

Partners for Climate Protection

Greenhouse Gas Reduction Initiative of the Month

Geo-exchange heating system at Whistler's Spruce Grove Field House



Municipal Profile

Population: 10,228

PCP Member since: November 1997

Background

The Resort Municipality of Whistler, British Columbia, adopted its *Green Building Policy* in October 2008. The policy notes that “the built environment plays a key role in Whistler’s vision for the future.” During the Whistler 2020 consultations — a shared community vision developed more than three years ago and adopted in 2005 — community task forces emphasized the role of green buildings in creating a sustainable community. Constructing building to higher standards means that, Whistler will be able to achieve lower operating costs, better occupant health and a smaller ecological footprint.

Implementation and Approach

One such green building in Whistler is the Spruce Grove Field House. Installation of a geo-exchange system at the Field House began in 2001 and was completed in 2002.

Geo-exchange systems use the heat from the earth to heat buildings. The Spruce Grove Field House system consists, in part, of a heating loop – piping that contains a water-glycol solution and that is installed in underground bore holes. The heating loop is connected to a heat pump and an internal heat distribution system.



“This was our first municipal system,” says Ted Battiston, Whistler’s manager, Community Energy and Emission Reductions, “so direct experience was not widespread at

the time, either internally or within the heating, ventilation and air conditioning (HVAC) sector.”

Whistler therefore outsourced the mechanical design, ground analysis, testing and groundloop design, as well as the groundloop installation, to outside companies.

“We needed to first ensure that the architect, designer and engineers understood our motivation in terms of energy conservation and greenhouse gas (GHG) reduction technologies,” says Battiston. “We then completed detailed studies and an analysis of the return on investment before seeking buy-in from the key decision-makers and funders.”



Top: Spruce Grove Field House. Left: The geo-exchange heat pump. Photos courtesy of the Resort Municipality of Whistler.

Results

The geo-exchange system cost more than \$126,000 – about 85 per cent (\$107,000) of which was spent on purchasing and installing the equipment. Based on propane rates at the time, annual savings are about \$21,000. The payback period is 6.1 years.

The avoided use of 1,100 gigajoules (GJ) of propane has reduced GHG emission by 65 tonnes per year.

Electricity use, however, increased by about 200 GJ. “The heat pump runs on electricity,” explains Battiston. “If there was a boiler instead of a heat pump, there would be almost no electricity used for space heating requirements. However, a great deal more natural gas would be consumed.”

Lessons Learned

Battiston says the project ran smoothly. Communicating project results — particularly the benefits of green buildings and energy-efficiency investments — was critical. “It led to our success in promoting greater green building standards,” says Battiston.

For other municipalities that may be considering a geo-exchange system, Battiston advises, “Try to avoid the temptation to only look at capital costs. The true value of the investment must be considered and assessed over the life of the equipment – integrating a cost on carbon whenever possible.” He also suggests tracking and communicating system performance. Doing so makes it easier to recognize the benefits of investing in green buildings.

Future Direction

All municipal and community buildings are routinely evaluated for energy-efficiency upgrades. “The Field House will likely have a lighting audit and upgrade initiated in the next few years,” says Battiston.

Other green building projects that Whistler has recently worked on include a district energy system in the new Cheakamus Crossing neighbourhood, and a geo-exchange and solar hot water energy retrofit of the community pool. During the 2010 Winter Olympics, Whistler also opened its first certified “passive house” in Canada. This building was used by the Austrian Olympic Committee and Austrian Public Broadcasting during the Olympics.

A passive house is a building having an interior climate that can be maintained without an active heating and cooling system. By using a combination of super insulation, thick walls and windows, solar retention, ground heat and other technology, the building uses little or no energy for heating and cooling.

Further Information

Ted Battiston
Manager, Community Energy and Emission Reductions

Resort Municipality of Whistler
TBattiston@whistler.ca

Click [here](#) to download a copy of Whistler’s Green Building Policy.

Click [here](#) to check out the energy performance of the Lost Lake Passivhaus in real time.

The Partners for Climate Protection (PCP) program is a network of Canadian municipal governments that have committed to reducing greenhouse gases and acting on climate change. PCP is the Canadian component of ICLEI’s Cities for Climate Protection (CCP) network, which involves more than 900 communities worldwide. PCP is a partnership between the Federation of Canadian Municipalities (FCM) and ICLEI – Local Governments for Sustainability. PCP receives financial support from FCM’s Green Municipal Fund.