Kissed twice by the sun

Holidaygoers who choose to vacation in the newly opened Reka holiday village in Blatten (VS) benefit from the sun twice. They can enjoy the warm rays on the southern slope of Valais and also profit from the sun indirectly. The holiday resort satisfies about two-thirds of its energy needs from the sun. Hybrid solar panels produce hot water and electricity. The comprehensive energy plan – approved by the Swiss Federal Office of Energy as a flagship project – does largely without fossil fuel energy.

The Reka holiday village Belalp in Valais – managed by Roger Zenklusen – produces hot water and electricity by hybrid solar panels. Photo: B. Vogel

Dr. Benedikt Vogel, on behalf of the Swiss Federal Office of Energy (SFOE)

The sun does not always shine in Blatten. But when it does, a strong warmth unfolds on the southern slope above the town of Brig, even in winter. Blatten is situated at 1300 meters. Pretty chalets on stone stilts line the paths through the town. The cable car takes holidaygoers up to the Belalp, which is ideal for skiing in winter and hiking in summer. From the cable car, one can see the snow-capped peaks. On the other side of the valley, the road winds its way up to the Simplon Pass.

To kick off the winter season, the Reka holiday village in Blatten opened its doors on December 2014. It is the 14th holiday village operated by Reka (Swiss Reisekasse), the others are in Switzerland and Italy. The new holiday village accomodates up to 350 holidaygoers, who will find 50 apartments situated within nine holiday homes. The holiday village Blatten is not only the youngest Reka holiday village, but from an energy point of

A technical report about the results of a flagship project in the field of buildings, which is financially supported by the Swiss Federal Office of Energy.

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

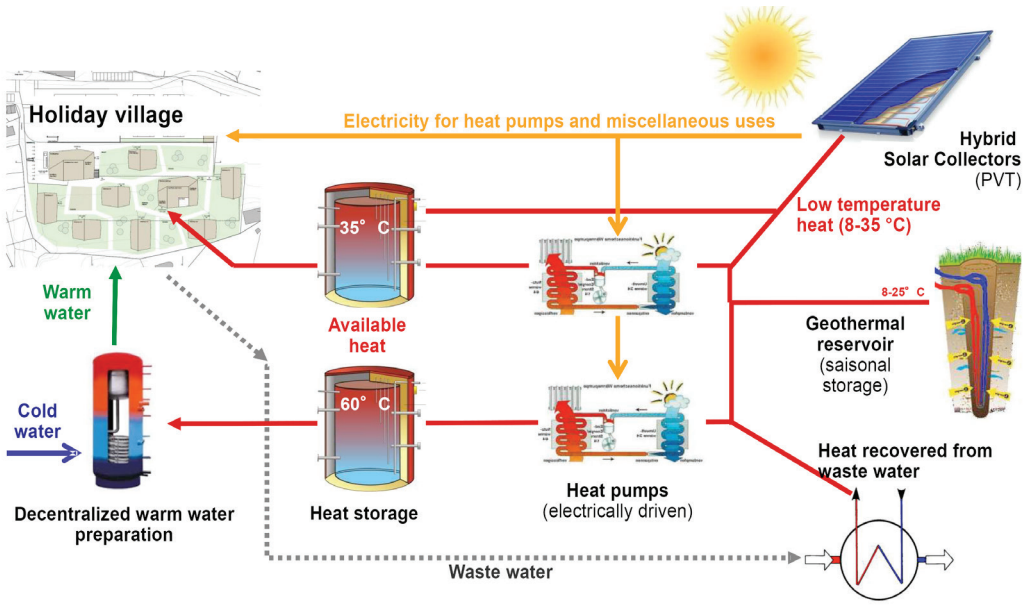
Swiss Federal Office of Energy SFOE

The roofs are oriented to the west and east. The solar yield falls in the mornings and in the afternoons and when energy use peaks in the village (during the day the holiday guests are usually not home). Photo: Lauber IWISA AG

view, also the most advanced. Its heating system is based on a forward-looking approach, says the Swiss Federal Office of Energy, and therefore supports the facility as flagship project. Environmentally conscious guests can enjoy their holidays to the fullest with the knowledge that they are using a sustainable source of energy.

Hybrid Panels produce hot water and electricity

When the Reka planned their new holiday village in Blatten, they focused on the topic of energy. The planners initially flirted with idea of constructing a wood heating system. But the wood would have to be laboriously delivered from the valley. Thus, the project team decided to use solar energy. Blatten provides good conditions for this. "Due to the altitude the energy yield here is around 20% higher than on the Swiss Plateau. In addition, the cool temperatures benefit the generation of solar power," says Simon Summermatter, who manages the project for the energy planning office of Lauber IWISA (Naters/VS). The Reka village planners were able to move forward with their plan thanks to a new hybrid photovoltaic panel that produces



The energy system of the holiday village Blatten-Belalp in overview. Illustration: ELIMES AG

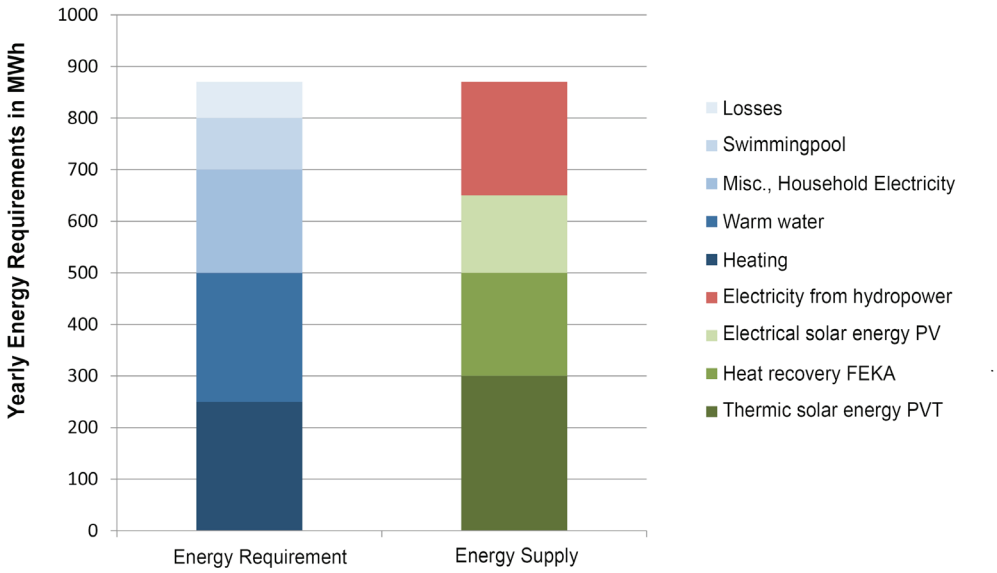
electricity as well as hot water that was recently marketed by the Swiss manufacturer Meyer Burger. Four roofs with hybrid panels and three roofs with photovoltaic panels (PV) deliver up to 380 kW of heat and 180 kWp electricity. Together they form the basis for the energy supply of the Reka holiday village.

The hybrid panels feed the low-temperature heating system (35 °C) and supply the village with hot water (60 °C), which together make up a relatively high proportion of energy consumed by the village. When the sun does not deliver the desired temperature, heat pumps are employed. The pumps draw electricity from their own PV modules and additionally from the electricity grid (hydropower plant Blatten). Rounding out the energy system is an additional system for recovering heat from wastewater (eg. showers, wash basins, toilet). From these energy sources more than 70 % of the holiday village's energy needs can be met throughout the year, according to energy efficiency estimates.

Seasonal heat storage in bedrock

For the system to succeed, another component is needed: a storage unit. This consists of 31 geothermal probes that rest about 150 m deep in the bedrock and are able to store heat in the surrounding rock and also retrieve it. With this geothermal reservoir, the excess heat from the summer can be carried over into the winter months: During the warm months, the ground is heated up to 14 °C. This heat can then be retrieved during the cold season, which then cools the ground to 4 °C. With the underground storage, a very large portion of the heat energy yield of solar collectors – according to calculations 97 % – can be stored for hours, days or months.

After two months of operation, "the holiday village is going well, the guests are happy,"



The (calculated) energy use of the Reka holiday village in Blatten: What is noticeable in consumption (left) is the relatively high proportion of hot water use, which is typical for a hotel operation. Right: More than half of the energy comes directly from the sun, another 20 percent is covered by the wastewater heat recovery processing system. In addition, 30% of electricity comes from the electricity grid (certified green electricity from hydropower). Energy losses are 10%, which is typical for a complex network of pipes. Graphics: Lauber IWISA AG

says Roger Zenklusen, manager of the village. The solar panel system supplies warmth not only for heat and hot water in the holiday homes, but also to heat the swimming pool. Peak demand – when the winter guests shower after skiing for example – the system masters easily.

The energy system will be further optimized

The owner has forgone installing a comfort ventilation system. For this reason, the building did not receive Minergie certification, even though it is insulated to Minergie A standards. "For us, it was not about a Minergie label, but energy use and the most optimal approach to energy independence at low consumption," says Reka director Roger Seifritz. That the holiday village is a model project, energy planner Summermatter is convinced: "The integrated project shows how energy efficient buildings, which are thermally and electrically connected and produce no emissions (Zero Emission), can be operated solely by renewable energy."

Today, the village is complete and already fully booked. However, for energy planners an important part of their work starts now. The aim is to optimize the energy system by the end of 2015 in such a way that the various components work together perfectly, so that the planned energy effciency value – a self-sufficiency rate of 70% – will be achieved. For monitoring, about 300 data points are collected and recorded by a control system. Optimizing the operation includes many aspects: Through clever load management of the heat pump, the use of energy from the electricity grid should be minimized. The decentralized hot water system, that supplies the warmth necessary to heat water for every house, must be optimally controlled. One open question is how and when in winter the solar panels should melt the snow covering them using stored energy, which would increase solar yield, without endangering guests with falling snow. "We hope that the project also offers fundamental insights into the question of where the cost optimum lies between insulated building shells and building technology when designing district heating networks," says energy planner Summermatter.

Reka focuses on sustainability

The energy system of the Village Belalp has its price. According to energy planners, investment and operating costs for heating are estimated at 24.5 Rp. / KWh, about a quarter more than the price of energy supplied by oil heating. "The investment cost of the solar energy concept is 1.6 million Fr. higher than the originally planned wood pellet heating system. But the higher investment costs of the solar energy system over a conventional energy supply system can be compensated to a large extent by the sun, which provides a huge portion of the holiday village's electricity and heat for free. Very little energy must be additionally purchased," says Reka Director Seifritz and adds: "Additional costs are passed on to our holiday guests. This however, does not affect our discounts for families with modest incomes." The selection of a solar energy system is an expression of the company's sustainability goals, prescribed in the Reka 2011. Six of the 14 Reka villages are up to date from an energy use standpoint, three other villages (Zinal / VS, Lenk / BE, Lugano Albonago / TI) will be completely renovated with high energy efficiency standards by 2017.

- For further information on the project, please contact Dr. Yasmine Calisesi Arzner (yasmine.calisesi[at]bfe.admin.ch), Program Leader pilot demonstration and flagship projects in SFOE
- For more technical articles in the area of energy use by buildings and solar power, please visit the following links:
  www.bfe.admin.ch/ct/gebaeude
  www.bfe.admin.ch/ct/solar
  www.bef.admin.ch/ct/PV
- For Reka-holiday village Blatten-Belalp see:
  www.reka.ch/blatten

A playful energy experience

The Reka has focused its new holiday village Belalp on the motto energy. But not only does the village have an advanced energy system, it brings this idea even closer to its guests. An informational brochure, an interactive info screen in the community center and an outdoor energy trail all inform holidaygoers about the village energy system. Interested holiday guests are also offered guided tours, says manager Roger Zenklusen. Children are playfully introduced to the idea of energy via four play towers that explore the topics of muscle, solar, wind and water energy. BV

SFOE supports flagship energy projects

The innovative energy system of the Reka holiday village Belalp is one of seven recognized flagship projects with which the Swiss Federal Office of Energy (SFOE) has been supporting the economical and rational use of energy since 2013 and through which the agency aims to promote the use of renewable energies. In parallel, the SFOE supports pilot and demonstration projects that are geared towards achieving the objectives of the Energy Strategy 2050. The SFOE promotes pilot, demonstration and flagship projects by covering 40% of allowable costs. Applications may be submitted at any time.

For more information: www.bfe.admin.ch/leuchtturmprogramm and www.bfe.admin.ch/pilotdemonstration

Swiss Federal Office of Energy (SFOE)
Mühlestrasse 4, CH- 3063 Ittigen, Postal address: CH-3003 Bern
Phone +41 (0)58 462 56 11, Fax +41 (0)58 463 25 00
cleantech@bfe.admin.ch, www.bfe.admin.ch

04/2015