

TACKLING THE ENERGY AND CLIMATE CRISIS LONG-TERM

The recently established ESC Expert Group Security of Supply outlines steps for Switzerland for reaching fossil fuel independence. This will ensure meeting climate targets and also reduce dependence on energy imports from abroad.

Switzerland sources about half of its primary energy supply from abroad as fossil fuels. This conflicts with meeting climate targets and means that Switzerland is heavily dependent on other countries and geopolitics. Transitioning away from imported fossil fuels to an energy system that relies mostly on renewable energy will put Switzerland on the road to building a fossil-free, climate-neutral and secure energy system by 2050. This will require a diverse combination of technical, political and social measures. The paths to get there are equally diverse. However, there are some critical steps that need to be initiated now.

The policy brief 'Steps to Fossil-Fuel Independence for Switzerland' published by the group delineates these steps. The three largest fossil fuel and energy consumers are the transport, building and industry sectors in Switzerland. The most important measure for the transport sector is electrifying motorized individual transport, the top user of fossil fuels. For other transport sectors like long-haul freight and aviation, green hydrogen and renewable synthetic fuels need to become established. For the household and building sector, reducing energy demand by renovating the building stock and electrifying heating as much as possible will be key. Here it is essential to incentivize and speed up renovation now. With the current annual renovation rate of 1 to 2 percent, many buildings are likely still

not energy efficient in 2050. In the industrial sector the majority of fossil fuels are needed to generate heat. Low-temperature processes should also be electrified, whereas green hydrogen, synthetic or biofuels should be used for high-temperature process heat.

Electrifying all these applications requires increasing the production of renewable electricity massively. Thus, policies have to be put in place now to accelerate the deployment of renewables (solar, wind, bio- and geothermal energy). In parallel, the digitalization and automation of the entire electricity system will ensure an efficient integration of renewable electricity. The policy brief also highlights that integrating the Swiss power grid within the European system will be more efficient and less costly than energy autarky. This means creating a continued secure legal basis for electricity trade, which would allow Switzerland to export its relative surplus of renewable electricity during the summer months and import in winter. ■

REFERENCE

Hug G, Demiray T, Guidati G, McKenna R, Oswald K, Patt A, Saar MQ, Sansavini G, Schaffner C, Schwarz M, Steffen B (2022) Steps to Fossil-Fuel Independence for Switzerland. ETH Zurich, Energy Science Center, Policy Brief. doi.org/10.3929/ethz-b-000555764

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Photovoltaic systems in alpine regions could be important to generate more electricity in winter. Source: anatoliygleb / 123rf.com

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The Energy Science Center (ESC) at ETH Zurich is an interdisciplinary competence center that facilitates energy research and teaching across fields and departments.