

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).

Heating your Home with Solar Air

Solar air systems lower heating bills by providing space heating on sunny days, but a solar air heating system works on cloudy days, as well.

The concept is simple: metal collectors with perforations throughout most of the surface area are attached to the south side of a building. As outside air enters the collectors and rises, it is warmed by the sun. When the warmed air reaches the top of the collectors, it enters the building through the home's distribution system, providing fresh pre-heated air to improve indoor air quality and to reduce the demand for space heating.

On some units, heat leakage from a building through the wall is captured in the air stream of the collector, and this warm air is also returned to the building when the unit fans are running, providing an insulation value equivalent to RSI 10.

In a residential application, a solar air heating system can pay for itself immediately when used in new construction because the cost is about the same as installing brick siding on your house, and you are simply buying one product instead of another. On retrofit installations, the payback can be as short as one year.

Systems offer a ten-year warranty, with a life expectancy of at least 25 years, and they are maintenance-free and aesthetically attractive. A solar air heating unit that is mounted on a south wall can also help to keep your house cooler in the summer by shading the main wall, and venting the

warmed air away from the building to reduce the heating load. You can also bring in cool night air by running fans at night.

There are a number of strong environmental arguments for the use of solar air heating in the Canadian residential market.

A system will reduce the emission of greenhouse gases and pollutants that cause acid rain, by reducing the amount of fossil fuels that are used to generate electricity or to provide space heating in homes. It also results in significant improvements in the ventilation inside a home.

Costs

The cost of a residential solar thermal air heating system ranges from \$8 to \$12 per square foot, plus installation. The amount of collectors required to produce a given amount of space heat (and the resulting cost) will vary from region to region due to the differing levels of solar radiation. Designers estimate that a system will produce between 300 and 1,000 kilowatt-hours a year for every square metre of collector surface area (kWh/m²/a), for locations ranging to regions in Canada with the lowest solar insolation levels to regions with high levels of sunshine.

Energy output on a sunny day will be up to 500 watts of heat per square metre, or 150 Btu/hr per square foot. Savings also vary, based on region and location, as well as on factors such as hours of

operation, air flow rate and quantity of insulation in the walls.

Any home or cottage that has a south-facing wall with no obstructions can benefit from a solar air heating system.

As with other solar energy technologies, there are some common misperceptions:

Myth: Solar air heating is too expensive.

Fact: With today's technology, a solar air heating system for residential applications can prove very beneficial. At \$298 for a four-panel kit, this type of system can pay for itself several times over in its lifetime.

Myth: It doesn't look attractive on my house.

Fact: Solar air heating systems come in many shapes and colours to match the owner's taste (although dark-coloured collectors have the highest energy efficiency).

Another benefit of solar air heating is the use of ducting to destratify the air in your house, by mixing the air that comes into the building from the collectors with the hot air that is rising inside the building. This process takes advantage of the inside air that has already been heated. This type of system can combine the comfort of warmth with a good supply of fresh air when it's cold outside, and cool fresh air on summer nights.

Overall design considerations

Every building is a bit unique, and the final responsibility for conforming to local regulations, design and installation of a system lies with the designer and installer, in consultation with the owner.

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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, or contact our office:

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