



DOES IT MAKE A DIFFERENCE FOR HOME-OWNERS?

"Knowing what I know now as far as cost savings, I would consider the ground-source heat pump again, especially for a family with two small children," commented Mr. Barnes. According to Mr. Gallant, "the geothermal units are fantastic and very economical too."

DEVELOPING THE CANADIAN MARKET FOR GROUND-SOURCE HEAT PUMPS

Renewable forms of energy such as solar, wind, biomass, hydro, and earth energy produce low or no greenhouse gas (GHG) emissions. The Government of Canada encourages their use because of Canada's international commitment to reduce GHG emissions related to climate change. Natural Resources Canada's Renewable (NRCAN) promotes investments in renewable energy systems, such as ground-source heat pumps or earth energy systems, for heating and cooling. NRCAN promotes market demand for renewable energy systems and ensures that strong industry infrastructures are in place to meet consumer demand.

For more information on the REDI program, contact:

Natural Resources Canada
Renewable and Electrical Energy Division
Energy Resources Branch
580 Booth Street, 17th Floor
Ottawa ON K1A 0E4
Fax: (613) 995-0087
Web site: www.nrcan.gc.ca/es/erb/reed

For information on ground-source heat pumps, contact:

CANMET Energy Diversification Research Laboratory
1615 Lionel-Boulet Blvd., P.O. Box 4800
Varenes QC J3X 1S6
Fax: (514) 652-5177
Web site: <http://cedrl.mets.nrcan.gc.ca>

Earth Energy Society of Canada
130 Slater St., Suite 1050
Ottawa, ON K1P 6E2
Telephone: (613) 230-2332
Fax: (613) 822-4987
Web site: www.earthenergy.ca

Geothermal Heat Pump Consortium, Inc.
701 Pennsylvania Avenue, NW
Washington, DC 20004-2696
Telephone: 1 888 255-4436
Web site: www.geoexchange.org

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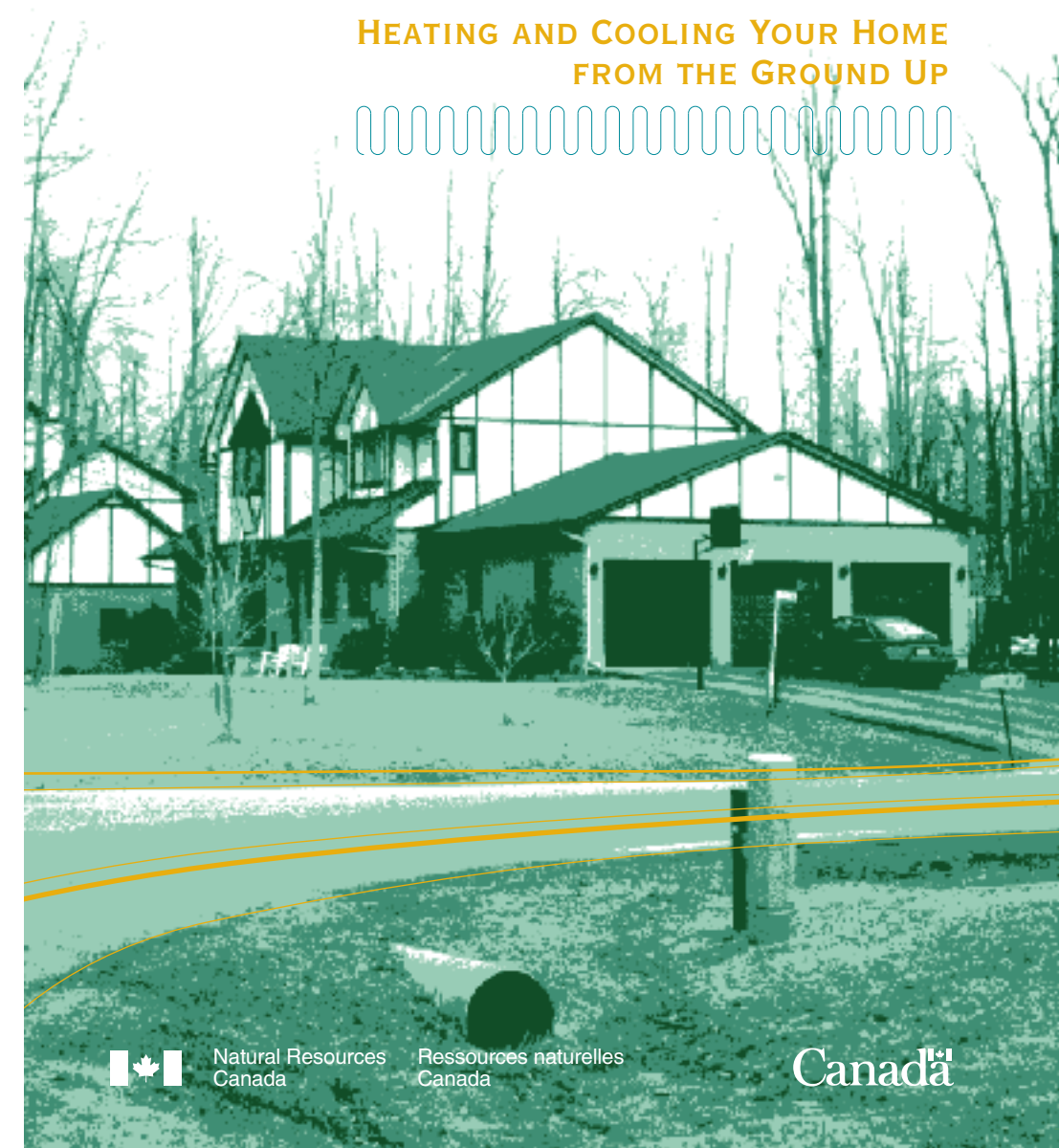
Cette publication est aussi disponible en français sous le titre : *Les pompes géothermiques : puisent l'énergie du sol pour chauffer et climatiser votre maison*

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GROUND-SOURCE HEAT PUMPS

HEATING AND COOLING YOUR HOME FROM THE GROUND UP



Natural Resources
Canada

Ressources naturelles
Canada

Canada

ENVIRONMENTALLY FRIENDLY AND THEY SAVE MONEY, TOO!

Shadow Ridge Estates in Greely, Ontario, is an excellent example of why choosing geothermal heating and cooling systems is a major plus for both builders and home buyers!

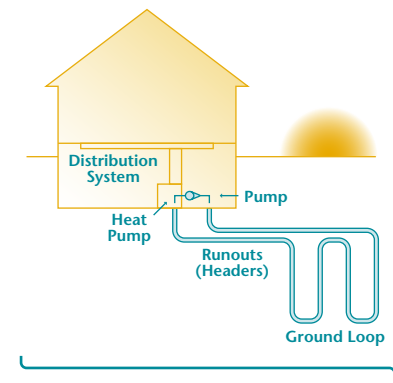
"I originally was drawn to this system because it is so energy-efficient and environmentally friendly," Don Cardill, owner of Donwel Construction, explained. Mr. Cardill quickly found out that offering a ground-source heat pump that heats a home in the winter and acts as an air-conditioning unit in the summer is a great selling feature for new home buyers. "We can offer our customers something nobody else does – and it's the same price," he said.

HOW THEY WORK

Geothermal heating and cooling systems (also called earth energy systems, ground-source heat pumps or GeoExchangeSM systems) are heat pumps that collect and transfer heat from the earth through a series of fluid-filled, buried pipes running to a building, where the heat is then concentrated for inside use. Ground-source heat pumps do not create heat through combustion – they simply move heat from one place to another.

Heat pumps also operate in reverse to cool a home by transferring the heat out of the house, where the cooler ground absorbs the excess heat. The system is appealing because a single system can be used for both heating and cooling, thus eliminating the need for separate furnace and air-conditioning systems.

Ground-source heat pumps offer a different kind of heating. Unlike conventional forced-air furnaces, geothermal units offer a steady heat. "There is no "blast" of hot air—it provides a constant heat," said Mr. Proudfoot, a satisfied customer and three-year home-owner in the community "But what we really like is that it's a clean heat – there's no residue or dust around the house like there was with a forced-air heating system in our home in the city."



Geothermal units are also extremely efficient in cooling homes. "I'll put it up against any external air conditioner – they are very efficient," said Bill Barnes, a 10-year resident of Shadow Ridge Estates. "We can cool the main floor of our house down in just one hour. We couldn't do that with our old system."

"I really like the fact that there's no big noisy implement outside my house to provide air conditioning. This is part of the furnace," said Mr. Gallant another homeowner. "The fact that the air conditioning came with our house was a definite bonus," said Mr. Proudfoot.

OTHER USES

At Shadow Ridge Estates, ground-source heat pumps in some homes also provide:

- radiant floor heating
- heating tubes in laneways to melt snow in the winter
- hot water for outside hot tubs and
- energy to heat hot water.

COST SAVINGS FOR HOME-OWNERS

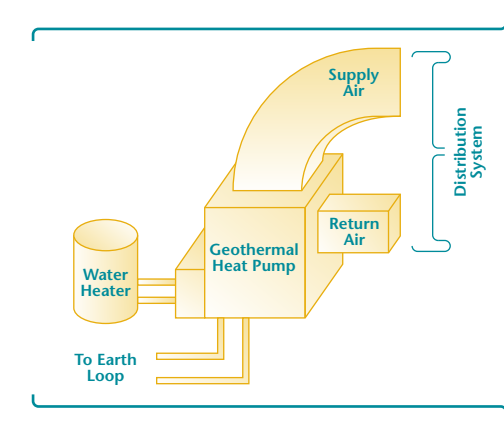
There are significant cost savings in the monthly hydro bills of people with ground-source heat pumps. A 2,000 sq. ft. (185.8 m²) home built above R-2000 standards at Shadow Ridge Estates had an air conditioning cost of less than \$50 for the whole cooling season and a heating cost of less than \$300 for the entire winter!

MAINTENANCE

Yearly maintenance of ground-source heat pumps is simple and straightforward. "They come in and do an acid wash to clean the pipes and make sure there's no buildup of mineral sediments," commented one home owner, Barry Proudfoot. Maintaining the system has also been positive for Bill Barnes. "We only had to replace our well pump once after 10 years of operation," he commented.

TECHNICAL DATA

The soil at Shadow Ridge Estates is a sand and gravel mix that is ideal for a ground-source heat pump system. Homes in the first five phases of the development have an open-loop design for their ground-source heat pumps. Each unit is connected to its own well and washes water through to a 25 ft. (7.6 m) deep hole on each property. There is about 40 ft. (12.2 m) of 1 1/4 inch (3.2 cm) piping from the home to the well for the open loop system.



The sixth phase will offer a closed-loop system that runs off a communal water and septic/peat bed system. This change was inspired by recent changes to environmental regulations requiring a home to have 1 hectare of land for a septic tank. Mr. Cardill's solution means that he can have smaller lots and still offer customers an environmentally friendly and efficient heating and cooling system. Donwel Construction uses 200 ft. (61 m) of piping per ton of furnace.

In the closed loop system the pipes are buried at 25 ft. (7.6 m) or at the water table, whichever is lower.

Homes in Shadow Ridge Estates have both forced-air and hydronic heating systems. All homes have forced-air units, and the heat pumps in homes with radiant floor heating have hydronic capability. All units are rated as high-efficiency heat pumps.

The size of the heat pump is measured by tonnage* according to the size of the home. For example, a 5 ton unit in a 3,600 sq. ft. (334.5 m²) home provides 62,600 Btus of heating and 54,700 Btus of cooling. A 2 ton unit in a 1,500 sq. ft. (139.4 m²) home provides 22,000 Btus of heating and 24,000 Btus of cooling.

* A ton equals 200 Btus per minute of energy

