



## Schiestlhaus: energy self-sufficient mountain refuge built to passive house standards

*In 1999, the Austrian Federal Ministry of Transport, Innovation and Technology (BMVIT) launched the research and technology programme 'Sustainable development' which aimed to effectively stimulate the restructuring of the economy towards sustainability. Various research and development projects as well as demonstration and diffusion measures which give new impetus to innovation in Austria's economy have since been supported within the scope of a number of subprogrammes.*

The 'Building of tomorrow' subprogrammes aims to develop marketable building components and concepts (for new construction and renovation) which meet the following criteria: reduction of energy and materials consumption, promotion of the use of renewable energy sources, use of renewable and ecologically sound raw materials, the taking into account of social aspects, improvement of the quality of life as well as costs comparable to those of conventional building construction. The 'Building of Tomorrow' builds upon the two most important developments in the field of solar and energy-efficient building design: solar low-energy and passive house design.

Alpine mountain refuges are a typical example of buildings in 'island locations' in Austria and in the entire alpine region. They are

situated in locations which are exposed, difficult to reach and ecologically very sensitive. Their location, far away from the public water and power-supply networks as well as from sewers, often causes great problems concerning supplies as well as high environmental impacts. On the other hand, they are situated in places in which solar irradiation is significantly higher than average and which therefore offer great potential for the use of solar systems as a supply of energy. In recent years, some operators have already taken measures towards solar and energy-efficient building designs in the course of the renovation or the new construction of mountain refuges. Measures focused on the use of photovoltaics and on solutions for environmentally acceptable waste water disposal.

For further information please visit:  
[http://www.nachhaltigwirtschaften.at/\(en\)/publikationen/forschungsforum/052/index.en.html](http://www.nachhaltigwirtschaften.at/(en)/publikationen/forschungsforum/052/index.en.html)



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**Research within the sub-programmes 'Building Of Tomorrow' resulted in a pioneering integrated concept for an energy self-sufficient mountain refuge.**

Based on a study project realized at the Vienna University of Technology, a planning team cooperating with many project partners planned and implemented the new construction of the *Schiestlhaus* on Mount *Hochschwab* according to the principles of solar building and passive house standards.

The Austrian Tourist Club's (ÖTK) *Schiestlhaus* is situated at an altitude of 2 154 m above sea level on a plateau directly below the *Hochschwab*'s main summit. As the existing, already 120-year-old building is in a very bad condition, the owner opted for a replacement. The ÖTK agreed to realise a pilot project for the first large mountain-refuge built to passive house standards. The new refuge will accommodate 70 people. So far, the *Schiestlhaus* has been used from the beginning of May until

the end of October. Planners have already considered extending the opening period.

As the refuge is at a great distance from any kind of infrastructure, planners aimed to develop a self-sufficient type of building, which uses an integrated package of thermal collectors, photovoltaic elements, and sufficient storage capacities for the power and heat supply.

In addition, with a view to nature and environment conservation (the sources for the second water supply pipeline to Vienna are situated in the *Hochschwab* area), this location's special conditions as well as the requirements resulting from the building's specific use had to be taken into account.

What was needed was a system which met the complex requirements of building construction in an alpine environment. The design should be able to withstand the extreme loads resulting from wind and snow pressure. At the same time, the difficult conditions for transportation and

assembly, and concomitant costs, called for special solutions. As the *Schiestlhaus* can be accessed neither via road nor by a freight-cable car, all building material had to be transported by helicopter. The supply of drinking water required the development of a complex rainwater-use system because there are no water sources at a practicable distance.

The development of an overall integrated system meeting these manifold specifications requires close cooperation between designers, planners, and professionals as well as networking between research and practice. The realisation of the *Schiestlhaus* has created a prototype for solar and ecological building construction in alpine island locations. The project partners are testing a number of sustainable technologies and a sophisticated concept for the floor plan under extreme conditions. The solutions and findings resulting from this project may be used — with slight modifications — for other building projects in similar alpine conditions.



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