Switzerland types of energy storage

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Swiss solutions for storing the energy of tomorrow

With its hydroelectric power plants in the Alps and innovative projects, Switzerland is contributing to the search for solutions for the efficient, long-term storage of electricity.

Thermal energy storage. Switzerland wants to achieve net-zero emissions by 2050. To do so, the energy used to heat buildings and hot water must become 100 per cent CO2-neutral by 2050. The rapid expansion of thermal grids and seasonal heat storage plays an important part in this.

The key is to store energy produced when renewable generation capacity is high, so we can use it later when we need it. With the world"s renewable energy capacity reaching record levels, four storage technologies are fundamental to smoothing out peaks and dips in energy demand without resorting to fossil fuels.

The best-known example in Switzerland (and probably the most widely used worldwide) is pumped storage. Whereas an upstream reservoir pumps water due to extra energy it receives, the downstream reservoir receives water (via pipelines connecting the system together) and produces energy using the water"s kinetic energy.

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Heat storage systems are currently used in Switzerland primarily to break load peaks, simplify control (hydraulic decoupling) and balance the diurnal cycle. If the thermal storage tank is large enough, heat can also be stored seasonally.

With seasonal heat storage, unavoidable waste heat from waste incineration, from cooling applications and other industrial processes can be retained. Even surplus heat generated in summer from solar energy or deep geothermal energy can be stored. In this way, the consumption of other energies (biogas, natural gas, heating oil and electricity) can be reduced during winter. Seasonal heat storage can also be used to increase the efficiency of heat-pump heating systems.

Currently seasonal heat storage is only economically viable in a few cases because it is still cheaper to use fossil energy sources to meet peak load coverage in thermal networks. (Current price developments caused by the geopolitical situation are not taken into account here.) High energy prices in winter increase the economic attractiveness of seasonal heat storage.

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As is the case with several other countries, Switzerland"s climate policy towards a climate neutral energy policy (Energy Strategy 2050) makes the transition from the existing use of several types of energy (fossil, nuclear, renewable, etc) challenging. Given the intermittent production of certain renewable energies (wind, hydropower) or the geographical obstacles imposed (geothermal), a consistent energy transition is not possible without a performant energy storage.

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