Berne retail store energy storage

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A journalist from Ticino resident in Bern, I write on scientific and social issues with reports, articles, interviews and analysis. I am interested in environmental, climate change and energy issues, as well as migration, development aid and human rights in general.

Around 30% of the electricity produced globally is generated by sunshine, wind, water and other sustainable sources. In the year 2000, this figure stood at 20%. The International Energy Agency (IEA) predicts that by 2050 almost 90% of electricity will be generated from renewable sources.

Switzerland already generates most of the electricity it consumes from renewable energies (75%), mainly via hydroelectric power stations. In recent years there has been an increase in photovoltaics, and to a lesser extent in wind power.

However, the electricity generated by solar and wind power is irregular and varies according to the seasons. Production can exceed demand, especially in summer. One of the main challenges of the energy transition is to develop systems capable of storing excess energy and returning it when it is needed.

Pumped-storage power stations are the most effective and economical solution. They allow water to be pumped to a higher altitude when there is an excess energy, and to release generated electricity when there is a shortage.

In Switzerland there are about 100 reservoirs for hydroelectric production, and about 15 of them have a pumping system. Compared to other Alpine countries, such as Austria, Germany and Italy, Swiss power stations generally have larger water-retention basins and are therefore able to operate over longer periods, notes the Association of Swiss Electricity Companies.

A new pumped-storage power station, one of the most powerful in Europe, came on stream in canton Valais in southern Switzerland in July 2022. This giant “water battery” will help compensate for fluctuations in solar and wind power on the continent.

As the Alpine glaciers slowly melt away, Switzerland will have the opportunity to build new dams and artificial lakes in the mountains. This will increase energy storage capacity in the Alps, strengthening Switzerland’s role as Europe’s "electricity battery".

The Swiss start-up Energy Vault follows the same principle as pumping and turbines. But instead of water, it uses concrete blocks. When there is a surplus of green electricity, these “bricks” are hoisted on top of each other to form a 120-metre tower. They are then “dropped” using gravity to generate electricity. The prototype built in canton Ticino, described below, has already attracted interest abroad.

Surplus electricity can also be converted into liquid or gaseous energy sources. So-called ‘power-to-x’ technologies make it possible to use electricity from a solar power plant or a wind farm to produce hydrogen and then methane, for example. These two elements can be stored for a long time and used as fuels.

Switzerland wants to pave the way for emission-free mobility by replacing fossil fuels with green hydrogen. In 2020, the world’s first fleet of hydrogen commercial trucks became operational and in June 2023, the first hydrogen refueling station on the national motorway network was inaugurated near Bern.

Despite its innovative and entrepreneurial spirit, Switzerland is lagging behind in the race for renewable hydrogen. The country does not yet have a national strategy for hydrogen and in the absence of an energy agreement with the European Union it risks finding itself isolated.

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