

## Economical heating and cooling systems for low energy houses



### Switzerland

The Swiss national team is represented by the **Institute of Energy in Building** of the **University of Applied Sciences Northwestern Switzerland**.

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### Swiss national project

Switzerland has a strong growth in low energy houses since the introduction of the voluntary MINERGIE® label in 1998. Presently, about 15% of the new buildings are certified according to MINERGIE® and about further 15% are not certified, but comply with the MINERGIE® requirements.

In 2002, the MINERGIE-P® label, defining an ultra-low energy house, has been introduced, and in 2006, the MINERGIE-ECO® label followed, which considers besides energy and comfort as well health and sustainability aspects of the building materials. In Switzerland heat pumps are the market leading heating system in new single family dwellings, reaching a share of about 70% in 2005 and 2006. (Fig. 1).

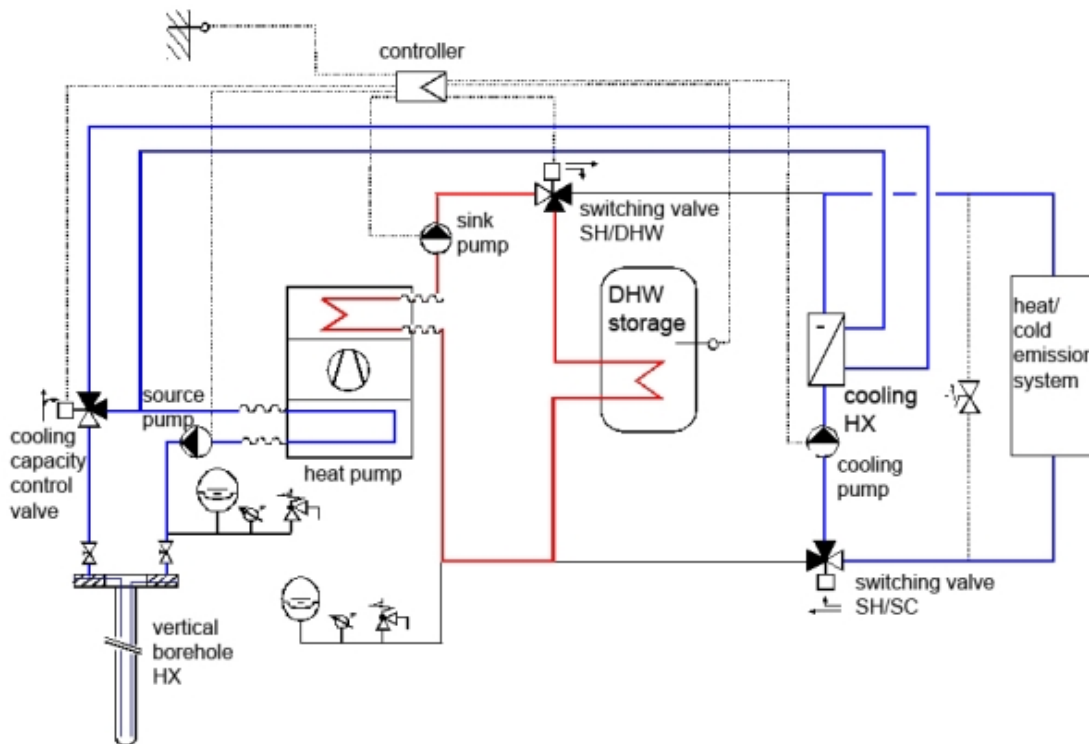


Fig.1 Standard hydronic layout for a ground-coupled heat pump system with passive cooling option and simultaneous space cooling-DHW production

The Swiss national project is dedicated to the evaluation of integrated heat pump system solutions for low and ultra-low energy houses including the function space heating, DHW and space cooling and an evaluation of the coupling the heat pump to the required mechanical ventilation system. The integration of the space cooling function is in focus, including passive cooling methods, as well, e.g. a direct cooling by ground coupling. The assessment will evaluate the energy consumption, operation limits and reachable comfort as well as robustness of the hydraulic configuration and design values. Moreover, field testing of systems will be performed. In 2007, a ground-coupled heat pump system for space heating, space cooling and DHW installed in the first MINERGIE-P® multi-family dwelling in the canton Basel has been instrumented with monitoring equipment and will be measured for at least one year. The system evaluation will yield an evaluation of the functionality and optimisation potentials.

Results shall yield:

- standardised system configurations for the application in low energy houses
- respective design guidelines
- field monitored best practice system

The Swiss activities are supported by the **Swiss Federal Office of Energy (SFOE)**

## Swiss links

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### SFOE heat pump research website

The website of the Swiss research program on heat pumping technologies, cogeneration and refrigeration of the Swiss Federal office of Energy (SFOE) provides information on the research programme and download of final reports of the research projects. Website in German, reports in German and French.

 <http://www.waermepumpe.ch/>



### Swiss heat pump association FWS

The website of the Swiss heat pump association provides news, market statistics, publications, events etc. Website in German and French.

  <http://www.fws.ch>



### Swiss heat pump test centre

The website of this Swiss heat pump test centre situated as the NTB in Buchs includes test criteria and download of test results for air-to-water, water-to-water and brine-to-water heat pumps for space heating (EN 14511) and DHW operation (EN 255-3).

 <http://www.wpz.ch>



### MINERGIE® Association

The website of this Swiss MINERGIE® Association includes all information concerning the Swiss low energy house labels, among others information on the requirements of the three labels MINERGIE®, MINERGIE-P® and MINERGIE-ECO®, downloadable publications and a data base of all registered MINERGIE® Buildings.

  <http://www.minergie.ch>



### IG Passivhaus Switzerland

The website of the Swiss passive house association provides information, statistics and qualification on passive houses in Switzerland.

 <http://www.igpassivhaus.ch>

## IEA HPP Annex 32

IEA HPP Annex 32 is a corporate research project on technical building systems with heat pumps for the application in low energy houses.

The project is accomplished in the Heat Pump Program (HPP) of the International Energy Agency (IEA).

Internet: <http://www.annex32.net>

