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EARTH MOTHER; Business begins tapping into geothermal technology

Cambridge company is one of the industry leaders in tapping into planet's heat source

Clare O'Hara

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Twenty five years ago Cheryl Marco and her husband Stan made the decision to purchase a geothermal energy system for their home, a system that not many people would have even heard about at the time.

Today, Cheryl is president of Cambridge-based GeoSmart Energy, Canada's fastest growing geothermal heat pump brand.

"We were probably the first people in Manitoba to install a geothermal system," she says. "We had no idea what these things were but decided to research geothermal energy further. We loved it so much that we eventually decided to go into the industry."

Although GeoSmart Energy opened only two years ago, Cheryl and Stan Marco are far from beginners when it comes to geothermal energy. While living in Manitoba, Stan was working independently when he was approached by WFI Industries Ltd. to set up some projects in Canada. WFI is American, one of the world's largest geothermal equipment manufacturers, and they've been producing geothermal equipment for over 20 years.

Accepting their proposal, the Marcos moved to Leamington, Ontario where Stan became the president of WFI in Canada. That was 15 years ago. Since then, Cheryl has gained experience in sales/administration and system installation in the geothermal industry.

GeoSmart Energy's national head office and resource training facility is located in Cambridge, where a 6,100 square foot facility houses close to 2,000 square feet of office space, a permanent training and testing facility, and 4,000 square feet of warehouse space. This is the place candidates interested in becoming geothermal energy installers come for training.

"We don't stock anyone that hasn't taken our training program for installers," says Marco. "We are a distributor so we train here in Cambridge and people all across Canada come here for the program." Geothermal energy was developed in 1903 in Italy by Giovanni Conti. Although it has been around for over 100 years, many people still have no idea what it is and how it works.

Geothermal literally means "earth heat" and the secret of a GeoSmart Energy system is the earth's ability to store heat. In fact, almost 50 per cent of the sun's energy that reaches our planet is absorbed into the earth.

That's 500 times more energy than all of humanity would need in a year and it's an unlimited energy source.

The GeoSmart Energy system is a technology designed to provide 100 per cent heating and cooling from ground source energy. By using the earth's thermal properties in conjunction with electricity it can provide whole-home-space conditioning and unprecedented efficiency. By simply moving heat energy to or from the home and earth through a ground loop system, a geothermal unit achieves efficiency levels that ordinary gas furnaces or air conditioners are unable to reach.

With rising energy costs home and business owners are looking for energy efficient solutions that are also eco-friendly. Geothermal byproducts can be added to your hot water tank or transferred to your swimming pool, so for eight months of the year you have free hot water.



Photo by Stephen Uhraney

Cheryl Marco is president of GeoSmart Energy in Cambridge, a company that taps into underground energy sources to make our lives better and the world a little cleaner.



Photo by Stephen Uhraney

Cheryl Marco, president GeoSmart Energy in Cambridge, surrounded by geothermal ground source heat pumps and coiled in 100 per cent virgin pipe.

"For every unit of electricity the system uses, it provides four units of heating energy, giving a geothermal system an on average 400 per cent efficiency rating," says Marco. "These numbers can translate into real savings on your utility bills year-round. It's free energy from the ground! "

Due to the efficiency of a GeoSmart Energy system, the energy savings can be enough to offset the capital cost associated with the installation of the equipment. A GeoSmart Energy system operates more efficiently than ordinary heating and air conditioning systems - in most cases, 30 to 70 per cent more efficiently.

Once installed the GeoSmart Energy system resembles a conventional forced-air furnace. The system extracts heat from a series of closed loop pipes buried outside of the building and transfers it into the mechanical room directly to the GeoSmart Energy unit.

From there the system superheats the free energy and distributes it through the building by way of forced-air or infloor heating.

In the summer months, the system simply reverses and extracts heat from the building for cooling and moves the heat to either the domestic hot water tank or into the closed loop pipes outside.

The looped pipes can be installed four separate ways depending on available space and installation costs.

Where there is adequate land space horizontal loops can be laid down under a parking lot or front lawn. Vertical loops are used when space is limited and drilling can be done directly beneath the building or a small area.

"Horizontal is the most often used loop installed, but if you are in the city where space is limited a vertical loop can be done right beneath the structure," says Marco.

Pond or lake loops can be done if there is an adequate sized body of water close to the building, and because there are no excavation costs, this is also one of the most cost effective loop systems. Open loops are used where there is an abundant supply of quality well water to support both the domestic use and the GeoSmart energy unit.

GeoSmart Energy has worked on numerous projects since its inception in May 2005.

Lange leads the way

Lange Transportation became the first company in Canada to retrofit a large warehouse with geothermal technology and GeoSmart Energy was hired to do the engineering. Local projects have included Challenger Motor Freight in Cambridge and Enviro-Eze Transport Inc. in Elmira.

"We always have bids going on with all kinds of different opportunities both locally and nationally," says Marco. "Our most recent project, and probably the biggest project we've done, was the Guelph Hydro building. That was a big project in a beautiful building and it is all very energy efficient."

In October 2006, Guelph Hydro Electric Systems Inc. opened a second phase of their headquarters' building, an expansion to the existing building that opened in 1995. Along with the geothermal system, the building also included a thermal and photovoltaic solar system.

"We have had a geothermal system for the last 12 years," said Roy Burch, manager of Loss Prevention and the company representative for Guelph Hydro. "We are very energy conscientious here at Guelph Hydro and we wanted to continue that awareness with the new addition."

Reducing emissions

With the geothermal energy technology alone, it is projected to reduce energy needs by 40 per cent in comparison to conventional HVAC systems. By using the geothermal system Guelph Hydro will be eliminating 300 tonnes of CO2 emissions annually - the equivalent of taking 60 cars permanently off the road. The cost of the installation was originally estimated to take eight years for payback, but with today's increasing costs of natural gas, that has been reduced to five or six years time.

With a 37,000 square foot addition to the existing 36,000 square foot building, Guelph Hydro had to add an additional 20 wells with five rows of horizontal looping to keep the building running efficiently.

"We believe that our building and the geothermal technology it uses can be a model for other companies in Ontario to conserve energy and reduce their operating costs," said Art Stokman, president of Guelph Hydro, in a press release earlier this year.

"Guelph Hydro Electric Systems Inc. intends to set a very high example of environmental performance both of our own community and elsewhere, and by creating a more sustainable and 'green' building we believe we have achieved this."

Along with being environmentally friendly and cost efficient, there are additional benefits to geothermal systems. They run quietly, unlike noisy outdoor air conditioners, as well as take up limited space as visual components are all kept in the mechanical room.

The system is also one of the safest for use in home or office - because no fossil fuels are



Installing looped piping.

required to operate a GeoSmart Energy unit, there is no combustion, flames or fumes and no chance of carbon-monoxide poisoning.

"One of the main benefits is comfort," says Marco. "It's very comfortable. You will never have the chill you sometimes feel with a gas system or when you have an electric air conditioner. Geothermal provides consistent comfortable heating and cooling that is reliable."

With 70 dealers across Canada and already some set up in the U.S., GeoSmart Energy is definitely in a growth phase.

"We are doing very well," says Marco. "We have exceeded our estimations and surpassed our business plan."

While the system works extremely well for commercial applications, including warehouses, it can also be used in other situations. Restaurants may want to invest in one for kitchens which can become unbearably hot. The system can cool the kitchen while supplying the restaurant with free hot water. Ice hockey rinks can take the heat out of their water and produce ice - GeoSmart Energy has done this for curling rinks. The rinks are then left with a fair amount of by-product that can be used to heat the building for free.

Future projects for GeoSmart Energy include branching south to the tropical resorts of the Bahamas. In a place where there is an abundance of heat, the geothermal system will be able to eliminate the heat within buildings and put it back into the water heaters for resort swimming pools, kitchens, bathrooms and washing machines.

"There is so much to do if you use your imagination," says Marco. "There are just so many uses for this type of heating and cooling, and it is not always the standard stuff that we usually think of."



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