

Buildings in the Service of the Energy System

Buildings play an important role in transforming Switzerland's energy supply towards sustainability by providing flexibility in when they draw electricity from the grid or feed it into the grid. This flexibility, which can help stabilise the electricity grid, was the focus of this year's brenet Status Seminar, a specialist conference organised by the Building and Renewable Energies Network of Technology (brenet).

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

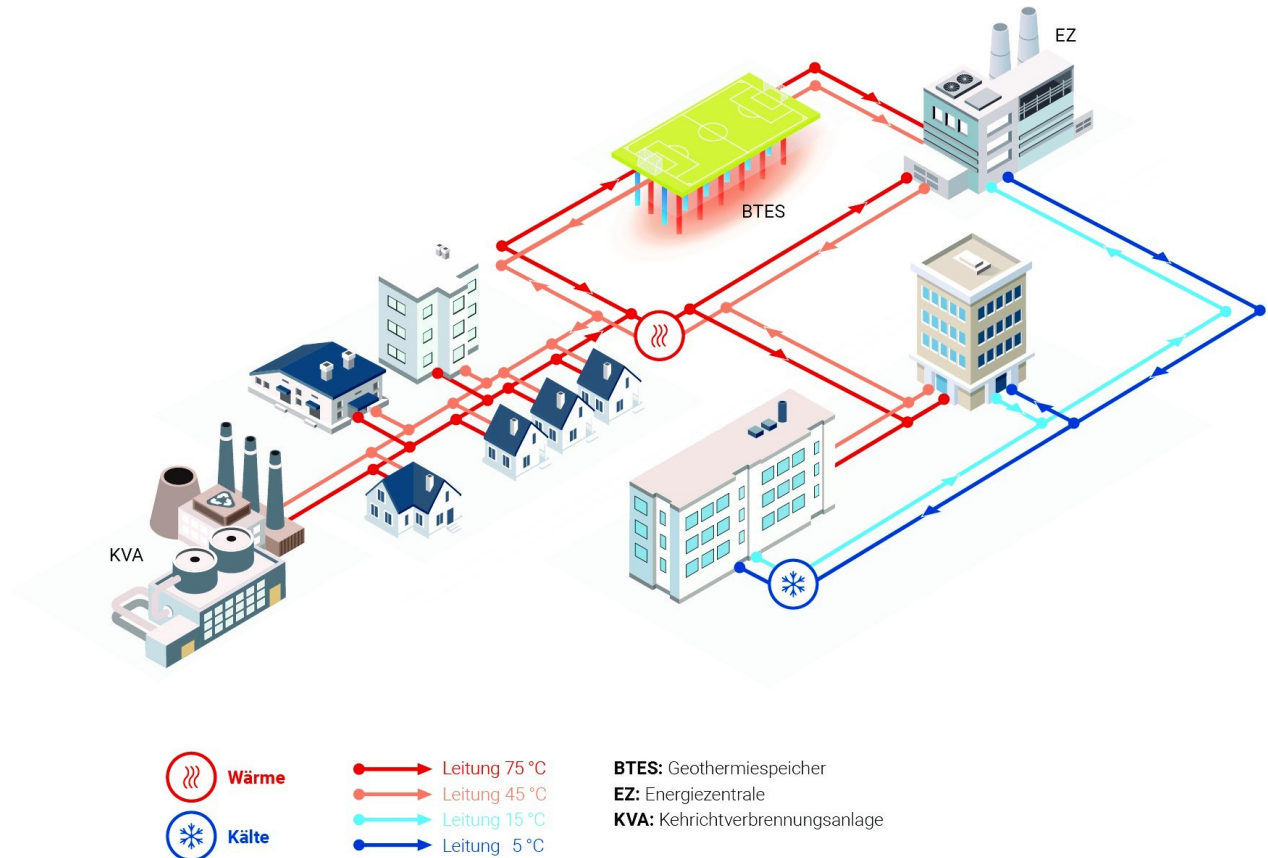


Exchange forums at the brenet Status Seminar helped establish contacts between researchers and industry. Photo: @brenet | Daniel Dyntar Photography

Held every two years, the brenet Status Seminar showcases research conducted by Swiss universities in the fields of sustainable construction, renewable energy and future-oriented building technologies. In particular, the event presents current projects from the research institutes that have joined forces in the brenet association. Researchers in the building sector have always maintained close ties with industry. This cooperation - and with it the transfer of knowledge from research - must be strengthened further, says Olivier Steiger, Professor at the Lucerne University of Applied Sciences and Arts - Engineering and Architecture (HSLU) and a member of the brenet Board. One way to achieve this is the brenet Status Seminar, whose 24th edition took place in Rotkreuz (Canton of Zug) in mid-August. Around 70 experts in building research used the event, supported by the Swiss Federal Office of Energy and other partners, to exchange experience with practitioners from industry and public administration.

Innovative Regeneration in Wallisellen

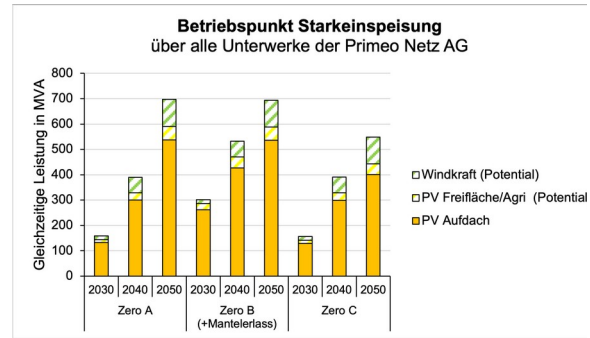
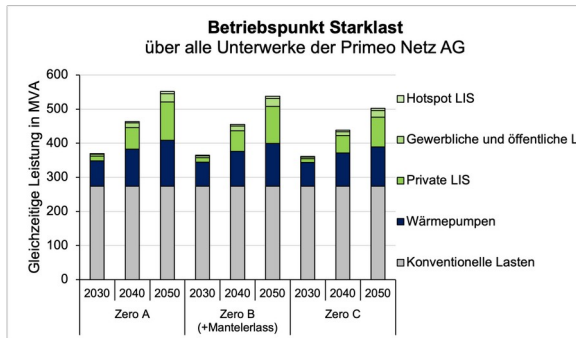
This year's conference did not focus on the building in isolation, but on its integration into the energy system. Buildings consume energy and increasingly produce it as well, particularly solar power. They are therefore becoming what are known as prosumers. "From consumer to prosumer: buildings in Switzerland's energy system" was accordingly the title of the conference. In Rotkreuz, around three dozen presentations, short talks and exchange forums explored this topic. The high practical relevance of research in building technology became apparent time and again.



Schematic representation of the planned district heating network in Wallisellen: a borehole thermal energy storage system (BTES) serves as a heat source in winter and is regenerated in summer using waste heat from the municipal waste incineration plant. Graphic: die werke versorgung wallisellen ag

The cooperation between research and practice was illustrated by the "SaisonLink" project for the new Wallisellen energy network, presented at the Status Seminar. Over the coming years, the Zurich municipality plans to build a district heating network that will mainly use ambient heat (geothermal energy and outdoor air) and waste heat from a municipal waste incineration plant. To keep the associated borehole field, and thus construction costs, as manageable as possible, the ground from which heat is extracted during the winter months is to be regenerated in summer using waste heat from the incineration plant at temperatures of 60 to 70 degrees Celsius. "By using the borehole field as a seasonal heat store, we can reduce its size by a factor of three," says Igor Bosshard, who is responsible for the thermal networks business unit at the local energy utility. What is more, by incorporating ambient heat from outdoor air and (bio)gas, the borehole field will require only 192 probes and will be no larger than a football pitch. The project is based on a feasibility study by the Eastern Switzerland University of Applied Sciences (OST), where Bosshard previously conducted research himself. According to OST researcher Florian Ruesch, a few examples of borehole fields regenerated at high temperatures already exist worldwide. What is new, however, is the approach of minimising the number of probes and thereby reducing costs.

The Problem Is Not the Expansion of Photovoltaics

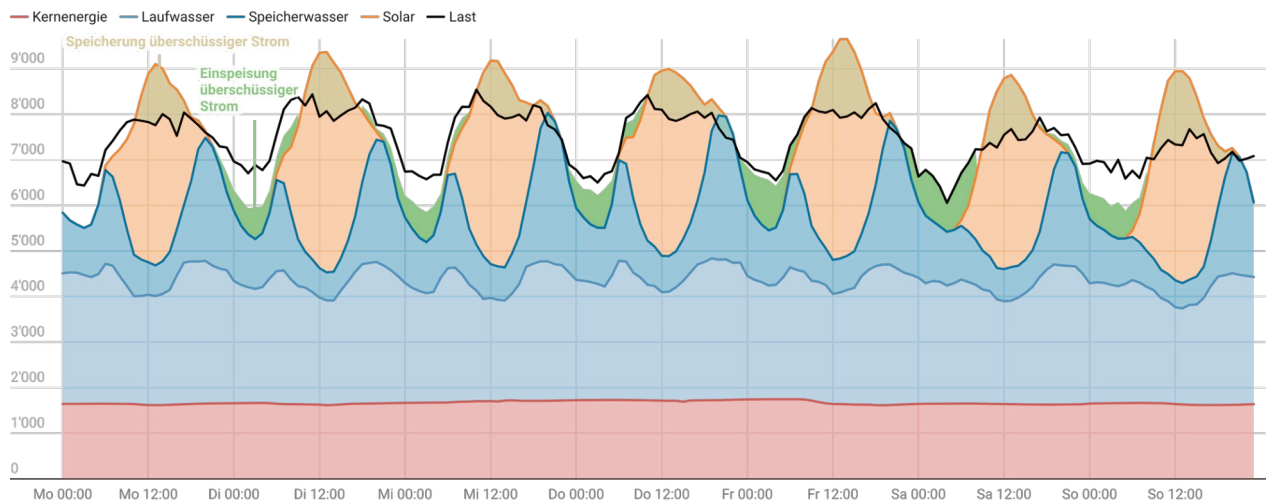


Three scenarios for the Primeo distribution grid for the years 2030, 2040 and 2050 - loads (power drawn from the grid) on the left and generation (power fed into the grid) on the right. The grid is designed to ensure that heat pumps can continue to operate during a two-week cold spell in winter (at just over 400 MVA). This grid design is possible because Primeo assumes that electric vehicles are highly flexible loads and that dynamic tariffs will allow a large proportion of charging to be shifted to off-peak periods. With average driving of around 200 km per week, a vehicle must be charged once a week with 40 kWh at the charging infrastructure. At a charging capacity of 11 kW, this takes just under four hours. According to Primeo, dynamic tariffs therefore create sufficient incentives for buildings and people to behave in a grid-supportive manner through energy management systems. Graphic: Primeo Netz AG

Lukas Küng, CEO of Primeo Netz AG, also contributed a practitioner's perspective at the Status Seminar. The Basel region distribution grid operator must prepare for a growing number of electric-vehicle charging stations requiring more electricity, while decentralised photovoltaic systems feed additional power into the grid. "It is not so much photovoltaic systems and electric vehicles that concern us, but the strong trend towards denser construction," says Lukas Küng. This will increase the required capacity while reducing the space available for grid infrastructure such as transformer stations. According to Küng, the limiting factor when dimensioning the future electricity grid is therefore not photovoltaic systems or electric-vehicle charging stations, but heat pumps: "We dimension the electricity grid so that it can cope with a two-week cold spell."

Sabine von Stockar (Minergie) and Beat Fuchs (Siemens) also reported from a practical perspective. Maïke Schubert (Weisskopf Partner GmbH) presented the activities of the SmartGridready association. Energy suppliers, distribution system operators, service providers and manufacturers have joined forces in the association to develop harmonised solutions for communication between the grid and buildings (grid interface). Such solutions are important for keeping the electricity grid balanced despite strongly fluctuating solar and wind power production. To achieve this balance, they use the flexibility available in buildings, including electrical loads such as appliances and charging stations, battery storage systems and photovoltaic installations. SmartGridready also makes an important contribution in the field of dynamic tariffs: a map provides an overview of where dynamic tariffs can be used. A list also shows which energy management systems (EMS) can optimise operation according to these tariffs. This allows end customers to reduce energy costs while consuming electricity when it is abundantly available. Dynamic tariffs have been clearly regulated by law since the beginning of 2026. Eight grid operators serving two million electricity consumers now also offer dynamic tariffs. Maïke Schubert expects areas with dynamic tariffs to expand further in the coming year.

Durchschnittliche Stromerzeugung Schweiz, Sommer 2025



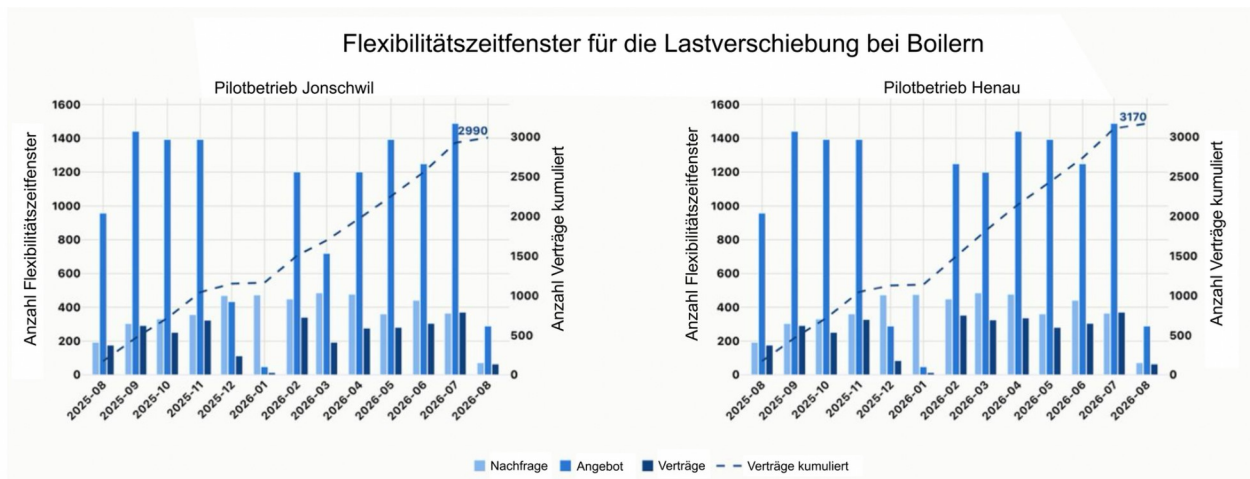
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Quelle: Basierend auf Swiss Energy-Charts, Speichermöglichkeit ergänzt durch Swissolar • Erstellt mit Datawrapper

On sunny summer days, surplus solar electricity is already being generated. Buildings and storage systems can help make use of these surpluses. SmartGridready and its members are developing harmonised solutions for this purpose. Graphic: Swissolar

Making Optimal Use of Flexibility

The flexibility hidden in the building stock should be used as effectively as possible for a sustainable electricity supply - this guiding principle ran through the research projects presented at the Brenet Status Seminar. These included new tools for the integrated planning of heating and cooling networks, electricity distribution grids and building-integrated photovoltaics. Other research addressed tools for simulating energy networks and intelligent heating controls that incorporate weather and electricity-price forecasts. Discussions also covered new forms of electricity consumption communities (ZEV, vZEV and LEG) and the shared use of heat pumps within neighbourhoods. Other research projects are exploring ways of identifying flexibility in the building stock as automatically as possible or classifying buildings using flexibility labels.



Market activity during the one-year pilot operation in Jonschwil and Henau. For each month, the charts show the number of flexibility time windows requested by grid operators (Demand), the time windows offered by the boiler portfolios (Offered) and the contracts actually concluded as a result (Cleared Contracts). The two charts present the results separately for the Jonschwil and Henau pilot areas. More than 6,000 flexibility contracts were concluded during the pilot operation. Graphic: ENPLATE, adapted by B. Vogel

Some of these ideas are still at the conceptual stage. Others are already being implemented, at least in pilot operation. At the Status Seminar, Joëlle Clot (HSLU) presented a one-year trial in the St Gallen municipalities of Jonschwil and Henau. The two pilot areas comprised 419 connections. In participating households, an algorithm controlled electric boilers and heat pumps in a grid-supportive manner using smart-meter and forecast data. "Our results show

that local flexibility can also pay off economically: in the Henau test region (one transformer and 148 low-voltage cables), around EUR 27,000 in annual grid expansion costs could be avoided by 2040. Part of these savings could be passed directly on to flexible households - with more than 15 cents per kilowatt-hour of photovoltaic electricity not fed into the grid,” says Joëlle Clot, summarising one of the study’s main findings. The project was carried out as part of the European research project ENPLATE.



HSLU Professor Olivier Steiger opened the 24th breneT Status Seminar on behalf of the breneT Board. Photo: @breneT | Daniel Dyntar Photography

Major Expansion Required

The breneT Status Seminar demonstrates that there is a wide range of concepts capable of safeguarding the robustness of the energy system even as the use of solar power and other renewable energies increases. It remains to be hoped that renewable energy will in fact be expanded accordingly. This is by no means guaranteed today, as Andreas Eckmanns - responsible for the SFOE research programme on buildings - warned in Rotkreuz: “We are on track when it comes to reducing per-capita energy consumption, but renewable energy must grow exponentially if we are to achieve the targets that have been set.”

- [Documentation of the 24th breneT Status Seminar >>](#)
- For further information, please contact Martin Menard (menard@lowtechlab.ch), external head of the SFOE research programme Buildings and Cities.
- [Further articles on research, pilot, demonstration and flagship projects in the field of buildings and cities on the SFOE website >>](#)



ABOUT BRENET

breneT connects Swiss universities of applied sciences and research institutes working on sustainable construction, renewable energy and future-oriented building technologies. The network helps companies, municipalities and other practitioners find suitable research expertise and initiate joint projects with universities.

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