

Community ice rinks go underground for energy savings

Submitted by Manitoba Hydro

With another cold Manitoba winter approaching, it is only a matter of time before winter athletes and enthusiasts move indoors to enjoy their favourite pastime. Community ice rinks are faced with the challenge of keeping athletes, spectators, and staff comfortable while keeping operating costs down and maintaining energy efficiency. With these goals in sight, some community ice rinks have installed geothermal heat pumps as the answer to an efficient and comfortable heating and cooling system that also benefits the environment.

Geothermal heat pumps can cut energy costs anywhere from 50-70% over conventional chiller and heating systems. These operations cost savings allow communities to enjoy the benefits of artificial ice rinks at a fraction of the cost.

Community centre boards, which often manage ice rink facilities, have a long-term focus that makes geothermal a perfect fit.

The life cycle cost savings of geothermal heating can save the community a significant amount of money over the years, which can be reinvested in the facility or other community programs. "For community or municipal boards, geothermal offers them an opportunity to use capital dollars to leverage additional operational funds that can provide more services for the community. It's really a win-win situation for both the facility and the community," says **Domenic Marinelli**, Marketing Specialist from Manitoba Hydro's Earth Power Program.

In addition, maintenance and repair costs are smaller in scale and easier to manage because several geothermal heat pump units are used, rather than one or two very large conventional chillers.

In 2003, the community of Reston installed a geothermal heat pump in their ice rink. "We are quite happy with the system," says Reston rink board member **Barry Hen-**

derson. "We saw savings of \$10,000 in the first year and we are still getting savings. We save in the summer with the air cooling system and system maintenance has not been a problem."

Geothermal heat pumps are great at supplying efficient heating, and they can also produce ice. The system can become even more efficient if the heat produced during the ice making process is recovered and used to heat the lobby, dressing rooms, or even an attached community centre.

A geothermal heat pump moves heat into or out of the earth by using water wells or a network of pipes buried in horizontal trenches or vertical boreholes. During the heating season the heat pump draws heat from the earth and pumps it into the building. During the cooling season the system operates in reverse, removing heat from the building and pumping it into the earth. As Domenic Marinelli explains, this transfer of heat is responsible for the system efficiency, "because you are moving heat in and out of the building instead of creating it with an electric coil or gas burner, you can achieve efficiencies of more than 300%."

A distribution system is required throughout the building. In a forced air system, a fan in the heat pump unit blows air over a fan coil and the heated or cooled air is distributed through your ductwork to regulate the temperature in your building. In a hydronic system, hot water is circulated through radiators or a system of in-floor pipes to provide heat.

Geothermal heat pump systems are environmentally friendly and can help demonstrate a community's commitment to environmental stewardship. It will reduce a building's greenhouse gas emissions and harmful impacts on the environment. When combined with hydro electricity, geothermal heat pumps create no greenhouse gas emissions and have been recognized by both Natural Resources Canada and the US Environmental Protection Agency as one of the most environmentally friendly space conditioning options available today.

The Commercial Earth Power Program provides financial incentives to customers who install a geothermal heat pump system to replace a conventional electric heating system.

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Other ways your community rink can increase its energy efficiency

- Take ice shavings outside for melting, rather than melting them indoors.
- Reduce temperatures to 10°C at all times in unoccupied facilities.
- Replace older equipment with high-efficiency boilers and furnaces.
- Replace exit signs with LED exit signs.
- Replace T12 lighting with T8s.
- Install a parking lot controller to reduce plug-in expenses.
- Upgrade insulation in walls and roofs, and weather-strip windows and doors to reduce heat loss from the building envelope.
- Install programmable thermostats to control the indoor temperature.

Manitoba Hydro has provided financial incentives for 13 ice rinks to install geothermal heat pump systems. In total, these ice rinks are saving local communities more than \$95,000 a year in energy costs. “The program has been extremely popular with the rural community and municipal sector buildings, specifically ice rinks, since its inception in 1996. It’s only over the past few years that the private sector has stood up and taken notice to what the municipalities have been taking advantage for years,” adds Marinelli.

In most cases, municipally owned or operated buildings qualify for Power Smart for Business commercial buildings programs. Pre approval is required so it is important for municipalities to contact Manitoba Hydro for information before they get started. If eligible, Manitoba Hydro’s Commercial Earth Power Program can help your community evaluate the economics of a geothermal heat pump system for your ice rink. In addition, a financial incentive may be available to help offset a portion of the capital system costs.

For more information on Manitoba Hydro’s Commercial Earth Power Program, please visit the Manitoba Hydro website at www.hydro.mb.ca or call 1-888-MBHYDRO (1-888-624-9376). You can also email: earth-powerinfo@hydro.mb.ca. ☺

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