

# Households in Switzerland could feasibly be energy self-sufficient by 2050

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By 2050, photovoltaic technologies that convert sunlight into electricity could enable many single- and multi-family buildings in Switzerland to produce enough energy to meet their own consumption needs, including

the charging of electric vehicles. Ursin Gstöhl and Stefan Pfenninger of ETH Zürich report these findings in the open-access journal *PLOS ONE* on March 4, 2020.

Reducing reliance on fossil fuels is a major focus of efforts to mitigate climate change. Photovoltaics offer a promising alternative that could also increase energy [self-sufficiency](#) at the level of individual households. While previous studies have explored various aspects of households that produce their own energy, none have taken a big-picture view of their feasibility in a temperate country like Switzerland.

To address this gap, Gstöhl and Pfenninger evaluated the technical and financial feasibility of energy self-sufficiency for households that switch to electric vehicles and turn to photovoltaic electricity to power all their needs, including heating. Using already-available data, the researchers explored a range of different building types and energy demands.

The analysis suggests that total self-sufficiency is technically feasible by 2050 for single- and multi-family buildings in Switzerland across a range of scenarios. Self-sufficiency is easily attainable for single-family households with behavioral change to lower [energy demand](#) and with urban vehicle use patterns. In contrast, a multi-family [building](#) with conventional energy demand and rural vehicle use patterns would require advancements in the efficiency of photovoltaic technology.

The predicted financial feasibility of self-sufficiency depends on several factors, including government incentives and the cost of [energy](#) storage technologies. Fully self-sufficient buildings are more expensive than buildings that are fully electrified but still connected to the grid, but so are households that still use [fossil fuels](#) for heating and vehicles. In other words, electrification is definitely economically beneficial for households, with self-sufficiency coming at an additional cost premium.

Still, the combination of falling storage costs, rising fossil fuel prices, and political measures could result in increased prevalence of fully self-sufficient households in Switzerland. These findings could also apply to other highly industrialized countries with temperate climates.

**More information:** Gstöhl U, Pfenninger S (2020) Energy self-sufficient households with photovoltaics and electric vehicles are feasible in temperate climate. *PLoS ONE* 15(3): e0227368.

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