

# Advanced Energy Sector

Opportunities for Investment, Talent and Enterprise



Ministry of  
Economic Development



LONDON

PARIS

BERLIN

BEIJING

SEOUL

TOKYO

MUMBAI

TAIPEI

HONG KONG

SINGAPORE

British Columbia

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VANCOUVER

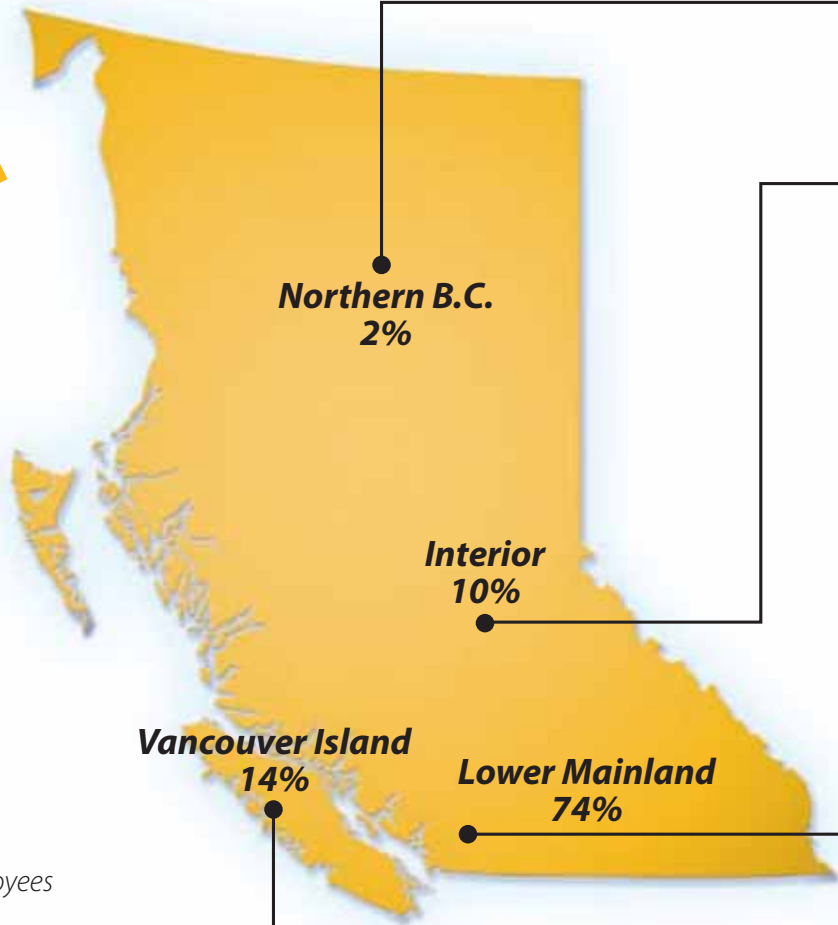
BOSTON

SAN DIEGO

Pacific Ocean

SYDNEY

Advanced Energy Sector: Opportunities for Investment, Talent and Enterprise



 = 20 Employees

 = 2 Companies

2 Companies



  
60 Employees

9 Companies



  
300 Employees

66 Companies

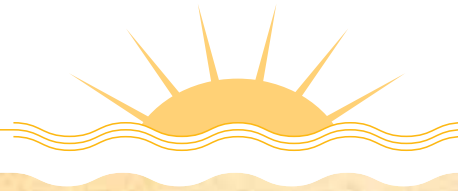


  
2,220 Employees

12 Companies



  
420 Employees



## Message from the Minister



British Columbia is home to some of the most progressive and successful Advanced Energy companies in the world. In fact, B.C. has what is arguably the world's largest hydrogen and fuel cell sector. British Columbia represents 75 per cent of Canadian fuel cell and hydrogen based R&D expenditures and accounts for approximately 69 per cent of Canada's employment in the sector. To continue our innovation lead in this area, the federal and provincial governments are investing \$89 million to develop hydrogen fuelling stations as part of our plan to create the

world's first fleet of 20 fuel cell buses in B.C. by 2010.

British Columbia's Advanced Energy sector is extremely diverse with companies active in power technology, bio-energy and solar, wind and tidal power. The tidal generation plant at Race Rocks off Vancouver Island is the first of its kind in Canada. Our innovative clean technology companies continue to forge strategic global partnerships. Over the past several years, companies from B.C. have successfully negotiated partnerships with several global industry leaders.

We continue to build upon our successes by offering one of the most cost-effective R&D environments in North America, with attractive tax advantages for investors and companies involved in the Advanced Energy industry in B.C.

Our success at delivering innovation is not a coincidence; we have designed policy that is critical to building an environment that accelerates innovation, including offering competitive taxes, deregulation to ensure business is not being strangled by red tape, a dynamic post secondary education system to meet the needs of the future, a robust venture capital market and a culture of innovation. The Province is also establishing a \$25 million Innovative Clean Energy fund to help promising clean power technology projects to succeed.

British Columbia's unparalleled quality of life continues to attract highly qualified talent, and combined with our long-standing entrepreneurial atmosphere, makes B.C. a great place for the Advanced Energy Sector to grow and thrive.

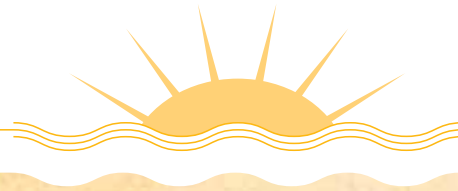
A handwritten signature in blue ink that reads "Colin Hansen".

Colin Hansen  
Minister of Economic Development

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# 1

## Executive Summary



British Columbia's rapidly maturing Advanced Energy Sector is extremely diverse, while exhibiting strengths in several areas.

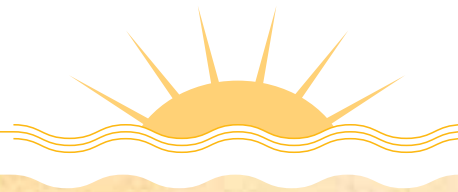
B.C. is home to several world-class companies in the hydrogen and fuel cell sector (Ballard Power, Hydrogenics, and QuestAir Technologies), biomass energy sector (Nexterra Energy) and advanced vehicle propulsion (Westport Innovations, Azure Dynamics, Dynasty Electric Car and Railpower Technologies). In addition, B.C. supports a growing technology cluster in power electronics, with firms such as Xantrex Technology and Argus Technologies and several advanced battery companies including E-One Moli and EaglePicher Energy Products.

There are approximately 89 companies currently active in the Advanced Energy Sector province-wide, generating revenues of approximately \$750 million and employing about 3,000 people. According to a survey of sustainable energy businesses, this sector is very export oriented, with approximately 95 per cent of respondents' sales in 2005 originating from outside of the province<sup>1</sup>.

Key areas of research and development concentration include: solutions for smart urban transport, sustainable urban practices and generation of remote power. B.C. is home to the world's leading firms when it comes to developing new solutions for motors, engines and alternative fuels. In addition, BC Hydro's innovative run-of-river sites initiative is encouraging independent power production in remote areas.

## Opportunities for Growth and Development

The global demand for energy will continue. China is expected to double its energy consumption, which could equal as much as 30 per cent of the world's energy use, and India is committed to bringing electricity to an additional 78 million households. As a result, excellent opportunities exist, especially given B.C.'s proximity to major rural markets in China and its cultural connections to India. Currently, remote power solutions systems and the development of rural energy projects in remote communities is a field where B.C. is excelling. B.C. is also emerging as a leader in sustainable urban practices, with the provincial government supporting Smart Urban Transport, including demonstration projects around hydrogen fuel cells, natural gas, electric, biofuels and hybrids. The 2010 Winter Olympic Games in Vancouver presents a key opportunity for show-casing B.C. as an innovator and leader in sustainable development, green buildings and sustainable community planning.

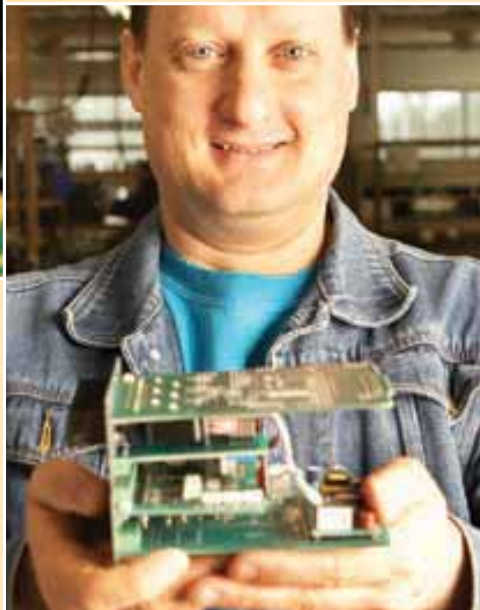
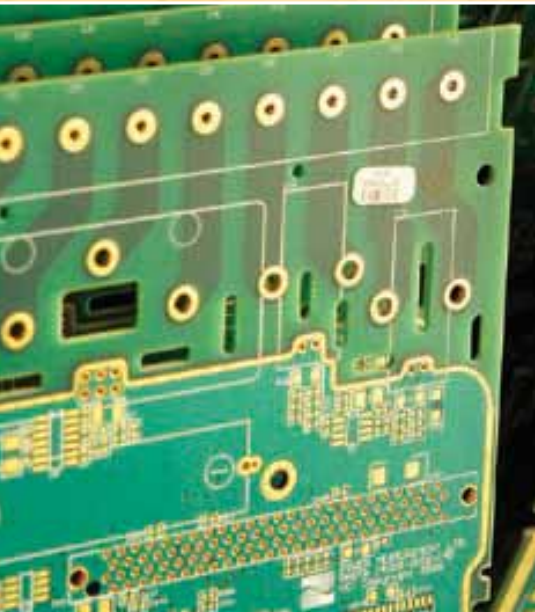


# 2

## Sector Description and Overview in British Columbia

The Advanced Energy Sector in B.C. is comprised of companies active in the development and commercialization of advanced energy technologies.

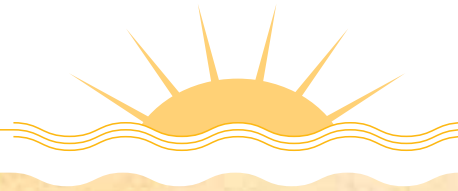
For the purposes of this profile, hydrogen and fuel cells, power technology, bio-energy, and alternative energies (which include solar, wind, and ocean sources) are considered part of the Advanced Energy Sector.





## Sector Highlights

- Led by fuel cell innovator Ballard Power Systems, B.C. is home to what is arguably the largest hydrogen and fuel cell sector in the world. B.C. represents 75 per cent of Canadian fuel cell and hydrogen based R&D expenditures and accounts for approximately 69 per cent of Canada's employment in the sector<sup>ii</sup>. Internationally, Canada is home to 30 per cent of the headquarters of fuel cell activities<sup>iii</sup>. The first zero-emission vehicle, a transit bus, was unveiled in 1993 by Ballard.
- Westport Innovations Inc. is a Vancouver-based company recognized as a world leader in gaseous-fueled engine technologies. This technology enables internal combustion engines to run on clean-burning gaseous fuels. Westport has joint venture and technology development agreements with global automotive leaders, including Cummins Inc., Ford Motor Company Ltd., BMW and Isuzu Motors Ltd.
- Power Measurement, acquired by Schneider Electric in 2005, is a Vancouver Island based energy information and control company that pioneered the shift from analog to digital metering in 1984. Since 2000, Power Measurement has received three awards from Frost & Sullivan, an international consultancy in emerging technology and industrial markets. The Frost & Sullivan awards recognize companies in the North American electrical utility meter market that are leaders in technology innovation, product innovation and new product development.
- Dynasty Electric Car Corporation designs, manufactures and markets Low Speed Vehicles (LSVs) at its head office and manufacturing facility in Delta. The IT zero emission, electric vehicles are for the urban, recreational and light commercial markets.
- The National Research Council of Canada's Institute for Fuel Cell Innovation (NRC-IFCI) is Canada's premier applied research organization dedicated to supporting Canada's fuel cell and hydrogen industry. Located on the campus of the University of British Columbia, NRC-IFCI emphasizes federal support for B.C.'s hydrogen and fuel cell sector, the largest concentration of expertise of its kind in the world.
- On April 1, 2004, at GLOBE 2004, former prime minister Paul Martin announced Canada's plans to build a Hydrogen Highway™ from the Vancouver Airport to Whistler for the 2010 Winter Olympics. The Hydrogen Highway™ is a coordinated, large-scale demonstration and deployment program intended to accelerate the commercialization of hydrogen and fuel cell technologies.
- The provincial government will establish an Innovative Clean Energy Fund of \$25 million to help promising clean power technology projects succeed. The fund will support clean power and energy efficiency technologies in the electricity, alternative energy and transportation, and oil and gas sectors.
- In Victoria and Whistler, BC Transit is working with the provincial and federal partners to put 20 fuel cell buses on the road by 2010.



# 3

## Profile of 20 Largest B.C. Companies

The following table profiles the 20 largest companies in the Advanced Energy Sector in B.C. Rankings are based on revenues followed by employment.<sup>iv</sup> The list includes both public and private companies headquartered in the province, as well as those with locations in B.C. but headquartered elsewhere.

Many technology companies throughout B.C. are privately held; therefore, information on company revenues and employment is limited. Following the list of 20 companies is a table with the names of several privately-held companies with a brief description of their technology focus. This list of privately-held companies is included to illustrate the diversity of innovative technologies available in this sector.



<b>Rank</b>	<b>Company</b>	<b>Revenue</b> <i>(Most recently reported annual. CAN \$M unless otherwise specified)</i>	<b>Employment</b>	<b>Specialty</b>	<b>Background</b>	<b>Description</b>
1	<b>Xantrex Technology Inc.</b> www.xantrex.com	\$165.4	B.C. 300 Global: 461	Power Technology	Established in 1983 Products convert raw electrical power into high quality power (from solar, wind, etc.)	Xantrex provides power conversion equipment that converts raw electrical power from various sources. Products include solar and wind and battery chargers.
2	<b>Argus Technologies Ltd.</b> www.argus.ca	\$63.0	BC: 228 Global: n/a	Power Technology	Develops and manufactures AC and DC power conversion, protection and standby products.	Argus Technologies is a privately-owned company producing a wide range of DC power products for wireless, fiber, broadband, PCS, traditional telephony and customer premise applications. Argus has three main operating units: manufacturing, research and development, sales and marketing.
3	<b>Ballard Power Systems</b> www.ballard.com	\$62.4	BC: 484 Global: 611	Hydrogen and Fuel Cells	Founded in 1979 Launched first commercial fuel cell product in 2001	Ballard is recognized as a world leader in the design, development and manufacture of zero-emission proton exchange membrane (PEM) fuel cells.

Rank	Company	Revenue	Employment	Specialty	Background	Description
4	<b>Power Measurement (Schneider Electric)</b> www.schneider-electric.ca	\$52.6	BC: 260 Global:350	Power Technology	Acquired by Schneider Electric in 2005	Power Measurement, acquired by Schneider Electric in 2005, pioneered the revolution from analog to digital metering by introducing the world's first microprocessor-based three-phase power and energy meter in 1984. It helps companies use, deliver, purchase and bill for energy efficiently and economically.
5	<b>Westport Innovations, Inc.</b> www.westport.com	\$43.6	BC: 141 Global: n/a	Power Technology	Produces low emission engines	Westport develops environmental technologies that allow internal combustion engines to run on other fuels such as natural gas, hydrogen and hydrogen-enriched compressed natural gas. Its unique technologies reduce nitrogen oxides (NOx), particulate matter (PM) and greenhouse gas emissions (GHG) while preserving the power, torque and fuel efficiency of diesel engines.
6	<b>EaglePicher Energy Products</b> www.eaglepicher.com	\$41.0	BC: 400 Global: n/a	Power Technology	Designer of batteries for military and medical applications	EaglePicher Corporation manages a portfolio of advanced technology companies with a diverse range of products.
7	<b>Alpha Technologies, Ltd.</b> www.alpha.com	\$41.0	BC:112 Global: 113	Power Technology	In the mid-1970's, Alpha Technologies introduced the concept of reliable standby power to the cable television industry. Alpha focuses on providing the communications industry with powering solutions available.	Alpha Technologies manufactures uninterruptible power supplies (USPs) and power conversion equipment.

*Advanced Energy Sector: Opportunities for Investment, Talent and Enterprise*

<b>Rank</b>	<b>Company</b>	<b>Revenue</b>	<b>Employment</b>	<b>Specialty</b>	<b>Background</b>	<b>Description</b>
8	<b>Carmanah Technologies Corporation</b> www.carmanah.com	\$38.7	BC:154 Global: 218	Renewable Energy Capture	Design and development of solar powered lighting	Carmanah is a leading integrator of renewable and energy-efficient technology solutions. They focus on three technology groups; solar-powered LED lighting, solar power systems (off grid and grid tie), and LED illuminated signage.
9	<b>TIR Systems, Ltd.</b> www.tirsys.com	\$17.0	BC:122 Global: 125	Renewable Energy Capture	Light emitting diodes (LED) and organic light emitting diode (OLED) technology	TIR is a world leader in specialty, solid state lighting (SSL) as well as designing, developing and marketing products for architectural and corporate identity applications. As of August 2006, TIR has 113 patent applications, in addition to the six patents it holds in SSL. Its intellectual property portfolio supports over 60 inventions in the technologies needed to successfully commercialize SSL systems.
10	<b>Hydrogenics Test Systems</b> www.hydrogenics.com	\$14.0	BC: n/a Global: 270	Hydrogen and Fuel Cells	Testing of PEM, solid oxide and direct methanol fuel cells	Hydrogenics Corporation is a leading global developer of clean energy solutions, advancing the Hydrogen economy by commercializing hydrogen and fuel cell products.
11	<b>QuestAir Technologies, Inc.</b> www.questairinc.com	\$6.3	BC: 74 Global: n/a	Power Technology	Gas purification systems Innovator in hydrogen fueling stations Recently extended its joint development agreement, with Exxon Mobil Research and Engineering to 2010. Using QuestAir's technology, the agreement facilitates product development for refinery and petrochemical applications.	Emerging developer, manufacturer and supplier of advanced air purification systems. Named one of Canada's fastest growing technology companies in the 2006 Deloitte's 2006 Canadian Technology Fast 50 program. (The program ranks the fastest-growing Canadian tech companies based on percentage revenue growth over a five year period).

Rank	Company	Revenue	Employment	Specialty	Background	Description
12	<b>Reliable Controls Corp.</b> www.reliablecontrols.com	\$5.3	BC: 50 Global: n/a	Power Technology	Development, manufacturing and sales of energy metering systems for residential/commercial buildings	Reliable Controls designs, develops and manufactures hardware and software for the multi-billion dollar building automation industry.
13	<b>Azure Dynamics Corp.</b> www.azuredynamics.com	\$4.6	BC: 18 Global: 109	Power Technology	Incorporated in 1997 Development and commercialization of controls for electric & hybrid electric power trains	Azure Dynamics Corporation is a developer of hybrid electric and electric vehicle power train systems for commercial vehicles. The company is focused on the urban commercial delivery vehicle and shuttle bus markets where inefficient drive cycles and strict emissions standards are driving demand for ready-to-roll solutions to the operational and environmental issues associated with fossil fuel consumption.
14	<b>Cellex Power Products, Inc.</b> www.cellexpower.com	\$4.5	BC: n/a Global: 54	Hydrogen and Fuel Cells	Established in 1998	Produces fuel cells for industrial vehicles
15	<b>General Hydrogen Corp.</b> www.generalhydrogen.com	\$3.8	BC: n/a Global: 33	Hydrogen and Fuel Cells	Started by Dr. Geoffrey Ballard and Paul Howard, the original founders of Ballard Power Systems	Develops and commercializes fuel cell systems and hydrogen fuelling solutions for industrial vehicles and other off-road equipment.
16	<b>Altek Power Corp.</b> www.altekipower.com	\$1.8	BC: n/a Global: n/a	Renewable Energy Capture	Independent power producer	Altek develops timely, profitable and environmentally responsible energy solutions. An independent power producer and manufacturer of distributed generation plants, Altek offers quick-to-market electrical generation solutions in response to the growing demand for energy throughout the world.

*Advanced Energy Sector: Opportunities for Investment, Talent and Enterprise*

<b>Rank</b>	<b>Company</b>	<b>Revenue</b>	<b>Employment</b>	<b>Specialty</b>	<b>Background</b>	<b>Description</b>
17	<b>Synex International, Inc.</b> www.synex.com	\$1.7	BC: 15 Global: n/a	Renewable Energy Capture	Engaged in the development and operation of electrical power facilities; hydro electricity	Experienced developer, owner and operator of electrical energy facilities. The company owns and operates 4MW of hydroelectric capacity in British Columbia.
18	<b>E-One Moli Energy (Canada)</b> www.molienergy.com	n/a	BC: 426 Global: 736	Power Technology	Manufactures rechargeable lithium-ion batteries	Incorporated in 1977 to develop a commercially viable battery using technology from the lithium research program at the University of British Columbia. E-One Moli Energy is the only high volume manufacturer of cylindrical lithium-ion rechargeable cells in North America.
19	<b>Tekion, Inc.</b> www.tekion.com	\$0	BC: 63 Global: 73	Hydrogen and Fuel Cells	Micro fuel cells for mobile devices	North American company with operations in both the United States and Canada is integrating advanced battery technology with a unique micro- fuel cell technology to create a new personal power source capable of fitting inside mobile devices.
20	<b>Syntec Biofuels, Inc.</b> www.syntecbiofuel.com	Privately Held: n/a	BC: n/a Global: n/a	Bioenergy	Ethanol technology	Syntec's mission is to process and develop an advanced, thermo-chemical catalyst for the production of ethanol from syngas.

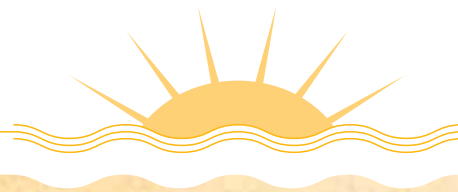
## Privately held Advanced Energy companies

(names compiled by PwC in conjunction with industry associations and other related sources)

<b>Company</b>	<b>Technology/Area</b>	<b>Description</b>
<b>Analytic Systems Ware, Ltd</b> <a href="http://www.analyticssystem.com">http://www.analyticssystem.com</a>	Power conversion; battery chargers.	Manufactures reliable and robust power conversion products. Ongoing R&D programs create innovative, state-of-the-art electronic designs that provide clean outputs in efficient and compact packages.
<b>Angstrom Power, Inc.</b> <a href="http://www.angstrompower.com">www.angstrompower.com</a>	Fuel Cell	Angstrom Power is an innovator in the field of micro-structured fuel cells. In 2005, Angstrom achieved a record in energy density and power for a micro-hydrogen fuel cell. Potential applications for its products include handheld consumer electronics products such as mobile phones, MP3 players and digital still cameras, as well as military and industrial applications that require longer run times.
<b>Canadian Bioenergy Corporation</b> <a href="http://www.canadianbioenergy.com/">http://www.canadianbioenergy.com/</a>	Biodiesel	Western Canada's leading supplier of biodiesel for fleets and private vehicles.
<b>Chrysalix Energy Management</b> <a href="http://www.chrysalix.com">www.chrysalix.com</a>	Venture capital	Chrysalix is a venture capital firm with investments in technology firms including Angstrom Power Inc., Day4 Energy Inc., and PolyFuel Inc. Investors in Chrysalix include Ballard Power Systems, BASF Venture capital and Citigroup.
<b>Day4 Energy Inc.</b> <a href="http://www.day4energy.com/">http://www.day4energy.com/</a>	Developer and manufacturer of high efficiency photovoltaic devices	Solar-energy company producing photovoltaic (PV) solutions that will enable grid and grid-connected PV systems to grow to occupy a significant part of the world's electrical generation infrastructure.
<b>DeltaQ Technologies Corp.</b> <a href="http://www.delta-q.com/">http://www.delta-q.com/</a>	Power conversion/management	Delta-Q supplies electric drive and hybrid vehicle manufacturers with power conversion and power management products.



<b>Company</b>	<b>Technology/Area</b>	<b>Description</b>
<b>Improheat Industries Ltd.</b> <a href="http://www.inproheat.com/">http://www.inproheat.com/</a>	Industrial boilers and furnaces.	OEM designer and manufacturer of environmentally compliant submerged combustion systems.
<b>Nexterra Energy Corp.</b> <a href="http://www.nexterra.ca/">http://www.nexterra.ca/</a>	High efficiency biomass gasification systems.	Nexterra develops gasification systems for industrial and institutional customers to reduce their on-site fuel costs and help them become energy self-sufficient. The gasification systems currently have applications in the forest industry and at universities, hospitals and government institutions.
<b>Philtek Power Corp.</b> <a href="http://www.philtek.com/">http://www.philtek.com/</a>	Power conversion	Serves industrial markets requiring power conversion products such as gas and electric utility companies, pulp and paper mills and refineries. Range of products include DC to AC Inverters, battery chargers, frequency converters, uninterruptible power supplies and custom designed power conversion equipment.
<b>Premium Pellet Ltd.</b> <a href="http://www.premiumpellet.com/">http://www.premiumpellet.com/</a>	Bio-energy. Manufactures high-quality wood pellets	Premium Pellet Ltd., manufactures high quality wood pellets from sawmill sawdust, planer shavings, chips and fines (white wood waste) used for biomass energy
<b>Tantalus Systems Corp.</b> <a href="http://www.tantalus.com/">http://www.tantalus.com/</a>	Smart metering.	Provides two-way real time data communications networks to monitor and control electric utilities.
<b>VRB Power Systems Inc.</b> <a href="http://www.vrbpower.com/">http://www.vrbpower.com/</a>	Development and sale of redux flow batteries.	Energy storage technology developer that markets, sells and manufactures products utilizing a patented system which economically stores and supplies large amounts of electricity on demand. Focused on stationary applications.



# 4

## Centres for Research and Innovation

In the Advanced Energy Sector, the physical infrastructure is made up of research labs, hydrogen and fuel cell testing centres and other specialized facilities. Research facilities at universities and throughout the community indicate the depth of research capabilities available to support a sector.



## **Research Facilities**

University of British Columbia  
(UBC)

### **Clean Energy Research Centre (CERC)**

[www.cerc.ubc.ca](http://www.cerc.ubc.ca)

CERC is a multidisciplinary centre housed in the Faculty of Applied Science at UBC that provides state-of-the-art research facilities for the exploration of clean energy technology. The centre's research focus includes:

- Clean burning engines
- Catalytic NOX reduction
- High temperature materials
- Fuel cell systems development

British Columbia Institute  
of Technology  
(BCIT)

### **Photovoltaic Energy Applied Research Lab (PEARL)**

[www.bcit.ca/appliedresearch/tc/facilities/pearl.shtml](http://www.bcit.ca/appliedresearch/tc/facilities/pearl.shtml)

The PEARL facility can be used to simulate grid connected or stand alone electric systems. Specialized equipment housed at PEARL includes:

- Solar Photovoltaic (PV) cell tester
- PV module simulator
- Solar module laminator
- PV cell cutter
- Tabbing station
- Solar PV array simulators
- Inverter and battery testing equipment
- FDM Rapid Prototyping System
- SMT rework station
- Schematic capture software for PCB design

University of Victoria  
(UVic)

### **University of Victoria, Institute for Integrated Energy Systems (IESVic)**

[www.iesvic.uvic.ca](http://www.iesvic.uvic.ca)

Founded in 1989, IESVic promotes feasible paths to sustainable energy systems. Research expertise is in fuel cells, cryofuels, energy systems analysis and policy development. Other capabilities of IESVic include:

- In house dynamometer used for simulation of fuel cells in low-speed vehicles (scooters, forklifts, etc.).
- IRENE modular regenerative energy system that can use a variety of renewable energy inputs to supply a residential-scale load.

## Research Facilities

Simon Fraser University  
(SFU)

### 4D Labs

[www.4dlabs.ca](http://www.4dlabs.ca)

4D Labs focuses on the design, development, demonstration and delivery of advanced materials and nanoscale devices. The lab will house analytical and clean room facilities to support new materials innovation in photovoltaics, fuel cells and passive energy control systems.

Mathematics and Information Technology and Complex Systems National Centre of Excellence

This Centre of Excellence is a mathematical modeling project network, with current projects related to fuel cells and clean energy.

Energy and Materials Research Group (EMRG)

The EMRG focuses on the analysis of new technologies, strategies, behaviours and policies that lead to a sustainable flow of energy and materials use. It also houses the Canadian Industrial Energy End-Use Data and Analysis Centre.

Activities conducted by EMRG include:

- Technologically explicit and behaviourally realistic simulation modeling.
- Data collection on energy and materials characteristics, systems, and infrastructure.

National Research Council of  
Canada Institute for Fuel Cell  
Innovation  
(NRC-IFCI)

### National Research Council of Canada Institute for Fuel Cell Innovation (NRC-IFCI)

<http://ifci-iipc.nrc-cnrc.gc.ca/>

NRC-IFCI is an applied research centre that supports the fuel cell and hydrogen industry in Canada, by working independently and in partnership with companies, research organizations, universities and government agencies on projects focused on the research, development, demonstration and testing of hydrogen and fuel cell systems.

Among the facilities at the NRC-IFCI are:

- Nine hydrogen-ready labs for testing and evaluation.
- Hydrogen Environmental Chamber that tests and evaluates fuel cell products and vehicles in extreme conditions.
- Fuel cell test stations.
- Integrated technology demonstrations.
- Meeting and incubation space for industry.
- Pacific Spirit Refueling Station to be used by the Vancouver Fuel Cell Vehicle Program and the Hydrogen Highway™

**Research Facilities**

Powertech Labs, Inc.

**Powertech Labs, Inc.**

[www.powertechlabs.com](http://www.powertechlabs.com)

- Wholly owned subsidiary of BC Hydro. Their facility is located in Surrey and has 18 labs with about 80 engineers, scientists and technologists.
- Only company in Canada that has capability to test and certify hydrogen cylinders.

Facilities (hydrogen and CNG): cylinder test centre (test reports recognized by major regulatory agencies, including France (DRIRE), Germany (TUV), Japan (KHK), Argentina (EWARGAS), Switzerland (EGI) and Australia), component test labs, filling stations, field test sites and hydrogen vehicle service centre.

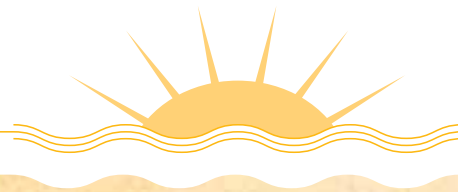
Hydrogenics Corporation

**Hydrogenics Corporation-Hydrogenics Test Systems**

[www.hydrogenics.com](http://www.hydrogenics.com)

- Fuel cell testing and diagnostics for stationary, portable and transportation applications
- Testing capabilities include: Fuel Cell Automated Test Systems (FCATS) for proton exchange membrane (PEM) fuel cells; high temperature test stations for solid oxide fuel cells and catalysts; custom fuel cell testing equipment; diagnostic testing for AC impedance, internal cell resistance, and DC voltage; and contract fuel cell testing.





# 5

## Skilled Workforce

The number of graduate students is often considered indicative of the skill level and depth of knowledge and experience in a region. The following table illustrates the number of graduate students enrolled in Master of Engineering and Master of (Applied) Science programs in B.C. universities from 2001-2002 to 2005-2006. In addition, this section provides information on some of British Columbia's research activities.



**Number of Graduate Students Enrolled in British Columbia Universities**

<b>Graduate Students</b>	<b>2005/06</b>	<b>2004/05</b>	<b>2003/04</b>	<b>2002/03</b>	<b>2001/02</b>
Master of Engineering	129	143	166	195	177
Master of Applied Science	586	632	609	575	506
Master of Science	2,080	2,074	1,894	1,894	1,794
Bachelor of Applied Science/Master of Engineering	9	8	6	7	10

Source: The University Presidents' Council of British Columbia (TUPC), data are as of September 2006.

Also important to note is the number of undergraduate students, which are listed in the following table. The table includes undergraduate students enrolled in B.C. universities from 2001-2002 to 2005-2006.

**Number of Undergraduate Students Enrolled in British Columbia Universities**

<b>Undergraduate Students</b>	<b>2005/06</b>	<b>2004/05</b>	<b>2003/04</b>	<b>2002/03</b>	<b>2001/02</b>
Bachelor of Applied Science	3,883	3,623	3,387	3,062	2,813
Bachelor of Engineering	764	770	777	731	720
Bachelor of Science	16,018	15,581	15,382	14,492	14,714
Bachelor of Science (Tech BC)	-	726	542	233	-

Source: The University Presidents' Council of British Columbia (TUPC), data are as of September 2006.



## Areas of Specialization

This section focuses on the research strengths of B.C.'s Advanced Energy Sector describing the public research available and the funding awards provided to advanced energy companies.

## Research Chairs

There are five Canada Research Chairs in advanced energy held in the province as well as one NSERC Research Chair.

Canada Research Chairs may be either Tier 1 or Tier 2. Tier 1 Chairs are awarded to outstanding researchers that are recognized by their peers as world leaders in their respective research area. These chairs are renewable, and the researcher's university receives \$200,000 annually for seven years. Tier 2 Chairs are awarded to emerging researchers that are recognized by their peers as potential world leaders in their area of research. Tier 2 Chairs are renewable once and the researcher's university receives \$100,000 annually for five years.

The following table identifies British Columbia's Research Chairs in advanced energy.



<b>Canada Research Chairs</b>	<b>Research Title / Year Awarded</b>	<b>Research Chair</b>	<b>Department</b>	<b>School</b>
<b>Tier 1</b>	Energy System Design and Computational Modeling <i>July 1, 2005</i>	Nedjib Djilali	Mechanical Engineering	UVIC
	Clean Energy Processes <i>January 1, 2001</i>	John R.Grace	Chemical and Biological Engineering	UBC
	Physics and Chemistry of Nano-structured Materials <i>September 1, 2001</i>	George Sawatzky	Physics and Astronomy, Chemistry	UBC
	Clean Energy Fuel Cell Technology <i>July 1, 2004</i>	David Wilkinson	Chemical and Biological Engineering	UBC
<b>Tier 2</b>	Clean Energy Systems <i>July 1, 2001</i>	Steven Rogak	Mechanical Engineering	UBC
<b>NSERC Research Chairs</b>	Structured Surface Physics <i>Grant received between 1994-2005</i>	Lorne Whitehead	Physics and Astronomy	UBC

**Technology Partnerships Canada (TPC):** TPC is a Special Operating Agency of Industry Canada that makes strategic investments to support research, development and innovation. These investments are intended to encourage private sector investments in research and development. The TPC program is currently under review by the federal government and will not be accepting new applications as of December 31, 2006. After this date, TPC will continue to monitor and administer the existing \$3.5 billion portfolio.

Since 2002-2003, there have been five contributions awarded for R&D Projects, three of which were awarded for hydrogen and fuel cell based research projects.

Furthermore, there was an additional contribution awarded in 2004-2005 as part of the Hydrogen Early Adopters program.

**Technology Partnerships Canada – R&D Projects**

<b>Year</b>	<b>Company</b>	<b>Project</b>	<b>Approved Contribution</b>
2004-2005	<b>Cellex Power Products, Inc.</b> <i>www.cellexpower.com/Corporate/news/default.htm</i>	Develop hydrogen fuel cell power units for use by industrial lift trucks and develop hybrid fuel cell/battery technology.	\$9.5 million
	<b>General Hydrogen (Canada) Corporation</b> <i>www.generalhydrogen.com</i>	Develop self-contained fuel cell power packs for industrial vehicles.	\$9 million
2003-2004	<b>QuestAir Technologies, Inc.</b> <i>www.questairinc.com</i>	Develop hydrogen purification and gas management technologies for high temperature fuel cells.	\$9.6 million
	<b>Xantrex Technology, Inc.</b> <i>www.xantrex.com</i>	Advanced power technologies for green energy applications.	\$7.2 million
2002-2003	<b>Westport Innovations, Inc.</b> <i>www.westport.com</i>	Develop a diesel engine that operates on natural gas but retains the power and fuel efficiency of diesel.	\$18.9 million

**Technology Partnerships Canada - Hydrogen Early Adopters (h2EA) Investments**

2004-2005	<b>Sacré-Davey Innovations, Inc.</b> <i>www.sacre-davey.com</i>	In a consortium with Westport Innovations and Sacré-Davey to create a demonstration project to show how a hydrogen fuel system can power trucks and buses.	\$6 million
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## The National Research Council (NRC) Industrial Research Assistance Program (NRC-IRAP)

NRC-IRAP provides a range of technical and business oriented advisory services along with potential financial support to growth-oriented SMEs and has been a significant contributor in supporting the commercialization of advanced energy research. The program relies on an extensive network of professionals across the country working directly with clients supporting innovative research and the development and commercialization of new products. In 2004/05, NRC-IRAP's nearly \$130 million in total expenditures aided in building the innovative capacities of over 10,000 firms with direct financial support distributed across over 2,500 projects.

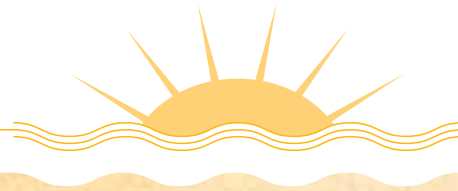
## Institutional Research

The following table presents areas of research identified in the strategic research plans of provincial educational institutions relevant to the Advanced Energy Sector. These are research areas that build on the institution's current strengths, as well as having strong growth potential.

It is important to note that research in advanced energy technologies are areas where the institutions have committed to enhance and build their capacity.

### **University Research Strategies**

UBC	Nanoscience (includes fuel cell materials and manufacturing research at the Advanced Materials and Process Engineering Laboratory (AMPEL)).
SFU	Communication, computational and technology (materials science and devices, including research in polymer/electrochemistry, modeling structures and processes in fuel cells, bio-fuel cells and methods for preparing proton-conducting membranes).
UVic	Matter and energy (includes research in cryofuel systems, fuel cell systems, and energy systems at the Integrated Energy Systems research centre (IESVic)).



# 6

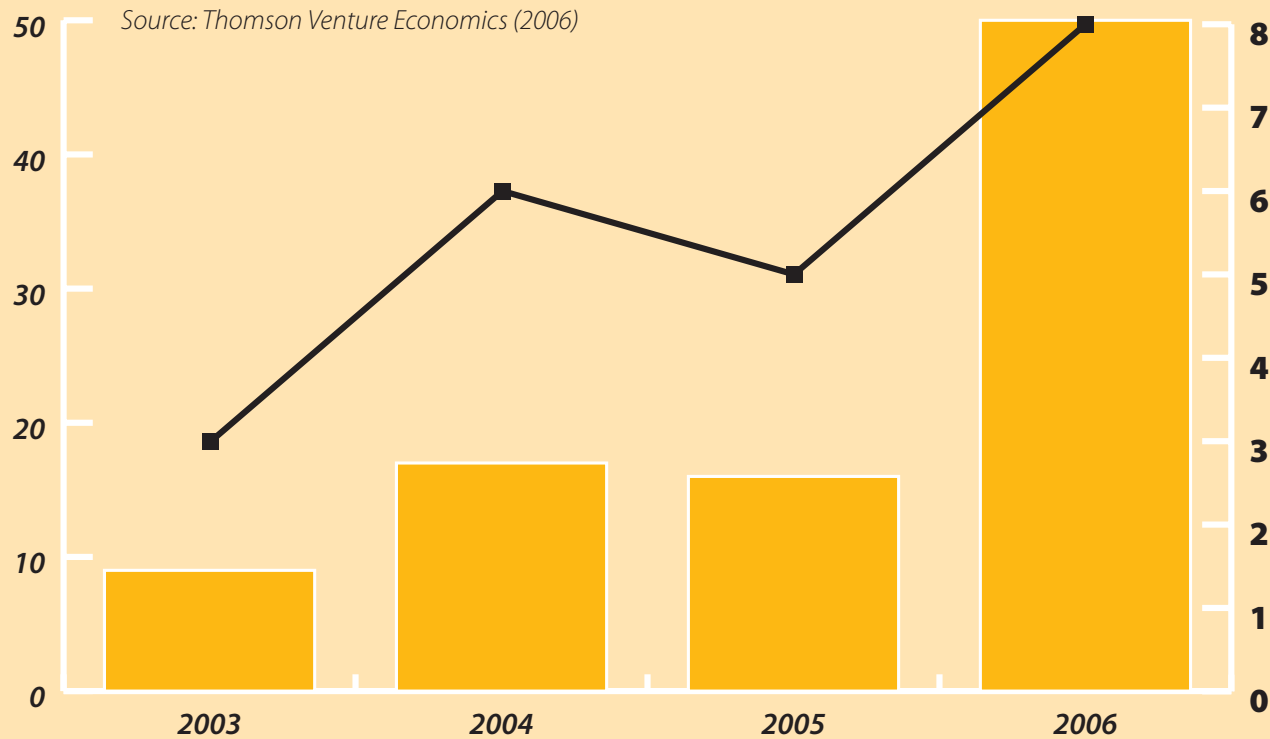
## Finance and Capitalization

The data is based on venture capital investments for B.C. based advanced energy companies and all amounts are reported in Canadian dollars. The source of the data is the VCReporter database from Thomson Financial. Some transactions may have occurred that are not captured in the Thomson Financial database, for example, an acquisition of a B.C. company by a U.S. based firm will not be reflected in the VCReporter database.



### Financing Statistics for B.C. Advanced Energy Sector

**\$M of Venture Capital Invested in B.C. in Advanced Energy 2003-2006**



	<b>VC Investment</b>	<b>\$9M</b>	<b>\$17M</b>	<b>\$16M</b>	<b>\$50M</b>
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	<b>Total # of Deals</b>	<b>3</b>	<b>6</b>	<b>5</b>	<b>8</b>
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### Fiscal Incentives

The following tables provide program information for fiscal incentives available to eligible companies carrying on business or residents located in B.C. All of the incentives listed are tax credits available from either the provincial or federal governments. Also noted are specific incentives available from the federal government to encourage investment in energy conservation and renewable energy projects.

## Research and Development Investment Tax Credits

Canada and British Columbia offer a generous program of research and development tax credits to support innovation. These credits can be used to substantially fund R&D and are very attractive to companies establishing themselves in the province.

The Scientific Research & Experimental Development (SR&ED) is the federal program designed to encourage businesses, including small and start-up companies, to work towards advancing technology to develop new or improved products or processes.

SR&ED provides companies with either refundable or nonrefundable tax credits for eligible expenditures incurred in Canada for research and development activities. Companies qualifying as a CCPC (Canadian Controlled Private Corporation) are eligible to receive a 35 per cent investment tax credit on up to \$2 million of qualified expenditures and 20 per cent of qualified expenditures not eligible for the 35 per cent rate. Non CCPC's are only eligible to receive tax credits of 20 per cent of qualified expenditures. All companies are able to carry forward federal investment tax credits for 20 years (from 2006).

<b>Canada – Federal</b>		<b>Scientific Research and Experimental Development (SR&amp;ED) Policy Details<sup>v</sup></b>			
<b>Tax Credit</b>	<b>Qualifying Entities</b>	<b>Tax Credit Rate</b>	<b>Refund Rate</b>	<b>Further Details<sup>vi</sup></b>	<b>Who Qualifies?</b>
Scientific Research & Experimental Development Tax Credit Program (SR&ED)	Qualifying Canadian Controlled Private Corps. (CCPCs)	<b>35 %</b> of annual expenditures up to threshold of \$2 million  <b>+20 %</b> of qualified expenditures not eligible for the 35% rate.	<b>100 %</b> of ITCs on current expenditure computed at the 35% rate  <b>+40 %</b> of ITCs on capital expenditures computed at the 35% rate and of ITCs of a qualifying corporation at the 20% rate.	The SR&ED is a refundable tax credit, which means that even if an eligible firm is not profitable, it will still get a cash refund from engaging in R&D.  For non-CCPCs, even though no refund is available, the program allows firms to reduce taxes payable for a net positive cash flow.	Qualified research must fit advancement, uncertainty and content criteria.
	Non CCPC's	20 %	N/A		
	Individuals	20 %	40 % of ITCs		

Under the B.C. provincial investment tax credit program, eligible corporations can take a 10 per cent tax credit against provincial income tax in addition to receiving federal SR&ED tax credits. Similar to the SR&ED program, CCPC's are eligible for refunds while non-CCPC's must apply the credit against taxes payable.

<b>Province of British Columbia</b>		<b>British Columbia R&amp;D Tax Credit Policy Details<sup>vii</sup></b>			
<b>Tax Credit</b>	<b>Qualifying Entities</b>	<b>Tax Credit Rate</b>	<b>Refund Rate</b>	<b>Further Details</b>	<b>Who Qualifies?</b>
British Columbia Provincial R&D Tax Credit	Qualifying Canadian Controlled Private Corps. (CCPCs)	10 per cent Credit Against Provincial Income Tax	Refundable	Qualifying CCPCs are refundable on the first \$2 million of expenditures eligible for SR&ED credit.	Qualified research must fit advancement, uncertainty, and content criteria.
	Other Corporations		Non-refundable	Other Corporations may carry the tax credit forward 10 years and back 3 years.	

### **International Financial Activity (IFA) Act <sup>viii</sup>**

B.C.'s *International Financial Activity (IFA) Act* came into effect on September 1, 2004, and provides eligible corporations and specialists with a refund on B.C. income tax paid on income that is related to the corporation's international financial activities conducted in B.C. The *IFA Act* was established to support certain business activities by essentially exempting income from these activities from provincial income tax or providing a significant reduction in the effective provincial tax rate.

These activities, all of which must be carried on with a non-resident person, includes: making loans, financing foreign affiliates, factoring trade accounts receivables, distribution of film and television rights, leasing property, captive insurance activities and foreign exchange activities. A corporation may receive an annual refund of 100 per cent of the provincial income tax paid on income earned from these activities. An IFA specialist is eligible to receive a refund of up to 75 per cent of income taxes paid.

Effective January 1, 2006, the IFA has been expanded to include the refund of income tax paid on income derived from certain types of life sciences patents<sup>ix</sup>. Corporations may receive an annual tax refund up to the lesser of \$8 million and 75 per cent of its corporate income tax paid on income that is derived from international commercialization of life sciences patents.

To be eligible for the refund, patents must have a primary classification number in accordance with the International Patent Classification and not have expired. Broad classifications for the types of patents that qualify for refunds include the following: new plant or processes for obtaining them, preservation of bodies of humans or animal, biochemistry, microbiology, investigation or analyzing food, and investigation or analyzing biological material. This program is summarized in the following table.

<b>Province of British Columbia</b>		<b>International Financial Activity (IFA) Policy Details<sup>x</sup></b>		
<b>Tax Credit</b>	<b>Qualifying Entities</b>	<b>Refund Rate</b>	<b>Further Details</b>	<b>Who Qualifies?</b>
British Columbia <i>International Financial Activity Act</i>	Incorporated Canadian companies with permanent establishments in B.C.	100 per cent of provincial income tax paid on non-life science patent activity.  Lesser of \$8 million and 75 per cent of provincial income tax paid on life sciences patent activity.	Registered corporations may claim a tax refund on patent activity or other eligible activities (but not both)	Must maintain membership in International Financial Centre British Columbia Society

### Small Business Venture Capital Act (SBVCA)

The B.C. Ministry of Economic Development offers tax credits to resident investors to help small businesses carrying on prescribed activities gain access to early stage or 'seed' capital through venture capital programs operated under the *Small Business Venture Capital Act (SBVCA)*. Prescribed activities include manufacturing and processing of goods in British Columbia, research and development of proprietary technologies, development and operation of a destination tourist resort and the development of interactive digital media products.

The annual cap for equity capital investment under this program is \$83 million of which \$10 million of program capital is reserved for investment in small businesses operating outside of the Lower Mainland and \$17 million is reserved for investment in small businesses substantially engaged in the 'new media' sector.

Under the SBVCA, program investment is made either through a holding corporation known as a Venture Capital Corporation (VCC) or directly to an Eligible Business Corporation (EBC). The EBC Tax Credit encourages direct investment by investors in eligible small businesses throughout the province. Professional management of the VCC fund selects and manages a diverse portfolio of investments on behalf of the pool of investors. Details of the SBVCA program are outlined in the following table.



Province of British Columbia		Small Business Venture Capital Act Policy Details		
Tax Credit	Qualifying Entities	Tax Credit Rate	Further Details	Who Qualifies?
Small Business Venture Capital Act (SBVCA)	Resident investors who provide investment capital into a VCC or EBC	30 per cent refundable tax credit <sup>xi</sup> for individuals to a maximum of \$60,000 annually. (Not refundable for corporations with no maximum limit.)  Tax credit is applied first against provincial and federal taxes payable, if any.	Investors may provide up to \$83 million per year in equity capital for investments in small business.  For tax certificates greater than \$60,000, the excess can be carried forward up to four years	Residents and corporations with B.C. taxes payable

The Venture Capital Corporation (VCC) Tax Credit encourages investment in small businesses operating outside of the Greater Vancouver and Capital Regional Districts.

### Employee Investment Act

The Labour-Sponsored *Employee Investment Act* provides investors with the opportunity to receive a provincial tax credit of 15 per cent and a federal tax credit of 15 per cent on their investment in the fund. The funds seek long-term equity investment opportunities in companies seeking ‘expansion’ capital.

Labour-Sponsored Funds are registered under the *Employee Investment Act* and are owned by shareholders who rely on professional management to select investments. Two Labour-Sponsored Funds that are registered in the province include Altura Growth Fund (EVCC) Inc. and the Working Opportunity Fund (EVCC) Ltd.

### Social Service Tax Act

The B.C. Social Service Tax is a provincial sales tax of 7 per cent levied on the purchase price of tangible personal property. Eligible manufacturers purchasing production equipment and machinery can apply for an exemption of the sales tax<sup>xii</sup>.

Province of British Columbia		B.C. Sales Tax Exemption for Equipment and Machinery Policy Details <sup>xiii</sup>		
Tax Credit	Qualifying Entities	Tax Credit Rate	Further Details	Who Qualifies?
Social Service Tax Act	Manufacturers	Exempt from 7 % PST	Production machinery and equipment purchased or leased by manufacturers are exempt from tax	Must meet definition of manufacturer and equipment must be used primarily and directly in manufacture of qualifying tangible personal property

## Energy Conservation and Renewable Energy Incentives

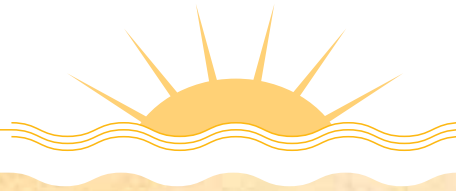
In addition to the above government support programs, there are specific incentives available from the federal government to encourage investment in energy conservation and renewable energy projects. These incentives include:

**ecoEnergy for Renewable Power Program (ERRP)<sup>xiv</sup>** —provides a total federal commitment of \$1.48 billion to generate 4,000 megawatts of renewable electricity. This fiscal incentive can be claimed per kilowatt hour—at one cent per kilowatt hour for up to 10 years.

**Class 43.1 in Schedule II of the Income Tax Act<sup>xv, xvi</sup>**, —accelerated capital cost allowance rates to encourage firms that produce energy to invest in equipment that uses renewable energy sources and waste fuels, or by using fossil fuels efficiently. Applies to certain electricity cogeneration systems and certain thermal energy systems (to produce thermal energy directly in an industrial process). This provision was recently extended (in November 2005) to cogeneration systems that use spent pulping liquor.

**Canadian Renewable and Conservation Expenses (CRCE)** —fully deductible expenditures that are associated with the start-up of renewable energy and energy conservation projects where at least half of the capital costs of property can be described under Class 43.1.





# 7

## Value Chain / Ecosystem

The following two diagrams illustrate the value chain/ecosystem of the advanced energy sector in B.C. Organizations that support or provide services to the sector are placed into the top and middle of the diagram according to their function as follows:

- Industry support organizations
- Industry infrastructure
- Research facilities
- Specialized finance organizations and
- Education and human resource support organizations

Advanced Energy companies directly involved with creating advanced energy technologies are then slotted into five activity categories including:

- Project developers
- Generation
- Transmission
- Energy storage and
- End use

The second diagram shows companies engaged in sub-categories under the advanced energy generation activity, encompassing activities such as: ambient energy capture, biomass conversion, fuel cell and stack development and end use.

## Ambient Energy Capture

### General:

- Altek Power Corp
- Energy Alternatives Ltd.
- Energy Options Ltd.
- SPS Energy Solutions
- Terratek Environmental Solutions
- Tri-Y Enterprises Ltd.
- Vancouver Renewable Energy Co-op

### Solar:

- Astravan Distributors
- Canadian Solar Technologies
- Day4 Energy Inc
- Solar Plus
- Solarcrest Innovations
- Swiss Solar Tech
- Taylor Munro Energy Systems
- Thermomax Industries Ltd

### Wind:

- Quantum Wind
- WestTech Energy Inc

### Current:

- Clean Current Power
- Blue Energy Canada

### Small Hydro:

- Asian Phoenix Resources
- Dependable Turbines
- Eco Hydro Energy Ltd.
- Synex International
- Thompson & Howe Energy Systems

### Geothermal:

- Earth Source Energy
- GeoTility Systems Group
- Lockhart Industries

### Wave:

- Synchwave

## Biomass Conversion

### Combustion:

- Clean Energy Combustion Systems
- Inproheat Industries
- Sherwood Industries
- Entropic Energy
- FPI Ltd. (Fireplace Products International)
- JF BioEnergy

### Gasification:

- Heuristic Engineering
- Nexterra

### Pyrolysis:

- DynaMotive Energy Systems Corp
- Linneaus Plant Sciences Inc.

### Fuel Supply:

- Agri-Green Biodiesel
- Biofuel Systems Technologies
- Canadian Bioenergy Corp.
- Cascadia Biofuels
- Linaeus Plant Sciences
- EnEco Industries
- Okanagan Biofuels
- Pellet Flame Inc.
- Pinnacle Pellet
- Premium Pellet
- Princeton Cogeneration Corp
- Waste Oil Refining Technology
- West Coast Reduction Ltd.

### Ethanol and Methanol:

- Syntec Biofuels
- Lignol Innovations
- Cascadia Biofuels
- Methanex

## Fuel Cell and Stack Development

- Angstrom Power Inc.
- Ballard Power Systems Inc.
- Cellex Power Products Inc.
- DPoint Technologies
- General Hydrogen Corporation
- Gen-X Power Corp. Ltd.
- Greenlight Power Technologies Inc.
- (Hydrogenics)
- H3 Energy
- Heliocentris Energy Systems
- MagPower Systems Inc.
- Methusala Microcells
- Palcan Fuel Cells Ltd.
- PEM Engineers Inc.
- PowerDisc Development Corporation Ltd.
- Tekion Inc.
- Zongshen PEM Technologies Inc.
- VEPower Technologies

## Strategic Consulting

- MK Jaccard and Associates
- Wise Energy
- ZE PowerGroup Inv
- Avalon Mechanical Consultants Ltd.
- Willis Energy Services
- Enerpro Systems Corp.

## Project Implementation

- Barkley Project Group
- Energy Optimizers Inc.
- Hemmera Energy Inc.
- Save-On Energy Inc.
- City Green
- Energex
- Sempa Power
- Windmill Developments

## Engineering, Design and Manufacturing

## Industry Infrastructure

- Canadian Transportation Fuel Cell Alliance
- NRC Institute for Fuel Cell Innovation
- Powertech Labs
- Translink
- BC Hydro
- BC Hydrogen Highway
- Vancouver Fuel Cell Vehicle Program

## Research Facilities

- UVic Institute for Energy Systems
- SFU Mathematics and Information Technology and Complex Systems National Centre of Excellence
- SFU Energy and Materials Research Group
- UBC Centre for Environmental Research in Minerals, Metals and Materials
- UBC Clean Energy Research Centre
- BCIT Photovoltaic Energy
- Applied Research Lab

## Project Developers

- Canadian Green Power Ltd.
  - SeaBreeze Power Corp.
  - Windmill Developments Inc.
- Small Hydro and Run of River:**
- Cloudworks Energy Inc.
  - Eaton Hydro Developers Inc.
  - Plutonic Power Corp.
  - Run of River Power Inc.

### **Geothermal:**

- Dynamic Geothermal Systems Ltd.
- Green Island Energy
- Western GeoPower Corp.

### **Wind Power:**

- Aeolis Wind Power Corp.
- Earth First Energy Inc.
- English Bay Energy
- Greenwind Power Corp.
- Nai Kun Wind Development Inc.
- Sequoia Energy
- Stothert Power Corp.

## Generation

### **Ambient Energy Capture**

### **Biomass Conversion**

### **Fuel Cell and Stack Development**

## Transmission

### **Power Conditioning and Measurement:**

- Alpha Technologies
- Analytic Systems
- Argus Technologies Inc.
- Go Power! Electric Inc.
- Innovative Circuit Technology (ICT)
- Legend Power Systems
- NxtPhase Corporation
- Philtek Power Corp.
- Power Measurement (Schneider Electric)
- Pro Energy Solutions Inc.
- Quadlogic Meters Canada Inc.

## Hydrogen Supply

- HY-GEO Consulting
- NeoDym Systems Inc.
- Neutron Technologies Inc.
- Sacré-Davey Engineering
- H3 Energy
- Membrane Reactor Technologies
- PowerNova Technologies Corp.
- QuestAir Technologies

## Lobbying and Industry Support

- Power Technology Alliance
- Hydrogen and Fuel Cells Canada
- EcoSmart Foundation
- Canadian Transportation Fuel Cell Alliance
- BC Sustainable Energy Association
- BC Wind Energy Association
- Canadian Institute of Energy (BC)
- Community Energy Association
- Geoexchange BC
- Independent Power Producers Association of BC
- Vancouver Electric Vehicle Association
- Canadian Geothermal Energy Association
- Ocean Renewable Energy Group
- PricewaterhouseCoopers

## Specialized Finance

- BC Angel Forum
- Chrysalix Energy
- Ventures West
- GrowthWorks Capital
- Pangaea Ventures
- Smart Seed Equity

## Education and HR Support

- BC Transmission Corporation: BC Transmission Academy
- Canadian Technology Human Resource Board

## Energy Storage

- Tantalus Systems Corp.
- Thomson Technology
- Xantrex Technology Inc.
- Conventional Boiler

### Technology:

- IBC Technologies
- Reliable Controls Corp.
- Viessman Manufacturing Co.
- D-B Equipment Ltd.
- ECCO Heating
- Eneready Products Ltd.
- Trane BC
- Pro Star Mechanical
- Technologies Ltd.

### Advanced Power Storage:

- AccelRate Power Systems
- Cadex Electronics Inc.
- EaglePicher Energy Products Corp.
- E-One Moli Energy (Canada) Limited
- Mountain Power
- VRB Power Systems Inc.

### Gaseous Storage:

- IMW Industries Ltd.
- Jordair Compressors Inc.
- Powertech Labs

## End Use

### Low Power Demand Products:

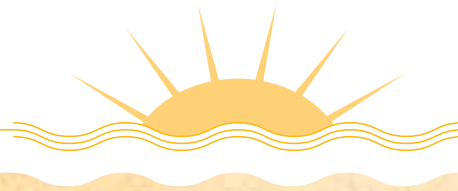
- Bell Lighting Technologies Inc.
- Carmanah Technologies Inc.
- JSF Technologies
- Ledalite Architectural Products Inc.
- SED Technologies
- TIR Systems Ltd.
- Gasmaster Industries Inc.
- International Thermal Research Ltd.
- Island Energy

### Electric Motors:

- ADL Products Inc.

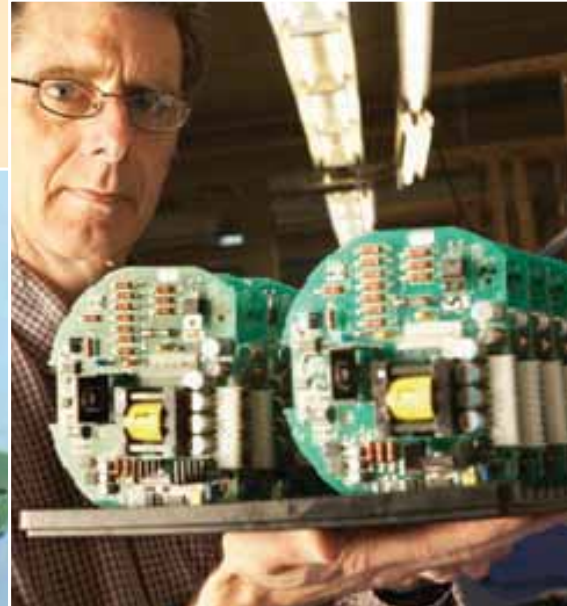
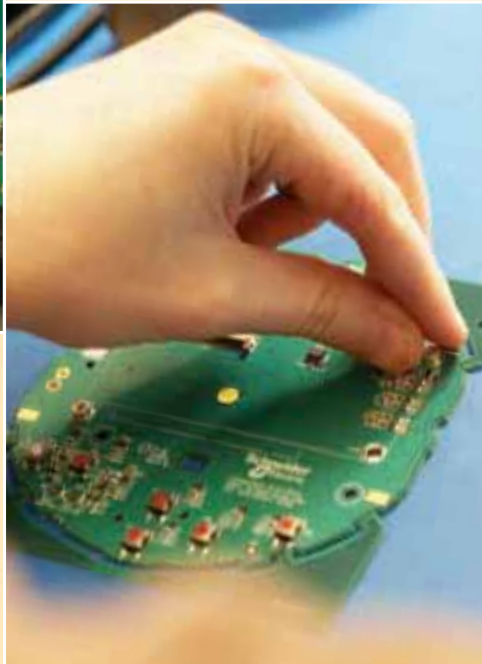
### Vehicle Systems:

- Catalyst Energy Inc.
- ECO Fuel Systems Inc.
- Enviromech Industries
- Mogas Sales Inc.
- Neoteric Biofuels Inc.
- NxtGen Emission Controls Inc.
- Technocarb Equipment (2004) Ltd.
- Westport Innovations Inc.
- Azure Dynamics Corp.
- Delta-Q Technologies Corp.
- Canadian Electric Vehicles Ltd.
- Dynasty Electric Car Corp
- Translink



# 8

## Industry Contacts





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## Endnotes

- i *PS Reilly, Survey of Technology Producers in the Sustainable Energy Cluster. The survey was of technology producers in the Alternative Energy and Power Technology sectors.*
- ii *Government of Canada, Government of British Columbia, Hydrogen & Fuel Cells Canada, and PricewaterhouseCoopers, British Columbia Fuel Cell and Hydrogen Industry Profile 2005*
- iii *US Fuel Cell Council, Hydrogen & Fuel Cells Canada, Fuel Cell Europe, Fuel Cell Commercialization Conference of Japan, and PricewaterhouseCoopers, 2006 Worldwide Fuel Cell Industry Survey*
- iv *Companies included among the twenty largest companies are those that rank the highest by 2005 revenues according to Business in Vancouver Magazine, Hightech British Columbia 2006 and by 2004 revenue according to Business in Vancouver's Book of Lists 2005. Annual revenues were confirmed by reviewing the most recent annual report for each company where available. In cases where the annual revenue figures differed between these sources, we used revenues from the company's annual report. The Business in Vancouver publications were also used as sources for information on employment numbers. Finally, Factiva was used to supplement revenue and employment data where that data was unavailable elsewhere. Where revenues are reported in \$US, they have been converted to \$CAN based on the monthly average \$CAN/\$US exchange rate of the last month of the company's fiscal year. Where revenues are not from a company's annual report, the annual 2005 exchange rate is used to convert the revenues to \$CAN.*
- v *PricewaterhouseCoopers, Tax Facts and Figures for Individuals and Corporations, 2006*
- vi *Susan Ward. Don't Miss Out on the SR&ED Tax Credit Program. From "Your Guide to Small Business Canada" available at <http://sbinfoCanada.about.com/od/taxinfo/a/SREDtaxcredit.htm>*
- vii *PricewaterhouseCoopers, Tax Facts and Figures for Individuals and Corporations, 2006*
- viii *Ministry of Small Business and Revenue, Bulletin IFA 001, International Financial Activity Overview, Revised February 2006*
- ix *Ministry of Small Business and Revenue, Bulletin IFA 002, Life Science Patents, Revised April 2006*
- x *PricewaterhouseCoopers Tax Facts and Figures for Individuals and Corporations, 2006*
- xi *To the extent credit is made available by the Ministry of Economic Development.*
- xii *Ministry of Small Business and Revenue, Bulletin SST 054, Manufacturers, Revised February 2003*
- xiii *PricewaterhouseCoopers, Tax Facts and Figures for Individuals and Corporations, 2006*
- xiv *Natural Resources Canada (awaiting link for this program)*
- xv *Government of Canada, Tax Incentives for Business Investments in Energy Conservation and Renewable Energy, 1998*
- xvi *Government of Canada, Canada Gazette, "Regulations Amending the Income Tax Regulations (Capital Cost Allowance – Forestry Bioenergy Equipment)", Vol. 140, No.23, June 10, 2006*



*Research for this profile was conducted by PwC*

