

**Project name** New Monte Rosa Hut, Switzerland

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**Keywords** Alps, Architecture, Energy-self-sufficient, Off-Grid

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**Start of project** 2005

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**End of project** In operation

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**Contact person or organisation** ETH Zürich, Schweizer Alpen Club SAC

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**Short project description / project function** The New Monte Rosa Hut was built between snow, ice, glaciers and mountains in the middle of the Swiss Alps. The hut serves as a guesthouse for climbers, hikers and skiers. The project is a cooperation between the Swiss Federal Institute of Technology ETH and the Swiss Alpine Club SAC. The hut was built as a test object for sustainable construction in such extreme conditions. The aim was to demonstrate self-sufficiency and sustainability. Lastly, the hut features a unique architecture that makes it an unmistakable project in the Swiss Alps.

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**Water** Since there is no connection to a central water supply facility, service water has to be obtained from melting ice. For this purpose, a water cavern was installed 40 meters above the hut where during summer ice is melted to fill the cavern. The sanitary facilities were designed to operate with low water consumption. The wastewater can be stored in a waste water tank depending on the available energy for the purification process. The sewage is purified in a compact wastewater treatment plant, which consists of the mechanical pre-treatment, the aeration tank, the filtration chamber and the separate surplus sludge storage tank. The purified water is used for the toilet flushing and the washing machine.

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**Energy** One of the main objectives of the project was to build an energy-self-sufficient building. 90 percent of the energy demand is covered by solar energy, i.e. a photovoltaic system integrated into the building facade and solar thermal collectors. Surplus electricity is stored in batteries. The remaining 10 percent energy

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	<p>demand is supplied by the rape oil-fired cogeneration unit. A model-predictive regulating system is installed to control each element of the system. The regulating system receives data of the weather forecast and the future occupancy.</p>
<b>Biomass</b>	<p>The organic waste from the kitchen is composted in a site above the hut. Furthermore, there is no nutrients recovery from the wastewater. The sludge from the wastewater treatment plant is flown by helicopter to the valley and burned in the waste incineration plant.</p>
<b>Project benefits</b>	<p>A nearly energy-self-sufficient building in the height of the Alps demonstrates that sustainability knows no boundaries. It is a leading example in sustainable building that shows new ways of how to use our resources efficiently. The New Monte Rosa Hut is widely known and has won many prizes for its architecture and technical implementation</p>
<b>Project level</b>	<p>Pilot project</p>
<b>Financial scale</b>	<p>Construction costs: 6.5 millions</p>
<b>Environmental conditions</b>	<p>Climate zone: alpine climate; Climate type: cold; Latitude: 45.96° N; Longitude: 7.81° E</p>
<b>Altitude</b>	<p>2883 meters above sea level</p>
<b>Description of special local conditions</b>	<p>The New Monte Rosa Hut is located in the Swiss Alps near Zermatt at the foot of the mountain Monte Rosa (4'634 m) in a plateau called «Plattje». The hut is the start for the route to the summit of Monte Rosa and other four-thousand-meter mountains located in the area. Below the hut is the glacier called «Gorner glacier».</p>
<b>Context Zero Emission Buildings</b>	<p>The New Monte Rosa Hut is particularly interesting because of the extreme environmental conditions. It is a great example of a Zero Emission Building due to the operation as an island installation in the remote Alps. Some of the findings could be transferred to other projects in areas without grid and water supply connection</p>
<b>Sources</b>	<p>Sulzer, M. (2009). Neue Monte Rosa-Hütte SAC «Die Berghütte der Zukunft». Abgerufen am 5. Juli 2013 von <a href="http://www.lauber-iwisa.ch/data/Ressources/1325585926-Broschuere_Monte_Rosa.pdf">http://www.lauber-iwisa.ch/data/Ressources/1325585926-Broschuere_Monte_Rosa.pdf</a></p> <p>Fux, S., Benz, M., Sidler, F., Menti, U., Plüss, I. &amp; Gwerder, M. (2012). Monte Rosa Hütte – Integrierte Haussysteme für optimale Energie- und Stoffbewirtschaftung. Abgerufen am 5. Juli 2013 von <a href="http://www.bfe.admin.ch/forschunggebaeude/02107/02134/index.html?lang=en&amp;dossier_id=04593">http://www.bfe.admin.ch/forschunggebaeude/02107/02134/index.html?lang=en&amp;dossier_id=04593</a></p> <p>Martin Systems AG (kein Datum). MBR New Monte Rosa Hut, Switzerland. Abgerufen am 5. Juli 2013 von <a href="http://www.siclaro.ch/en/referenzen/downloads/Prospekt_Monte_Rosa_EN.pdf">http://www.siclaro.ch/en/referenzen/downloads/Prospekt_Monte_Rosa_EN.pdf</a></p>