RENEWABLE ENERGY TECHNOLOGIES

CLEAN ENERGY TECHNOLOGIES

SOLAR THERMAL ENERGY

In Canada, about 70% of the energy used in the residential, commercial, and institutional sectors is for heating air and water. This need is most often met by fossil fuel sources or electricity. Fortunately, Canada's great capacity for solar energy offers a more efficient, clean and renewable option to meet heating demands. The amount of radiative energy from the sun that heats building roofs and walls far exceeds the actual building energy requirements for heating over a typical year.

The solar thermal energy experts at CANMET Energy Technology Centre-Ottawa (CETC-O) work closely with Canadian industry and the research community to develop and promote solar thermal technologies. Activities include the advancement of designs, standards, rating and certification procedures, and technology and market assessments for a wide variety of applications in Canada and abroad. CETC-O also works closely with funding agencies to develop and support demonstrations of innovative solar thermal technologies with the building and energy service sectors across Canada.

The following are activities undertaken by the solar thermal energy experts of CETC-O:

Drake Landing Solar Community Project

The Drake Landing Solar Community Project in Okotoks, Alberta, spearheaded by CETC-O, combines energy efficiency residential building measures with Canada's first solar seasonal storage district heating system. The community of 52 homes is the first in the world designed to provide over 90 percent of its space heating needs from solar energy, on an annual basis. This is achieved through the use of an innovative underground thermal storage system.

To meet hot water demands, each home is also equipped with a solar domestic hot water unit that derives heat from unique, self-regulated solar panels installed on the roof. Using this system, 60 percent of the home's domestic hot water requirements are met by solar energy.

The greenhouse gas emissions reductions achieved by the community are about 6 tonnes per house, per year. Prior to the completion of construction, the project had already earned notable awards including: a Gold Award from the

The Drake Landing Solar Community in Okotoks, Alberta, Canada

Canada

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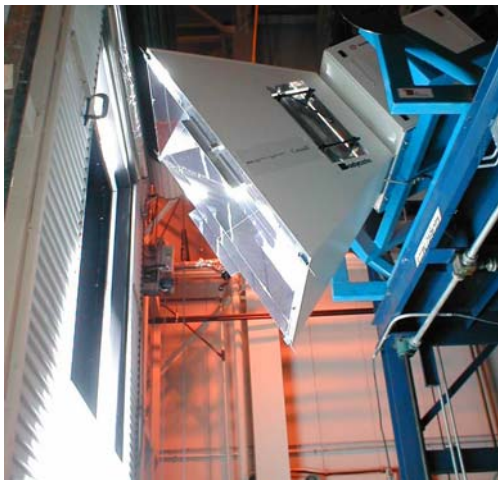
LivCom program (endorsed by the United Nations Environment Programme); and the Award for Best New Idea by the Alberta Home Builders Association.

National Solar Test Facility

The National Solar Test Facility (NSTF) is the leading centre for both testing and rating solar thermal products under controlled sunlight, temperature and wind. Located in Mississauga, Ontario, the NSTF has been used extensively by CETC-O and its partners for both standardized and developmental testing of solar thermal and photovoltaic energy equipment as well as other products. These efforts are facilitating the certification of products by the Canadian Standards Association.

The test equipment at the NSTF is owned by Natural Resources Canada and operated by Bodycote Materials Testing Inc. A Vortek 200 kW large area indoor solar simulator provides uniform irradiance closely matching the ASTM AM1.5 solar spectrum. This Vortek simulator is combined with an environmental control chamber and related calorimetric measuring equipment.



The Vortek 200kW indoor solar simulator at the National Solar Test Facility in Mississauga, Ontario.

SolarWall®

SolarWall ®, another award winning Canadian technology, was developed by Conserval Engineering with funding from Natural Resources Canada. This technology uses solar energy to heat ventilation air for large commercial, industrial and agricultural buildings. SolarWall® is the most cost-effective solar air heating system in the world because it is 40 percent more energy-efficient, and costs 25 percent less, than conventional products.

Feasibility studies and subsequent research papers produced by CETC-O led to increasing exposure for SolarWall ® among domestic and international networks of researchers and solar industry contacts. Demonstration projects have taken place in Italy, Germany, Austria and Switzerland. Performance assessments and technology improvements were made, and commercial opportunities for the SolarWall ® continued to arise.

The Bell's Corner Complex of CETC-O was the first government facility to utilize a SolarWall®. Heat from 700 square metres of solar panels installed on the southwest and southeast walls of one of the buildings supplement the natural gas heating system and provide about 35 percent of the heating load from solar energy. Other North American facilities equipped with the SolarWall® include: Toronto and Calgary City Maintenance Garages; the Windsor Housing Authority which is the world's tallest solar collector; Bombardier's 10,000 square metre SolarWall® located in Montreal, the world's largest solar air heating system; the Ford Motor Company's facility in Oakville which is the first SolarWall® to be monitored by CETC-O; the Federal Express distribution centre; and the new Wal-Mart energy efficient Supercentre store in Colorado.

SolarWall® is also used for agricultural drying applications in North America, Asia and Latin America. It serves as an alternative for using fossil fuels to dry products such as manure, walnuts, coffee beans, tea leaves and spices.

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