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Canada

Solar Energy Technologies

CUSTOMIZED-SOLUTIONS



SUSTAINABILITY



HIGH-QUALITY

Solar energy is clean, proven, practical and abundant!

The earth receives more energy from the sun in just one hour than the world uses in a whole year.

Opportunities to harness this energy are enormous. For instance, modern solar technologies warm buildings, heat water, cool spaces and generate electricity.

SOLAR TECHNOLOGIES AS AN ENVIRONMENTAL SOLUTION

Solar technologies will gain further recognition as an efficient, reliable, and sustainable alternative to non-renewable forms of energy. Solar energy also has many advantages over conventional energy forms, particularly:

- ▶ energy from the sun is, for practical purposes, inexhaustible
- ▶ exploitation of solar energy displaces the use of fossil fuels thus reducing greenhouse gas emissions
- ▶ versatile solar technology systems allow for applications on or off the electrical grid
- ▶ energy from the sun is virtually free after the initial investment has been recovered.

WHAT CANADA CAN PROVIDE

Canada's solar industry can provide a broad range of scalable, versatile technologies, products and services including:

- ▶ Turnkey solar heating projects for various commercial, industrial, institutional and residential applications
- ▶ Solar collectors

- ▶ Design of solar electric systems for off-grid, remote or northern locations
- ▶ Design of solar electric systems for grid-tied applications
- ▶ Consulting services for site assessment, load analysis and system design
- ▶ Photovoltaic modules
- ▶ Portable solar chargers
- ▶ Solar thermal equipment for air ventilation and water heating
- ▶ A wide range of balance of system components like solar charge controllers and inverters.

WHY CHOOSE CANADIAN PRODUCTS

Canadian companies offer cost competitive and high technology products and services. These companies have world-class expertise derived from many domestic and international projects, such as:

- ▶ crop drying systems in Panama, Costa Rica, China and India
- ▶ transit system lighting in the United Kingdom and the United States
- ▶ off-grid power systems for rural telecommunication systems in the Philippines and Kenya
- ▶ heating systems for industrial, commercial and residential buildings in the United States, Europe and Japan.



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CANADIAN ACHIEVEMENTS

Through market-driven research and development, Canadian companies possess highly innovative technologies, and are established world leaders in several "green" heating, cooling and electricity fields. Knowledge-sharing, market stimulation and strategic partnerships and alliances helped sustain a total Canadian sales growth of over 40% for active solar thermal in 2004 and about 20% in 2005. A further 20% growth is expected in 2006. Recently, approximately 10% of all sales were to international customers.



Model 601 taxiway edge lights installed at Truckee Tahoe Airport, a premier general aviation airport located in California, USA.

(Photo: Carmanah Technologies Corporation)

Solar electric systems

Canadian industry has developed a variety of successful, inventive technologies, products and services, including:

- ▶ Solar-powered light emitting diodes (LED) used for various commercial applications including marine, roadway and transit lighting.



i-SHELTER™ solar-powered LED lighting kit on a shelter installed in Edinburgh, Scotland.

(Photo: Carmanah Technologies Corporation)

- ▶ Building-integrated photovoltaic (BIPV) applications to integrate seamlessly the photovoltaic arrays into the building's design.



Thermo Dynamics Ltd.'s reliable, compact and efficient residential Solar-Boiler™ systems installed in Switzerland by Thermo Dynamik SOLAR AG.

(Photo: Thermo Dynamics Ltd.)

- ▶ Photovoltaic integration in cold-climate off-grid applications in northern remote locations.
- ▶ Solar photovoltaic products for developing country applications.



SSP SuperFlex® modules, the most powerful flexible solar modules on the market, meet the high quality needs of marine, camping and recreational users.

(Photo: Spherical Solar Power, a division of Automation Tooling Systems, Inc.)

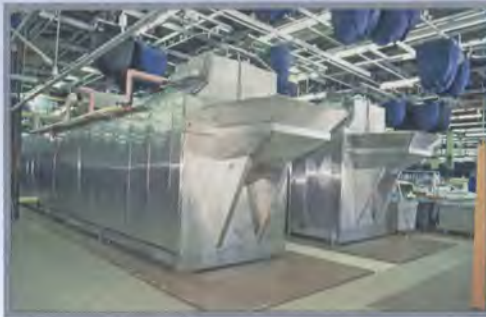
- ▶ Solar-powered consumer products.
- ▶ Lightweight and flexible photovoltaic modules specifically designed to adapt to a wide variety of applications in the recreational, transportation, building and power generation industries.
- ▶ Solar-powered alarm control systems for security monitoring and surveillance.

Canadian solar equipment and services provide innovative, high-class, flexible and sustainable solutions.

Solar thermal systems for water heating and swimming pools

Canadian manufacturers have developed some of the most cost-effective solar water heating systems in the world. Products and services include:

- ▶ "Off-the-shelf" solar water heaters that provide a clean alternative to gas, electric, oil or propane water heaters.



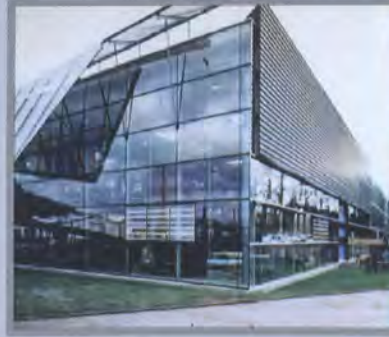
Solar energy preheats the water used by these commercial-scale laundry washing machines. (Photo: Natural Resources Canada)

- ▶ Freeze-protected solar water heaters specifically designed to operate reliably through the entire year, irrespective of outside temperatures being either well below freezing or extremely hot.
- ▶ Solar heating for residential or large swimming pools.
- ▶ Solar collectors, exchangers, pumps, tanks and controllers.

Solar thermal systems for air heating

Canada is a world leader in developing technologies and installing cost-effective solar air heating for buildings and process drying applications. The Canadian SOLARWALL® technology is a significant breakthrough resulting in a 40% improvement in performance and a 25% cost reduction over conventional solar air heating technologies. Canadian companies provide a full range of goods and services in solar air heating, including:

- ▶ cost-effective solar air heating systems for space heating and process drying applications.
- ▶ on-site field monitoring of commercial solar crop drying operations.



Award-winning SOLARWALL® panels installed on south wall of Metallau Eisenach manufacturing facility in Germany. The all metal system resembles traditional metal cladding, with the added advantage that it provides free heat and ventilation air. (Photo: Conservall Engineering, Inc.)

Solar thermal systems for air cooling

Solar thermal systems are uniquely suited for air conditioning as the supply of energy is coincident with the cooling demand. Solar vacuum collectors provide about 1 tonne of cooling per 10 m² of collector area. Solar thermal cooling systems can also be designed to provide hot water, cooling and space heating.

FUTURE TRENDS

Energy use is a global environmental concern. It is estimated that the total world consumption of energy is expected to expand by 54% by 2025. New and improved renewable energy technologies will be required to combine the growing need for heating, cooling, electricity and the effective mitigation of greenhouse gas emissions.

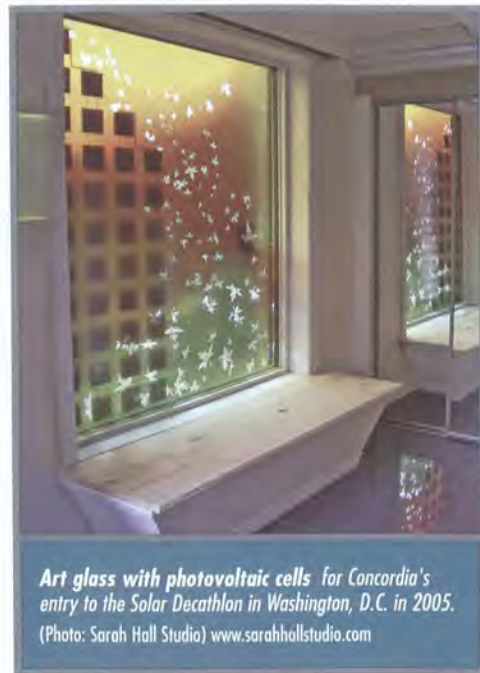
In the past few years, modern solar technologies have been penetrating the international market at progressively faster rates. The global market for solar technologies is growing by over 25% a year. Drivers behind this phenomenal growth include international action on climate change, energy security, demand for improved air quality, technological advances and energy deregulation. The Canadian solar technologies industry is positioned to play a key role in this promising and dynamic market.



The Power-Spar® revolutionary high efficiency solar concentrator provides heat, hot water, and electrical power to existing buildings or used in custom construction. (Photo: Menova Energy Inc.)

WOULD YOU LIKE MORE INFORMATION ON CANADA?

- ▶ The **Canadian Solar Industries Association (CanSIA)** is the national voice of the solar industry in Canada. Visit www.cansia.ca.
- ▶ The **Solar Energy Society of Canada Inc. (SESCI)** is a national organization with chapters or affiliates across Canada and operates as the Canadian section of the International Solar Energy Society (ISES). Visit www.solarenergysociety.ca.
- ▶ **Industry Canada** provides information on Canada's renewable energy industries, their technologies and capabilities, and manufacturing and investment opportunities — presented at www.strategis.ic.gc.ca/rei.
- ▶ The **Renewable and Electrical Energy Division (REED) of Natural Resources Canada** promotes the development of sustainable renewable energy in Canada through investments in green heating and cooling, information on renewable energy technologies, and analysis of electricity issues. Visit www.reed.nrcan.gc.ca.
- ▶ The **Canadian Renewable Energy Network (CanREN)** increases the understanding of renewable energy to accelerate the development and commercialization of renewable energy technologies in Canada and in the world. Access information at www.canren.gc.ca/default_en.asp.
- ▶ The Government of Canada's **Clean Energy Portal** displays extensive information on Canadian capabilities in climate change and clean energy technologies, as well as details on Canadian Climate Change initiatives worldwide, located at www.cleanenergy.gc.ca.
- ▶ **Export Development Canada (EDC)** provides innovative commercial solutions including financing, insurance and bonding services in addition to foreign market and sector expertise. Visit www.edc.ca.



*Art glass with photovoltaic cells for Concordia's entry to the Solar Decathlon in Washington, D.C. in 2005.
(Photo: Sarah Hall Studio) www.sarahhallstudio.com*

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