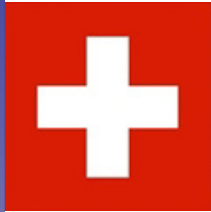


Economical heating and cooling systems for low energy houses**Switzerland**

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.

Switzerland has a strong growth in low energy houses since the introduction of the voluntary MINERGIE® label in 1998. Presently, about 25% 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 2011, the MINERGIE-A® label is introduced, which defines a highly efficient building with near zero energy consumption.

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).

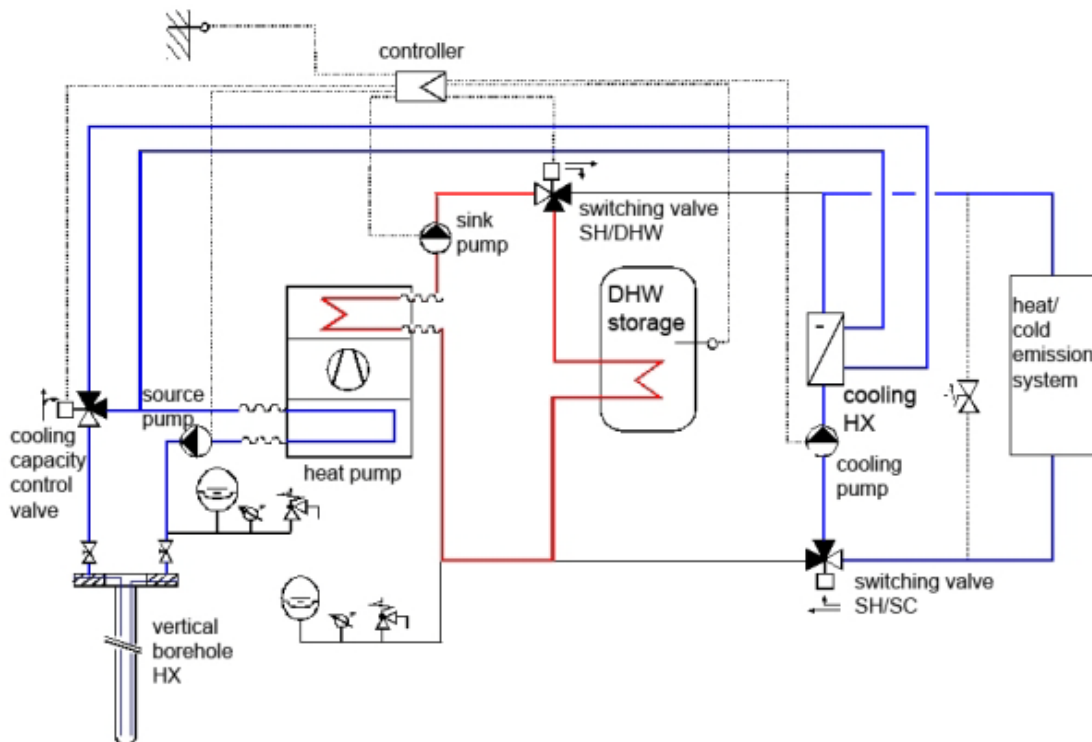


Fig.1 Standard hydronic layout for a ground-coupled heat pump system with passive cooling option and simultaneous space cooling-DHW production

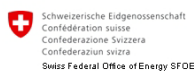
The Swiss national project is dedicated to the integration of a cooling function in heat pump systems for low energy houses. As result, typical system configurations for space heating/-cooling and DHW production, eventually coupled to a mechanical ventilation system, are derived.

Background of the project is an increased interest of space cooling options in residential dwellings. However, there are still insecurities about the hydraulic configuration, the operation limits, reachable comfort as well as system performance and adequate control strategies. Favourable for the application are marketable system configurations already containing a heat pump and further components which can be used for a pre- and passive cooling in summertime. These passive cooling opportunities should be deployed first and active cooling with a reverse operation of the heat pump should only be used to cover peak loads, if necessary, in order to minimize additional energy consumptions. On the other hand, active cooling can also have a high performance when applied in simultaneous operation with DHW. Five basic typical system configurations and component variants have been derived and are investigated in simulations. Objective of the project is to derive a simple and robust hydraulic configuration of the system and design for the chosen system configurations. Results of the system comparison are documented in the field monitoring report.

In parallel, two field tests of ground-coupled heat pump systems with included passive cooling functions have been accomplished. One system is installed in a multi-family house according to the Swiss ultra-low energy house standard MINERGIE-P® and the other in a single family house according to MINERGIE®. In focus was the functionality and performance of the the passive cooling operation. The results of the field test are presented in two Best Practice Sheets and the field monitoring report.

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

Swiss links



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 Programme (HPP) of the International Energy Agency (IEA).

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