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SEASON: TODAY'S ENERGY – TOMORROW'S WARMTH

ENERGY TECHNOLOGIES CATEGORY. A unique and innovative energy solution has been in operation in Frauenfeld (TG) since autumn 2024: the SeasON sorption storage heat pump, developed by the Lucerne University of Applied Sciences and Arts (HSLU) and Matica AG from Kaltenbach in the canton of Thurgau. SeasON's catchy slogan, "today's energy – tomorrow's warmth", sums up what it is all about: surplus renewable energy produced in the summer is stored for use in the winter by means of a thermochemical process. The process uses sodium hydroxide solution, which is charged with renewable energy or heat in the summer, i.e. concentrated by removing water from it. The sodium hydroxide solution and the water can then be stored separately at room temperature without any losses until winter. When the sodium hydroxide is diluted with the water again, heat is generated, which the sorption heat pump can use for heating purposes with almost no additional input of energy. The first pilot plant in Frauenfeld has shown how well this works. Two additional larger pilot plants in Switzerland and Germany will follow in the coming months, after which SeasOn should be able to position itself successfully on the market.

Benjamin Fumey, lecturer at Lucerne University of Applied Sciences and Arts – Engineering and Architecture (HSLU) and Marc Lüthi, Managing Director of Matica AG (from left to right)

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A heat pump is a climate-friendly heating system, but it needs electricity to run during the heating season. So how practical would it be to use rooftop solar energy, which is abundant in the summer, to do this? Swiss researchers have been thinking about this for several years, first at Empa and then at the HSLU Lucerne School of Engineering and Architecture. They were looking for a cost-effective, long-term storage technology for sustainable energy.

To the average person, the solution may seem surprising, as sodium hydroxide solution is more likely to be found in a chemistry lab than a boiler room. However, together with water, it acts as the working fluid for the sorption storage heat pump and can be easily stored in tanks at room temperature. The heart of the system, however, is the mass and heat exchanger. Benjamin Fumey of HSLU explains: "In summer, water is evaporated from the aqueous sodium hydroxide using renewable energy from photovoltaics, solar thermal power or wind energy. This 'charges' the sodium hydroxide solution, causing it to become more concentrated, which stores the potential to provide heat later on."

The concentrated sodium hydroxide solution and the separated water are stored in tanks until they are needed in winter. Benjamin Fumey continues: In winter, the water is then evaporated in the mass and heat exchanger using heat at a low temperature and then absorbed by the concentrated sodium hydroxide. In this process, both the condensation heat of the water vapour and the heat of mixing are released at a higher temperature. The mass and heat exchanger therefore works as a sorption heat pump, providing heat with virtually no additional electrical energy input.

To bring the prototype from the laboratory to the market, the HSLU needed a commercial partner, which it found in Matica AG, a company specialising in the manufacture of high-quality water heaters and heat and cold storage. Matica produced the system's components. "We really benefit from the close collaboration with researchers on this innovative project, and are confident that we can successfully bring the system to the market together," says Marc Lüthi, CEO of Matica AG.

The plant in Frauenfeld is being closely monitored as a demonstration project to gather valuable insights for further development. The project is supported by the Swiss Federal Office of Energy SFOE, the City of Frauenfeld, the Swiss Climate Foundation, the EKT Energy Foundation and Novus Engineering GmbH. Further pilot systems will be installed over the next few months at the new Swiss Post delivery centre in Kaltenbach (TG) and in an apartment block in northern Germany.

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AGRIVOLTAICS IN BUCHS
WHERE THE SUN PROVIDES A DOUBLE HARVEST

Sandro Spescha, Head of Energy at ewb (electricity and water utility of the town of Buchs), Markus Kobelt, CEO of Lubera AG and Adrian Bossart, CEO of ewb (from left to right).

RENEWABLE ENERGY CATEGORY. Plants need sunlight to grow, and solar panels need sunlight to produce electricity. Thanks to the agrivoltaic system on the roofs of the new greenhouses at Lubera AG in Buchs (SG), sunlight can be used for both at the same time. The system, built by the local energy supply company ewb, covers 10'700 square metres and generates around 750'000kWh of solar power for the ewb grid every year. The more than 6600 photovoltaic panels with an installed capacity of 812kWp were developed together with the company Insolight from Renens (VD) and Reech AG from Landquart (GR). The panels, which are seamlessly integrated into the greenhouse roofs, are transparent, so that 20 per cent of the sunlight can be used to produce electricity and 80 per cent is left for the plants in the greenhouse. This guarantees a double 'harvest'.

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LUBERA, 9470 Buchs
↗ **WWW.LUBERA.COM**

INSOLIGHT, 1020 Renens
↗ **WWW.INSOLIGHT.CH**

REECH, 7302 Landquart
↗ **WWW.REECH.CH**

"Lubera AG was planning to build new greenhouses, so they approached us with the question of whether and how a photovoltaic system could be installed on the large greenhouse roofs," recalls Sandro Spescha from ewb. In the summer of 2022, the idea became a reality: "It was decided that ewb would build the PV system on the greenhouses and become its owner and operator," says Adrian Bossart, CEO of ewb, looking back. "The necessary collaboration between the Lubera company, ewb as investor and project manager, the local authorities, the local community, and the technical experts from Reech AG and Insolight, who specialise in agrivoltaic systems, was exciting. The project was a challenge for everyone, given the size of the installation and the special technical requirements."

Reech AG and Insolight developed a PV solar panel with an aluminium frame specifically for this system, allowing it to be optimally fitted and tightly sealed on the glass roofs. As a result, the plants inside the greenhouses receive an ideal distribution of sunlight without any shade.

Approximately 700kWp went into operation on 22 February 2024, and the additional 110kWp on an existing building on 7 June. With the 750'000kWh of electricity that it now feeds into the grid each year, ewb can increase its own electricity production to over 40 per cent, and the residents of Buchs benefit from the solar harvest too.

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MICRO-DISTRICT NETWORKS: SHARING HEAT INTELLIGENTLY WITH NEIGHBOURS

BUILDINGS AND SPACE CATEGORY. Today, it is possible to share electricity from a rooftop photovoltaic system with neighbours for collective self-consumption. However, the same principle also makes sense for heating, because many home heating systems are oversized and therefore not used to full capacity. By sharing the heat from your own heating system with your neighbours, you can save on maintenance and heating costs. How well this works has been shown by the energy company IWB (Industrielle Werke Basel). Since autumn 2023, three terraced houses in a residential area in Basel have been connected to a ground source heat pump and two gas heating systems to form a micro-district heating network. In the first winter, more than 90 per cent of their heating was provided by renewable energy from the heat pump at a cost 15 per cent lower than before.

In 2020, Dominik Born, who works as an innovation manager at IWB, replaced the very old gas heating system in his terraced house in Langen Loh with a ground source heat pump. His neighbours were also interested in this idea, as they were also considering replacing their old gas heating systems. "The properties in our neighbourhood cannot be connected to the local IWB heating network, just like around 2900 other buildings in Basel," explains Dominik Born. "In discussions with

Dominik Born, Innovation Manager at the energy company IWB

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IWB NANOVERBUND, 4002 Basel
↗ **WWW.IWB.CH/NANOVERBUND**

SWEET PATHFNDR PROJECT
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neighbours, the question arose as to whether we could share the heat instead of each owner having to find an individual and often very expensive solution to replace their fossil fuel heating system." With the help of IWB experts, the idea was refined and finally became reality in autumn 2023. The Swiss Federal Office of Energy (SFOE) is providing scientific expertise to the project, which is being run as a pilot and demonstration project within the SWEET research consortium PATHFNDR.

Dominik Born's house was connected to the two neighbouring properties with heating pipes to form a small heating circuit. In every boiler room there is a heat transfer station, a meter and a flow and return pipe that controls the heating. If the return temperature in the house is low, the heating switches on; if the return temperature is high, it switches off.

The results after the first winter were impressive. The neighbours' two gas heating systems were only used on very cold days and for hot water. A full 91 per cent of the heating required for the three properties was provided by the heat pump. Running costs were reduced by 15 per cent, saving each neighbour around 500 Swiss francs. "The micro-district heating network could be extended to other properties. For example, if a neighbour with a pellet heating system were to join the network, the two gas heating systems could be switched off completely."

During the entire heating period, each party can use an app to track heat production, consumption and heating costs, and are billed accordingly. The members of the micro-district network need to agree among themselves on how much each of them will pay for the heat they use and for maintaining the systems. Ideally, these arrangements should be set out in a contract.

IWB now offers a service for setting up such micro-district heating networks. There are around 300'000 buildings in Switzerland that are adjacent to at least one other property and need a heating solution. So why not a micro-district network? IWB has already received many enquiries about micro-district networks, and not just from people in Basel. Technically, the solution is easy to implement and quite inexpensive, although the cost depends on the distance between the properties and the excavation work required. Dominik Born is delighted that his idea, which originated in Basel, could soon be used throughout Switzerland. "The crucial step is not the technology, but talking to your neighbours," he concludes.

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THE E-POWER TUNNEL: CHARGING INFRA-STRUCTURE FOR SUSTAINABLE TRANSPORT LOGISTICS

Peter Galliker, CEO Galliker Transport AG, Thomas Müller, Head of Infrastructure Services Galliker Transport AG (from left to right)

ENERGY-EFFICIENT MOBILITY CATEGORY. "We think in generations" is not just Galliker Transport's slogan, it has been the company's recipe for success for over a hundred years. The third-generation family business knows that it needs long-term visions and sustainable goals to ensure that each successive generation can continue to successfully sustain its strong brand. With its 'Green Logistics by Galliker' concept, the family is committed to sustainable business practices and treating people, the environment and nature with respect. It has set itself the goal of becoming carbon neutral by 2050, a vision that it is now actively putting into practice: around 10 per cent of its vehicle fleet is already equipped with alternative drive systems. The charging infrastructure it uses has also been improved. This has been achieved with an innovative underground e-power tunnel at the company's head office in Altishofen (LU), which can charge 28 electric trucks with up to 200kW of power. Similar tunnels will soon be built at other Galliker sites.

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↗ **WWW.FENT.CH**

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CKW, 6005 Lucerne
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The family business has been transporting goods for over a hundred years. Today, the third generation is running the company and the fourth generation is actively involved too. It is easy to see why sustainability is an important guiding principle for the family. For some time now, the buildings at the various locations have been optimised in terms of energy efficiency, for example by switching to LED lighting and installing large photovoltaic systems on the roofs. Today, almost all of their roofs are fitted with solar panels, enabling Galliker Transport AG to produce around 16,5GWh of electricity per year. This covers around 40 per cent of the company's total electricity requirements. At the main site in Altishofen, the company operates two site networks with a connection for self-consumption at medium-voltage level. This allows the solar power generated to be optimally distributed across the extensive site for on-site consumption. In future, battery storage systems will help to ensure that solar power can also be stored for use during the night.

Around 80 per cent of Galliker Transport AG's total carbon emissions are attributable to its approximately 1200 trucks. They are therefore at the heart of the company's 2050 climate strategy. Currently, they have around 100 trucks with alternative drive systems on the road, most of them electric. They also have six hydrogen-powered trucks. "Buying electric trucks is no longer a problem; there is a wide range of goods vehicles on the market," says Thomas Müller, Head of Infrastructure Services at Galliker Transport AG. "What we now need is a high-performance charging infrastructure for the growing number of electric trucks in our fleet."

The e-power tunnel is part of this infrastructure. "We bring the electricity to where the trucks are, not the other way round. This fits in much better with the established logistics processes," explains Thomas Müller. As a result, where there used to be 28 diesel trucks, there are now 28 green parking spaces with loading hatches. Beneath these spaces is the 150-metre-long tunnel, housing 28 charging stations with up to 200kW of power. "Six EVTEC power units (one of the 2023 Watt d'Or winners) each supply four to five of these charging stations. The underground charging stations are well protected and trucks can manoeuvre on the site with ease."

The site also has 12 fast-charging stations and tests are also under way with a mega-charger by Designwerk (a 2020 Watt d'Or winner), which can charge up to one megawatt. There are also plans to build e-power tunnels at the other Galliker sites. To save costs, fully equipped tunnel sections will be laid underground at these locations. Galliker Transport AG carried out this project together with Fent AG from Seon (AG), Thomas Lüem Partner AG from Baar (ZG) and CKW AG from Lucerne.

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SPECIAL JURY AWARD

In Switzerland, more and more electricity is being produced locally and fed into the electricity distribution network, for example from photovoltaic systems on buildings, while ever more consumers are drawing electricity from the distribution network, such as for electric vehicles and heat pumps. This means that the distribution network is becoming increasingly overloaded. To ensure an efficient and reliable electricity supply for consumers, as well as distribution of the electricity generated, it is not only the expansion of the distribution networks that is needed, but also dynamic network tariffs. Their potential can be fully exploited thanks to the widespread use of smart meters. The electricity industry is actively exploring network tariffs and different approaches. Four projects will receive the 2025 Watt d'Or in the Special Jury Award category: Genossenschaft Elektra, Jegenstorf (BE), Groupe E (FR), AEM (TI) and EKZ together with ETH Zurich (ZH).

TOP-40

The Genossenschaft Elektra in Jegenstorf (BE) has introduced a voluntary limit on the amount of solar power being fed into the grid. With their TOP-40 product, energy producers undertake never to feed more than 60 per cent of the maximum output of their photovoltaic systems into the grid. In return, they receive an eight per cent higher tariff for the electricity fed into the grid – based on Elektra's reimbursement tariff. They can use the last 40 per cent – which accounts for just six per cent of the total annual electricity production – themselves, such as to charge cars, top up batteries, for heating and cooling, or to intelligently control electrical appliances. In this way, they actively contribute to grid stability.

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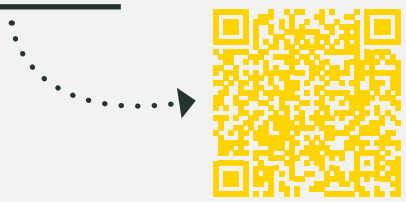

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AEM – DYNAMICITI, 6900 Massagno
↗ **WWW.AEMSA.CH/IT/NEWS/TARIFFA-DINAMICA-AEM**

EKZ – ORTSNETZ, 8002 Zürich
↗ **WWW.EKZ.CH/DE/BLUE/INNOVATION/2024/ORTZNETZ-WINKEL-INTELLIGENTES-STROMNETZ**

TARIF VARIO

Groupe E (FR) offers its customers a dynamic tariff that changes every 15 minutes depending on the expected load on the electricity grid. Groupe E publishes the prices for each 15-minute section of the next day by 6pm. An online interface (WEB-API) allows customers to automatically control certain functions, such as only heating hot water or charging electric vehicles during the cheapest hours of the day or switching off the heat pump when it is most expensive. This reduces the electricity bill and helps the grid to operate more efficiently.

DYNAMICITI

The distribution network operator Azienda Elettrica di Massagno AEM (TI) offers a dynamic grid tariff for customers with an annual consumption of less than 50'000kWh, which it developed with the support of Hive Power SA (TI) and Azienda Multiservizi Bellinzona AMB (TI). The aim is to fully exploit the potential of smart meters and dynamic tariffs, including using artificial intelligence and new user-oriented tariff structures. Thanks to these price signals, customers can control their consumption either automatically or manually to make the most of the cheapest tariff periods. In this way, they contribute to a more flexible, efficient and cost-effective distribution network.

ORTSNETZ

The distribution network operator EKZ (ZH), together with ETH Zurich and with the support of the Swiss Federal Office of Energy (SFOE), has carried out the OrtsNetz pilot project in the Zurich commune of Winkel. The aim was to test the potential of a local, intelligent supply network. The results show that both dynamic load control by the distribution network operator and real-time dynamic tariffs relieve the grid. It also enables the efficient use of renewable energies.

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