

Canadian Renewable Energy Alliance

promoting a transition to renewable energy

Green Heat

Green Heat is the use of renewable energy to heat or cool a building (or heat water) using these technologies in the residential or commercial-institutional (C/I) sectors: geothermal (earth energy) heat pumps, solar thermal water heaters, solar thermal air pre-heaters, and advanced biomass heaters. All these technologies perform best when the building has optimized its demand with energy efficiency and conservation measures.

Unlike green power (electricity from wind turbines, solar PV, small hydro) or green fuels (transport fuels from ethanol, biodiesel), Green Heat technologies provide low-grade thermal energy for low-grade thermal applications, and displace the need to combust natural gas, oil or propane for space / water conditioning.

Canada consumes large amounts of conventional energy for heating, and 1,500 million m² of floorspace in 12.2 million homes consume 1,458 PJ of secondary energy, while 548 million m² in C/I buildings consume 1,180 PJ each year. Total emissions of greenhouse gases are 79.8 Mt and 69.3 Mt, respectively, within these applications:

	Residential energy – PJ	Residential GHG – Mt	C/I energy – PJ	C/I GHG – Mt
space heating	873	45	644	36
water heating	312	17	76	4
space cooling	18	1	73	5
lights / electrical	255	16	387	25
total	1,458	80	1,180	69
Green Heat potential	83 %	80 %	67 %	64 %

In Canada's residential sector, 1,203 PJ of energy (83%) is consumed for applications that could be reduced by the range of market-ready Green Heat technologies, plus another 794 PJ (67%) in the national C/I sector. Annual emissions of 64 Mt and 45 Mt (respectively) could be displaced with greater Green Heat uptake in these two sectors alone.

For each residential dwelling in Canada (house or apartment), Green Heat can reduce annual energy consumption by 98,606 MJ and reduce GHG emissions by 5.2 tonne. For every m² of residential space, Green Heat can reduce consumption by 802 MJ and by 1,449 MJ in C/I buildings, with a reduction of 0.4 t and 0.8 t of GHG emissions each year.

This level of almost 2,000 PJ of low-grade thermal energy is equivalent to 60 billion kWh of electricity, and the 109 Mt of emissions is higher than all coal-fired generating facilities.

Two basic steps are required in Canada to increase awareness of the appropriate use of low-grade thermal energy for low-grade thermal applications:

- quantify and qualify the potential for Green Heat to provide secondary energy and to reduce GHG emissions from space & water conditioning applications; and
- implement policies to increase the feasible use of Green Heat technologies.

Most Green Heat output is 'behind the meter' and, therefore, not viewed on the same economic level as green power or green fuels (i.e. it is never included in any report). There is no federal support for Green Heat; the only program (Renewable Energy Deployment Initiative) was demanded by Finance Canada to offset the monetary and fiscal disincentives to Green Heat technologies in relation to conventional energy sources. Industry groups (Canadian Solar Industries Association and Earth Energy Society of Canada) have estimated that their installations displace the emission of almost 1 Mt of GHG a year.

In Europe, the Renewable Energy Council called for a European Union Directive to support 'renewable heating' and, in February 2006, the European Parliament directed the EC to develop a directive to promote Green Heat. Half the energy on that continent is consumed for space heating, and politicians want the share of Green Heat to double by 2020.

A 2004 report from the David Suzuki Foundation estimated that 80,000 new jobs would be created by 2025 in Ontario alone from greater uptake of Green Heat. A GreenTherms Standard (requirement for an increase in Green Heat use, similar to a Renewable Portfolio Standard for green power) could displace combustion of 1 billion m³ of natural gas by 2020 from geothermal heat pumps alone, and that gas could then be used for centralized power generation, hydrogen production or

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export to the U.S. There was no value placed on the potential savings for reduced need of transmission upgrade from such an initiative.

Recommendations for Governments and Other Actors to Promote Green Heat

A number of measures should be undertaken to promote Green Heat:

- ▶ Governments (federal AND provincial) should set targets for the sourcing of green heating and green cooling from renewable sources in all their buildings;
- ▶ Regulators should impose GreenTherms Standards to require distributors of thermal heating fuels to source an increasing percentage of energy content from eligible Green Heat technologies, with a target of 20% by 2020;
- ▶ Governments should provide financial support to offset any first-cost premium of a Green Heat installation;
- ▶ Building managers of government facilities should be required to evaluate comparative costs of Green Heat compared with conventional heating alternatives;
- ▶ Energy service companies (ESCO) and energy performance contractors should be encouraged to install and maintain Green Heat facilities in government buildings;
- ▶ Governments should promote 'off-carbon' initiatives, similar to 'off-oil' campaign of the post-OPEC crisis, to raise public awareness of the available options;
- ▶ Tax law should expand the use of CCA class 43.1 to make Green Heat technologies eligible for accelerated capital cost allowance;
- ▶ Emission trading credits should include the deemed GHG mitigation from Green Heat technologies, and Green Heat options should be eligible under CDM / JI activities;
- ▶ Collection of accurate and timely data on existing installed capacity, thermal output and GHG impact of all Green Heat technologies should be undertaken;
- ▶ Governments should place greater emphasis on lifecycle costing of energy systems, to encourage consumers to understand the combined value of installation AND operating costs for each technology option.

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