

COPPERHILL MOUNTAIN LODGE

Björnen, Åre - Sweden

Hotel, Spa and Conference centre

112 rooms and suites

Hydronic System

Year 2008



The exclusive hotel Copperhill Mountain Lodge is placed on the top of Mount Förberget, in the heart of Northern Europe's largest ski area. Member of *Design Hotel* group, it offers its guests unique facilities, including a helipad and a reserved access to ski slopes.

The Challenge

Absolute excellence. This was the investors' binding target in the realization of the new Copperhill Mountain Lodge. A complete range of facilities to satisfy even the most demanding requests for relaxation, adventure and fun had to be set for guests, with total respect for privacy.

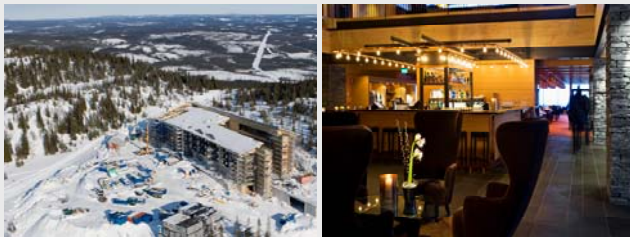
The 70 million euros investment would be signed by architect Peter Bohlin, the London, New York and Tokyo Apple Stores designer. The leading idea was the perfect integration in the surrounding environment, emphasizing the use of local natural resources such as wood, stone and copper.

The environmental impact had to be minimized from an energy point of view, and, at the same time, total comfort

for guests had to be guaranteed with no interruptions especially during the ski season, regardless of the harsh outside climate.

The rocky ground on which the Copperhill Mountain Lodge would be built had already inspired some possible geothermal applications. In this way it would probably be possible to reduce energy consumption to operate the structure with the smallest environmental impact.

With all these premises, investors were ready to evaluate various constructive and plant solutions. Their yardstick would be the *Life Cycle Cost* criterion.



Copperhill Mountain Lodge – Aerial view of the construction of the hotel and one of the indoor bars
www.copperhill.se

The Building

- Five levels over the ground with a large use of wood and stone

The size

- 112 rooms and suites, Conference capacity for 600 people
- Restaurants, bars, indoor pool, Spa, saunas, fitness area
- Helipad and ski facilities

The team

- Architectural Design Peter Bohlin
- Plant contractor VKG Fastighetsvärme
- Air conditioning system supplier Skiab

About Design Hotel™

Design Hotel™ is an international brand that embodies the best structures able to stand out for architecture, interior design, functionality and exceptional service. It provides an online booking service and a forefront support both for guests and members. Today it represents and markets a hand-selected collection of over 170 hotels around world.

The solution

The technical and economic analysis of the possible solutions confirmed the choice of a geothermal heat pump plant. Moreover this is a widely used technology in Sweden, and is appreciated for its efficiency and reliability.

An electric heat pump for geothermal applications is used for heating and hot sanitary water production. It is in Energy Efficiency Class A, with double screw compressors with modulating capacity control and can supply 600 kW of nominal thermal power.

Ambient distribution is achieved with radiant systems, placed mainly on the floor.

Heat exchange with the ground takes place by means of 92 vertical geothermal probes that go down 200 m. Water temperature to the heat pump is about 4°C all year-round. This allows direct intake to the areas that need cooling (*natural cooling*).

An emergency diesel generator guarantees operation even in case of interruption of the electricity network.

The Results

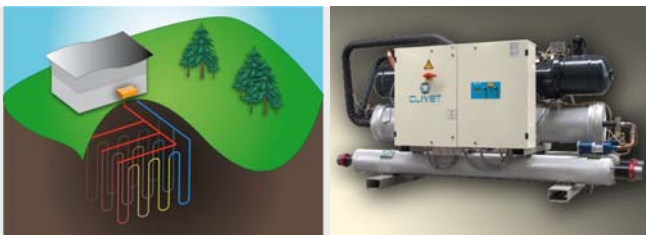
The Copperhill Mountain Lodge geothermal heat pump produces thermal energy with efficiency higher than 4 at full load. This implies a 60% primary energy savings compared to a traditional system based on the most efficient condensing boilers.

This is a system with Zero direct fumes and CO₂ emissions in the environment. It uses R134a ecologic refrigerant and, thanks to the total electric power supply, it makes the most of the renewable sources widely employed in Sweden for energy production.

The heat pump is installed in a plant room, perfectly integrated in the building, quiet and invisible from the outside. Its indoor installation, is sheltered from intense cold, and the stability of the geothermal source guarantees total comfort to guests regardless of outside conditions.

The low management costs of the plant, the thorough architectural integration and the maximum respect for the environment finally confirmed all expectations of both investors and their consultants as far as geothermal heat pumps were concerned.

For further information about Clivet systems:
www.clivet.com



Copperhill Mountain Lodge – Geothermal plant scheme and water-to-water heat pump

The System

- One 600 kW geothermal heat pump by Clivet, in energy efficiency class A with double screw technology, for heating and sanitary hot water
- Geothermal field made of 92 vertical probes with a development of 20 km
- Radiant distribution system
- One diesel generator in case of electric energy network failure

About Geothermics

Low enthalpy geothermics uses the ground as thermal energy source. By means of special heat pumps it is therefore possible to heat and cool buildings and producing sanitary hot water with high efficiency, regardless to outside climatic conditions. The most common geothermal probes used to transfer energy from the ground are formed by vertical or horizontal piping.