Switzerland

Ideologies bring no solutions

Failure of the energy transition is predictable

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Ueli Gubler (Photo ma)

The "Energy Concept 2050" adopted in 2017 provides for the phasing out of nuclear energy and the abandonment of fossil fuels. In the Federal Council's dispatch, the costs for a household of four were estimated at CHF 40 ($45) per year.

In June 2021, Federal Councillor Simonetta Sommaruga opened the referendum campaign on the CO2 Act with the remark that the energy transition would probably cost one hundred billion francs across Switzerland. That would be a total of CHF 48,000 per household for the conversion. It is to be feared that the federal government, and others as well, have no idea how great the technical costs of the energy transition will be.

Switzerland's annual energy requirement is 220,000 GWh (gigawatt hours). Of this, 20,000 GWh comes from nuclear power plants and 131,000 GWh from fossil fuels (petrol, diesel, oil, and gas). The "Energy Concept 2050" therefore calls for 151,000 GWh to be replaced by wind and solar energy.

Wind turbines

The wind farm showpiece "Verenafohren" in Tengen, Germany, north of Schaffhausen, Switzerland, with a rated output of ten megawatts (MW), distributed over three turbines, generates 19 GWh/year or $6^1/_3$ GWh/year and turbine. Larger wind turbines, e.g. of the Vestas V162 type, achieve 8 GWh/year. However, they are fifty metres higher, namely 250 metres (!) high. This means that around 19,000 wind turbines would be needed to replace the 151,000 GWh.

The surface area of Switzerland is 41,285 km^2, the settlement area is 3,300 km^2 and the area above 2,000 metres is 9,500 km^2. This leaves

Wind turbines are changing our landscape. (Picture ma)

28,485 km^2 for the 19,000 wind turbines. Sites above 2000 metres above sea level are not accessible to large construction machines and cranes, unless the sites are in the immediate vicinity of mountain passes. This means that there would be one wind turbine on every 1.5 km^2 of the remaining area from Lake Geneva to Lake Constance, regardless of whether the site is suitable or not.

This clearly shows how inefficient wind turbines are and how unsuitable Switzerland is for wind turbines. The official wind atlas of Switzerland shows an average wind speed of around 5 m/sec. According to the performance curves of various products, wind turbines only start producing at this wind speed. The capacity utilisation of the existing sixty wind turbines in Switzerland is therefore only 17 percent (ratio of the amount of electricity produced compared to the possible amount based on the installed nominal output). The capacity utilisation on the German North Sea coast is twice as high. This is why ninety per cent of German wind turbines are located north of Berlin.

The benefit of wind turbines is often quoted as 3000 – 5000 kWh/year per household. However, this is a deception. The actual energy consumption of a person is 27,000 kWh per year. That is 108,000 kWh for a four-person household. Industry, commerce, shopping centres, schools, hospitals, etc. cannot simply be excluded. The CO_2-loaded energy per person amounts to around 20,000 kWh per year. With an annual production of 8 GWh, one wind turbine can cover the needs of only 400 people.

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Solar plants

The planned large-scale solar plant "Gondosolar" (VS) covers an area of 100,000 m^2 and produces 23 GWh per year according to the client *Alpiq*. To replace the 151,000 GWh, 6560 such systems would be required. This area corresponds to two thirds of the area of the Swiss canton of Thurgau. This is therefore an impossible idea. Even a mix of wind turbines and solar plants would not change the enormous amount of space required.

Storage

Wind and solar energy cannot be planned. They occur sometimes, but not most of the time. The so-called full load hour factor for wind turbines is less than twenty per cent, that of solar plants around 12 per cent; scientists have been racking their brains over this for almost thirty years, without any success. It is not just the daily fluctuations that need to be balanced out. The seasonal fluctuations are far greater, with a ratio of 1:5 for solar systems. For large quantities, only pumped storage basins or the diversions via hydrogen are currently an option. Either way, the losses are enormous.

Primary energy is the amount of electricity that a country generates plus the net from exports and imports. Final consumption comprises the electricity that is actually purchased by the end consumer. In the European grid, this is only 70 per cent of primary energy. 30 per cent are grid losses or are lost during conversion in the transformation stations etc.

In the case of pumped storage reservoirs, the loss is over 50 per cent, and in the production and use of hydrogen over 70 per cent. It is incomprehensible why the efficiency of liquid gas is propagated so positively. The energy required for fracking, liquefaction to minus 162°C for transport by sea and subsequent vaporisation is concealed. Renewable energies considerably increase the difference between primary energy and final consumption – and the poorer utilisation also costs a lot of money.

Grid expansion

Current electricity consumption amounts to 58,000 GWh. If the energy from fossil fuels is converted into electricity, electricity consumption increases by 151,000 GWh to 209,000 GWh. That is 3.6 times the current volume. Our electricity grid is not designed for this. It's not just about the transmission lines. The effects will be felt right down to the neighbourhoods.

Conclusion

The larger a project, the more important careful planning is. Turning the tried and tested energy supply upside down is a mammoth project for which there is a lack of experience. In view of the enormous costs involved, it is irresponsible to place wind turbines in the landscape at random. This should only be started once the concept has been finalised in detail. It would be disastrous if such interventions in sensitive landscapes turned out to be a flop. Three things need to be clarified in advance: the number of wind and/or solar installations, the storage of electricity and the expansion of the grid.

Germany's disaster

The 30,000 wind turbines and 600 km^2 of solar panels that have been installed are only able to cover just under 10 per cent of Germany's total energy requirements. The construction of wind turbines has come to a standstill.

The "traffic light coalition" is trying to alleviate the power shortages, some of which they have caused themselves, by using expensive liquid gas and restarting old coal-fired power stations. This is a silent admission that the energy turnaround using wind and solar power has failed.

It is also an admission that all objections have been nipped in the bud with the constant threat of the "end times" and that increased CO_2 emissions are now being accepted. That is not credible.

Anyone who takes saving the climate at the last minute seriously, will act differently. Germany saw itself as a pioneer of the energy transition to which the rest of the world should bow. That went completely wrong. Germany is about to strangle its economy.

We have the choice to do things differently, albeit better. Unfortunately, there is no cure for ideology. Perhaps the rising electricity costs, which will also spill over to us, will open people's eyes. The planned bill on a secure electricity supply by the federal government is supposed to increase security of supply. In reality, it will restrict existing basic rights. This reminds us of Corona. It is not a good thing when well-founded objections to something that is doomed to fail from the outset are provisionally prevented.

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