is fast and straightforward
 - Special programs allow employers to permanently recruit high-end research staff and other workers within defined occupations
- Business-friendly environment:
 - Canada ranked #1 in number of procedures required to start a business, and #2 in time required to start a business (World Economic Forum, *Global Competitiveness Report 2008-2009*)
 - Ranked #4 globally for Ease of Doing Business by MasterCard Worldwide Center of Commerce Index (2008)
- Canada's largest centre for research and education – location for 35% of all R&D conducted in Canada
- Highly-skilled workforce of 1.8 million (25-64 years of age) drawn from the most educated population in the G8: 64% hold a post-secondary degree or equivalent
- Part of a well-developed transportation infrastructure – air, rail and highway corridors – that easily moves people and goods to cities in the US Midwest and Northeast

WORLD-LEADING RESEARCH AND EDUCATION

- Natural Sciences and Engineering Research Council (NSERC) awarded \$1.9 million in funding for 33 wind and turbine research projects in the Toronto Region (1999-2009)
- A centre of major academic and research with 19 wind technology related experts in five universities focusing on research in power systems, sustainable and renewable energy, and wind energy:
 - **McMaster University:** McMaster Institute for Energy Studies (MIES), Power Research Laboratory, Centre for Excellence for Earth and Environmental Technologies, and Centre for Excellence for Energy
 - **University of Guelph:** Centre for Agricultural Renewable Energy and Sustainability (CARES), and Guelph Institute for the Environment
 - **University of Toronto:** Centre for Technology and Social Development; Lassonde Institute for Engineering Geoscience, and Centre for Applied Power Electronics
 - **University of Waterloo:** Power and Energy System Group, Waterloo Institute for Sustainable Energy (WISE), Green Energy Research Institute (GERI), Sustainable Energy Research, Institute for Innovation Research, Adaptation and Impacts Research Division (AIRD), and Residential Energy Efficiency Project (REEP)
 - **York University:** Institute for Research and Innovation in Sustainability

Web Links

Toronto Region Research Alliance www.trra.ca	University of Toronto www.utoronto.ca
McMaster University www.mcmaster.ca	University of Waterloo www.uwaterloo.ca
Ryerson University www.ryerson.ca	Ontario Sustainable Energy Association www.ontario-sea.org
University of Guelph www.uguelph.ca	Canadian Wind Energy Association www.canwea.ca
University of Ontario Institute of Technology www.uoit.ca	

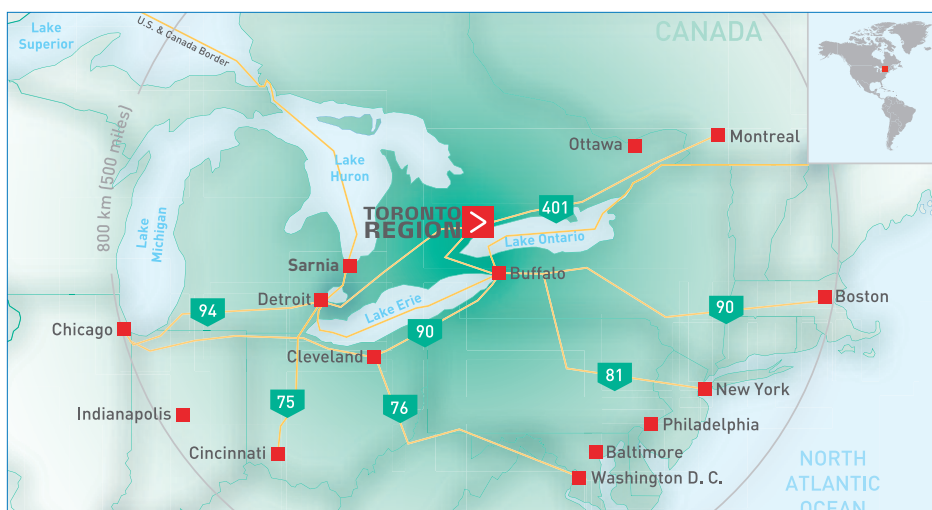
SUPPORTIVE GOVERNMENT PROGRAMS

- Companies can access a range of programs for business that include financial assistance and tax incentives, including:
 - **Government of Canada:** Wind Power Production Incentive Program, Sustainable Development Technologies Canada; Scientific Research & Experimental Development Expenditures; NRC Industrial Research Assistance Program; New Environmental Technologies Evaluation; Financial Support – Science & Technology; and Canadian Environmental Technology Information Centre
 - **Government of Ontario:** Renewable Energy Standard Offer Program; Feed-in-Tariff Program; Ontario Research Fund; Innovation Demonstration Fund; Investment Accelerator Fund; Business Mentorship and Entrepreneurship Program; Next Generation of Jobs Fund; Strategic Opportunities Program; and Ontario Business Research Institute Tax Credit

Leading Regions in North America for Wind-Related Publications and Citations, 2004 - 2009

Region	Number of Publications	Number of Citations	Number of Citations/Publication
New Jersey	82	921	11.23
Michigan	145	1331	9.17
Massachusetts	395	3575	9.05
California	807	6718	8.32
Pennsylvania	82	665	8.10
Toronto Region	122	858	7.03
Virginia	139	960	6.90
Illinois	74	498	6.72
New York	183	1179	6.44
North Carolina	76	470	6.18

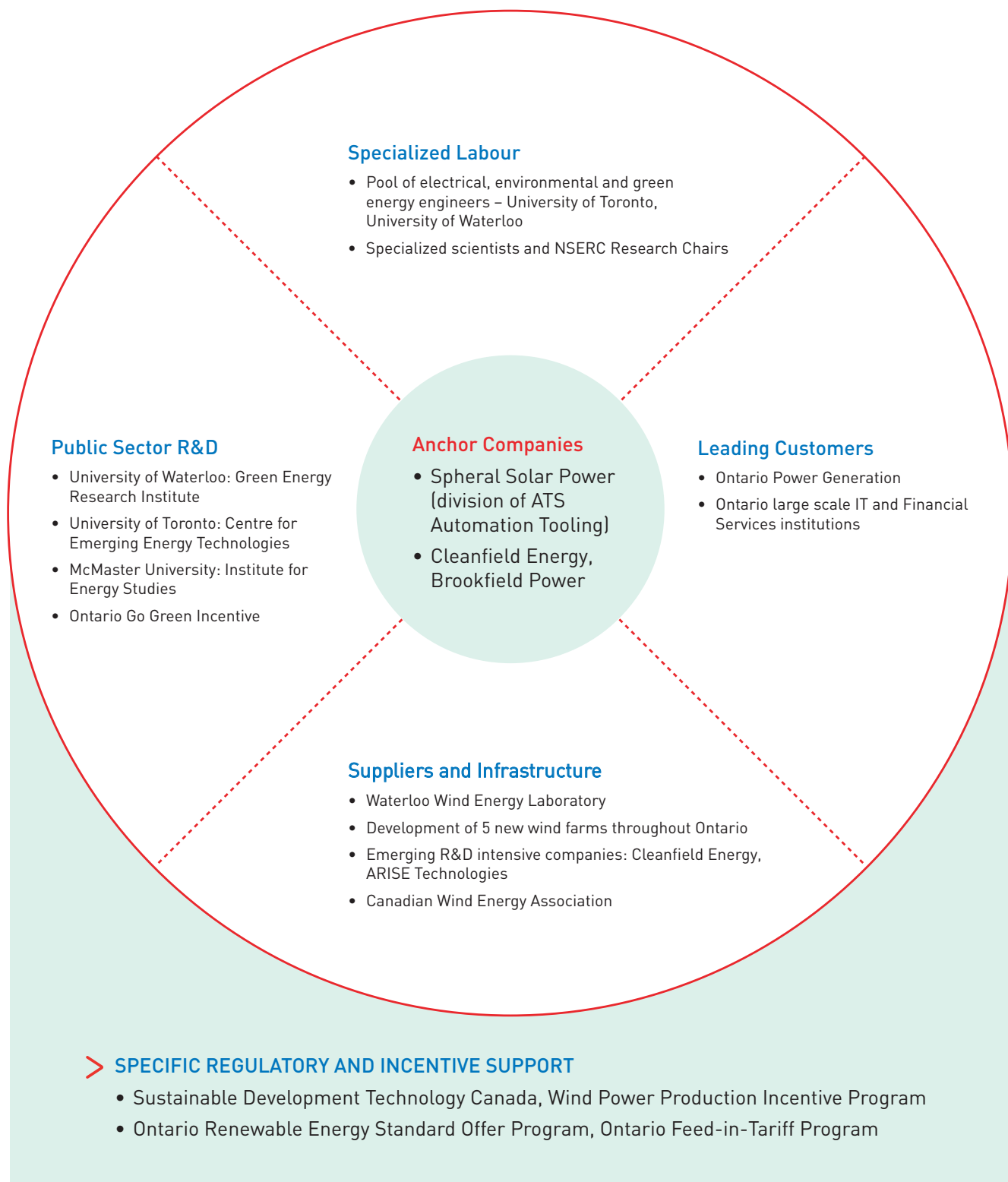
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Ontario's "Go-Green" initiative has fast-tracked development of the Toronto Region's wind energy expertise



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