

- reduced CO₂ emissions by 170 tons annually
- reduced energy consumption
- increased happiness

THE LISTEL HOTEL

Swiss Solar Tech Ltd. 
Solar and Thermal Dynamics

Solar and heat recovery hybrid system



The Listel Hotel is the first hotel in Vancouver to install a cutting-edge renewable energy system. The hotel is reducing its carbon footprint -- and annual energy expenses -- by installing solar panels and a highly efficient heat recovery system.

The Listel is now tapping into the sun's abundant and easily-accessible alternative energy via solar thermal collectors to lower their heating costs and, most importantly, their carbon footprint. The hotel expects to reduce its carbon gas emissions by 170 tons annually.

Technical details. The Listel's customized system employs equipment typically used as a ground-source heat pump. Such pumps exploit the steady underground temperature to provide seasonal heating and cooling. The Listel's system however does not have an underground loop of liquid-filled tubing for geothermal exchange. Instead, the heat pump is connected to twenty solar collectors and a heat recovery system as well as a 20 ton air-to-water heat pump.

According to Roger Huber, owner of Swiss Solar Tech, "There is incredible potential for heat recovery, particularly when combined with the solar panels." Huber explains that the waste heat is collected from the cooling system (the air-conditioning chiller) to use as pre-heat for the domestic hot water and as heating support for the building. "This enables the existing gas-fired boiler to run less, since the heat pump has a much better co-efficiency rate than a gas boiler."

A computer-controlled system from Care System of Vernon BC, combined with a gas-fired boiler, provides heating and cooling of water and air for the 129 room hotel. The solar heat from solar panels on the hotel's roof is primarily used to pre-heat the domestic hot water. Solar-heated water is stored in a tank with a capacity of 4,500 liters.

The savings. The estimated pay-back time (amortization period) is less than six years, based on an estimated five per cent annual price increase on natural gas rates. A federal grant from the ecoENERGY for Renewable Heat Initiative reduced the cost of the solar part by 25 per cent.

The technical side of the new energy efficient system at the Listel Hotel:

The new system, which became operational in February 2008 at the Listel Hotel in Vancouver, employs equipment normally used as a ground-source heat pump, designed to exploit the stable ambient temperature of the earth to provide seasonal heating and cooling. The Listel design, however, doesn't have an underground loop of liquid-filled tubing for geothermal exchange; the heat pump is connected to 20 solar collectors and a highly efficient heat recovery system and a 50 ton air-to-water heat pump. It sounds complicated because it's different but technically it's actually very simple, simple and reliable. That's the beauty of it.

There is so much potential for heat recovery, and the combination with the solar is really perfect. We collect the waste heat from the cooling system (air conditioning chiller) to use as pre-heat for the domestic hot water and as heating support for the building in order for the existing gas fired boiler to run less, since the heat pump has a much better co-efficiency rate as a gas boiler. A heat pump has 5 kWh output on 1 kWh of electricity which is also known as the COP rate (co-efficiency rate). The computer-controlled system, still in combination with a gas-fired boiler, provides heating and cooling of water and air for the 125-room hotel. The solar heat from the 20 solar panels on the roof of the hotel is primarily used to heat the domestic hot water with a solar water storage capacity of 4,500 liters for pre-heating.

The Listel Hotel is known as "Vancouver's most art-full hotel**" and one of the city's most well-appointed boutique hotels. Its other green initiatives include

- composting food wastes and all recyclable materials;
- reducing use of electricity and water via programs including low-flow toilets and showerheads;
- a towel and sheet reuse program;
- providing all amenities in refillable dispensers; and
- being first hotel in Vancouver to go 100% smoke-free.
- The hotel's restaurant and bar – O'Doul's - is in the Green Table Network and Vancouver Aquarium's Ocean Wise program.

The Hotel Association of Canada gave The Listel the highest eco-rating of any Vancouver hotel - 4 Green Keys.

20 solar thermal collectors

Make: Viessmann

Model: Vitosol 100 SV1

Installed: 2008

Purpose: Heats Domestic Hot Water

Water, pre-heated by the hotel's solar panels and/or various heat-pumps, is held in the hotel's "pre-heated water holding tanks" the water is then cycled through this High Efficiency Boiler and then utilized as the hotel's domestic hot water supply.



High Efficiency Boiler

Make: CAMUS Microflame series 2

Model: MFNW-1000-E-02

Installed: 2008

Purpose: Heats Domestic Hot Water

Water, pre-heated by the hotel's solar panels and/or various heat-pumps, is held in the hotel's "pre-heated water holding tanks" the water is then cycled through this High Efficiency Boiler and then utilized as the hotel's domestic hot water supply. The boiler itself is a sealed combustion and fan assisted model delivering thermal efficiencies of 85% to 91%.

10 x 120 USG pre-heat solar storage tanks



1,200 USG high efficient boiler set to 60°C

20t Heat Pump

Make: TRANE WEATHERTRON

Model: TWA240BW0

Installed: 2008

Purpose: Pre-Heats Domestic Hot Water

Using an air to water system, this heat pump removes heat from the air and utilizes it to pre-heat the Domestic Hot Water by use of a heat exchanger. The pre-heated water is held in the hotel's "pre-heated water holding tanks".



Chiller Unit

Make: TRANE
Model: RTAA 100 ton chiller
Installed: 2006
Purpose: Chills Water

Water is chilled for use in the hotel's air-conditioning system by use of this Chiller Unit. The unit replaced an older model that had been in use since 1986, this more modern and efficient unit reduced the overall building's electrical consumption by more than 21% following installation.



50 ton Multi Stack

Make: MULTISTACK

Model: MS50Z6C1H-V

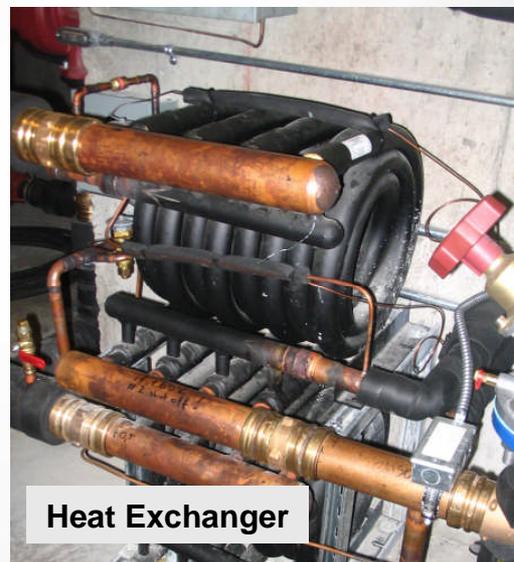
Installed: 2008

Purpose: Pre-cools water supply for Chiller Unit & Pre-heats water supply for DHW and space heating in building

Water is heated using the wasted heat generated by the Chiller Unit. This water is held in the hotel's "pre-heated domestic water holding tanks" and is providing space heating for the hotel building (so the 2x 2.5 Mio. BTU boilers will not be in operation most of the time). The now cooled water is sent to the Chiller Unit this allows the Chiller Unit to reach its cooling goals while expending less electricity since the water has been pre-cooled.



50 ton Multi Stack Heat Pump



Heat Exchanger