

1. Summary

Use of energy out of the lake Davos

Martina Weber

In this study we evaluate the potential of the thermal energy of the lake Davos in order to heat the planned tourist resort "Stillipark".

Seasonal stratification and mixing is a well known phenomenon in lakes in a temperate climate. In spring, the surface water rises in temperature due to solar radiation. This water body is called epilimnium. The warmer water with lower density is separated from the colder water by the thermocline. The water body below the thermocline with a temperature of approx 4 °C is called hypolimnium.

In 2006, a similar project was realised at the lake of St. Moritz. There, the water of the hypolimnium is used to run a heat pump. For this purpose the water is cooled down from 4 to 1 °C. The Palace Hotel is able to substitute 400.000 litres of oil per year by using this method.

Lake Davos is situated at 1560 m above sea level. It is used as a reservoir for hydroelectric power production during winter. The normal water level is achieved by mid June. From June to October 2007 the temperature profiles were measured in order to establish the depth and stability of the thermocline. In addition, temperature loggers were exposed for two weeks at the depth of 9 to 11 m, at the depth of the thermocline at that time.

The results clearly show the establishment of the thermocline during the summer season.

Different to St. Moritz, we propose to use the energy of the epilimnium to run the heating pumps. We estimate a potential of 9.500.000 kWh assuming a temperature difference of 10 °C. This compares to approx. 20.000 households using 4500 kWh per year.