

# Solar Energy in Canada

Solar energy can meet three distinct applications: **heating water, heating air, and generation of electricity** in any residential or commercial setting. In most cases, solar energy provides the lowest lifecycle cost, and the lowest environmental impact from the release of greenhouse gases (GHG).

## Savings from Heating with Solar Air

Solar energy can be used to heat fresh air that is required for building ventilation, in process drying, and for stationary combustion systems. Most buildings require fresh air to be distributed through a ventilation system but, if the air temperature drops below 18°C, it needs to be heated before it can be distributed throughout the building.

Crop drying, manure drying, and textile drying are all examples of process drying applications where fresh outdoor air is heated so that it can pick up more moisture. There are also many types of stationary combustion systems, ranging from residential natural gas water heaters to large coal-based generating stations. Preheating the oxygen used in a stationary combustion system (and even fuel cells) will increase its operating efficiency.

Solar energy can cost-effectively pre-heat the fresh air that is required for these (and other) applications, thereby reducing the consumption of conventional energy resources, saving operating costs, and reducing the emission of greenhouse gases that are linked with global warming and climate change.

Perforated-plate solar collectors are widely considered to be one of the most cost-effective and most efficient solar technology for heating fresh air.

### Typical costs

Installations which are larger than 500 m<sup>2</sup> usually cost \$150 to \$200/m<sup>2</sup>. Medium-sized systems with areas of 100 to 500 m<sup>2</sup> can cost \$180 to \$220/m<sup>2</sup>. Small systems with less than 100 m<sup>2</sup> usually cost

\$200 to \$300/m<sup>2</sup>. Residential kits for the handy person are also available and cost about \$400 to \$700, excluding delivery.

There is little to no maintenance for a perforated-plate solar collector, so ongoing maintenance costs are assigned.

### Rates of Return

Solar energy technologies reduce greenhouse gas emissions, but the environmental benefits are usually not sufficient reason for a business or consumer to select a system for purchase. For those concerned about payback, solar energy systems such as perforated-plate solar collectors should be viewed as an investment. If the technology's predicted rate of return is as good or better than required, and the risk is in line with the rate of return, then the system should be purchased and installed on that basis.

For new construction and retrofit facilities, perforated-plate solar collectors commonly have internal rates of return (IRR) of 15 to 30%. For other projects, the IRR is usually 10 to 25%, a range of returns that is better than the best bank rates and higher than the discount rate used by most organizations.

### Typical savings

Because of the wide variation among Canadian regions in terms of climate, energy prices and operating conditions for a solar system, it is

inappropriate to predict a savings level from a perforated-plate solar collector system without a site assessment. A solar energy expert can provide a cost estimate or undertake a feasibility study. The federal department of energy, NRCan, has developed software that can provide a pre-feasibility cost assessment of a solar energy site anywhere in the country (or around the world). The software, RETScreen, is available for free download from the internet at [retscreen.gc.ca](http://retscreen.gc.ca).

## Incentives

In addition to a positive rate of return on investment, there are a variety of incentives for Canadian business to use perforated-plate solar collectors. Currently, there are no incentives for residential applications.

Through the Renewable Energy Deployment Initiative (REDI), NRCan offers a rebate equal to 25% of the total cost for installing a perforated-plate solar collector system (and solar energy systems when used to heat water). The REDI incentive is intended for installations that are primarily heating ventilation air, and the incentive is capped at

\$50,000.

For process air heating, Class 43.1 of the Federal Income Tax Act allows for an accelerated depreciation of renewable energy assets, including perforated-plate solar collectors. This advantageous depreciation schedule results in the purchaser receiving a tax break equal to almost 25% of the system capital cost.

Several Canadian utilities offer an incentive for investing in energy-saving technologies, including solar collectors. This incentive is usually based upon estimated annual displaced energy consumption and is usually equal to about 5% of the total cost for a perforated-plate solar collector.

If your building or application requires heated air, you should consider saving energy and money with a perforated-plate solar collector system. Internal rates of return are almost always better than the best bank rate.

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The **Canadian Solar Industries Association (CanSIA)**, with assistance from **Natural Resources Canada**, has produced this series of bulletins to explain the feasible applications of solar energy in Canada. To demonstrate how you can put the sun to work for you, CanSIA has posted these bulletins on its internet homepage, with additional information on solar energy and a comprehensive directory of companies that are involved in the design, sale and installation of solar energy across Canada. Members of CanSIA comply with a Code of Ethics. Please go to [www.CanSIA.ca](http://www.CanSIA.ca), or contact our office:

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