



FACT SHEET

Monte Rosa Hut

The Monte Rosa Hut, which is also known as the “Bergkristall” (Crystal of the Mountain), is a mountain hut located in the most pristine landscape surrounded by the spectacular Gorner, Grenz, and Monte-Rosa glaciers. The hut serves as a shelter and lodging facility for mountaineers, hikers, and tourists exploring the surrounding Alps. Originally established in 1895 as the Cabane Bétemps, it was later renamed the Monte Rosa Hut in 1940.

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General Information

- The Monte Rosa Hut, which is located in the Valais Alps, Switzerland, originated as the Cabane Bétemps in 1895.
- Initially situated at an altitude of 2990 meters, it accommodated 25 people and was named after benefactor François Bétemps.
- Aging and structural damage necessitated renovation and reconstruction in 2002, thereby leading to the planning and development of a new “mountain hut of the future” by the Swiss Federal Institute of Technology (ETH) Zurich.
- The crystal-shaped design won an architectural competition in 2004, with planning beginning in 2008 and inauguration in July 2010.
- Inauguration of the “mountain crystal” on July 10, 2010 - demolition of the old hut in 2011.
- The new Monte Rosa Hut, which is located at an altitude of 2,883 meters, is equipped with modern technology and utilizes renewable energy sources.
- It accommodates 120 guests (around 8,000 overnight stays per year) and produces over 90% of its energy needs thanks to a photovoltaic system with 215 kWh battery capacity integrated into the south façade and thermal solar collectors.
- All of the technical systems are digitalized and can be controlled remotely.

Technology and customer needs

- The original hut, renovated in 1939, was prone to age-related problems such as mold growth, structural deterioration, and inefficient layout. This resulted in an increased need for renovation and modernization.
- Huts at high altitudes are more exposed to extreme weather conditions, including strong winds, heavy snowfall, and temperature fluctuations. These conditions require robust structures and infrastructure that can withstand extreme weather conditions.
- The Monte Rosa Hut is located in a sensitive mountain environment that requires strict environmental protection standards.
- To reduce dependence on external energy sources and minimize the environmental impact, it was necessary to upgrade the energy infrastructure.
- With an increasing number of visitors and more overnight stays per year, the hut needed to expand its capacity and improve its services to meet the needs of guests and provide a pleasant stay experience.
- In a challenging mountain environment, visitor safety is paramount. The hut required upgraded safety features as well as comfort facilities to provide guests with a safe and comfortable stay.

Siemens Technology

- The high-tech hut has been equipped with Siemens building technology since its opening in 2010.
- An integrated photovoltaic system and thermal solar collectors on the southern facade ensure a high degree of energy autonomy and reliable energy supply.
- Since 2010, all building performance data, such as solar power generated or battery performance, has been aggregated in the Siemens Navigator, a solution for building performance.
- In 2021, 8.6 tons of lead batteries were replaced by 2.7 tons of lithium batteries. Continuous online evaluation of energy flows indicated the need for a new solution as the existing lead batteries would soon reach the end of their lifespan.
- Siemens was tasked with the development and installation of the comprehensive new battery solution. Based on the online data, Siemens replaced 48 lead batteries with 14 lithium iron phosphate batteries (LFP) with a capacity of 215 kWh.
- Thanks to extended prior simulating and testing of two batteries in the office, the newly installed batteries were successfully integrated into the energy supply system within two days.
- Further enhancing autonomy, the already high energy autonomy level of the hut can also be increased by way of the new battery solution, as it relieves the generator intended for bad weather and the new batteries have a higher usable capacity.
- The PV Solar Panels mounted outside on the rocks were already badly damaged due to the harsh weather conditions. In 2022, Siemens replaced the existing PV solar Panels with a new installation. The new custom-made bifacial modules are extra sturdy and designed as an offroader. The Power output was almost doubled to 14.7 kW Peak. Most of the electrical components, including inverters, were replaced and connected to the Siemens building automation system Desigo CC.
- The latest version of the building management system “Desigo CC” as a comprehensive on-site solution to manage all of the systems, such as HVAC, Shading, Lighting, Power, Fire Safety, and Security. Therefore, operators can quickly review the key equipment values, checking key room KPIs and troubleshoot potential problems. It supports the hut operator with recurrent tasks and remote notifications for their daily work. Desigo CC is the integrated building management software for managing high-performing buildings. By providing an open architecture, it simplifies technology integration and ensures adaptability to the future requirements.
- In 2024, deployment of the open and flexible IoT platform “Building X” from Siemens. Building X is the scalable digital building platform to digitalize, manage, and optimize building operations, thereby allowing for an enhanced user experience, increased performance, and improved sustainability. The following applications on Building X support the hut operator:
 - **Operation Manager**
 - App to monitor and control buildings from anywhere. Handle building equipment and applications remotely and down to the data point level. Made for:
 - Remote live monitoring & operation
 - Event & Notifications
 - Alarm prioritization
 - Trend Analysis
 - **Energy Manager**
 - App to optimize energy consumption and monitor sustainability KPIs by tracking energy consumption, cost, and carbon emission footprint across the entire building portfolio. Made for:
 - Energy KPI Monitoring and Benchmarking

- Granular energy analysis
 - Inefficiency spotting
- Thanks to Siemens Technology, the hut can be operated 24/7 all year round even if there is no one on site for weeks in the winter.

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