

SCCER-FURIES WP 4

100% renewable energy and how to integrate 50% PV electricity (40 TWh) in the grid

Grid planning for Swiss city of Burgdorf 2050

SimZukunft - <https://simzukunft.ch/>

What are the impacts of the Swiss Energy Strategy 2050 for a small city in Switzerland?

Four scenarios:

- **NEW ENERGY POLICY NEP** Energy Strategy 2050 - political measures, moderate increase in renewable energy + EV, slow and steady growth of economy
- **POLITICAL MEASURES POM** Energy Strategy 2050 - political measures, slightly weaker version of NEP
- **UTOPIA - BEST POSSIBLE FUTURE** 100% PV + EV, smart grid, sector coupling, cheap storage, retrofit of houses, zero CO₂, 100% decarbonisation, moderate economy
- **DYSTOPIA - WORST POSSIBLE FUTURE** barely any growth in renewable energy, expensive PV, hardly any electric vehicles, global warming (maximum indoor climatization), poor economy, climate refugees

Broad group of experts:

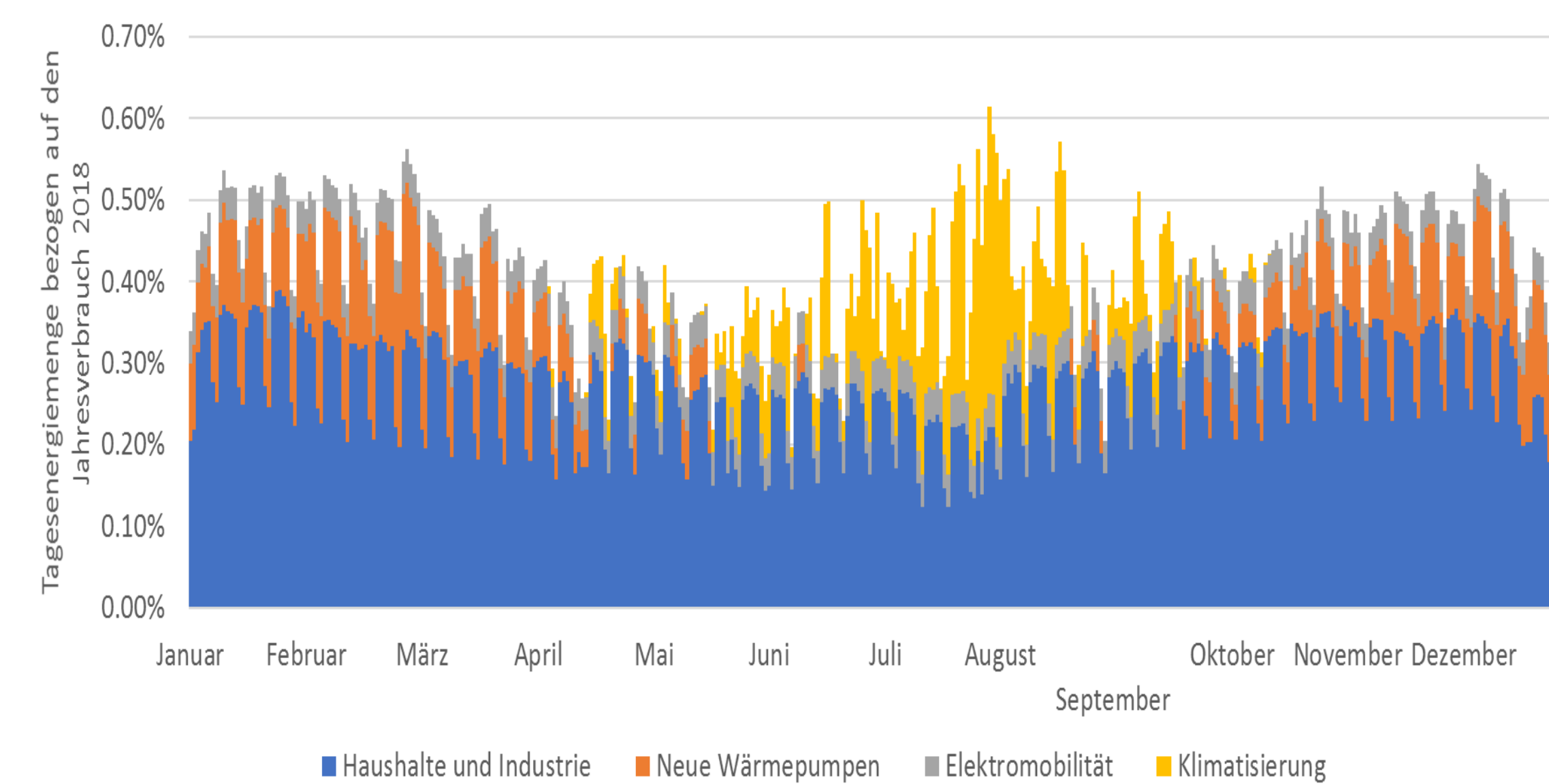
Academic Partners

PV LAB - BFH / Adaptricity AG

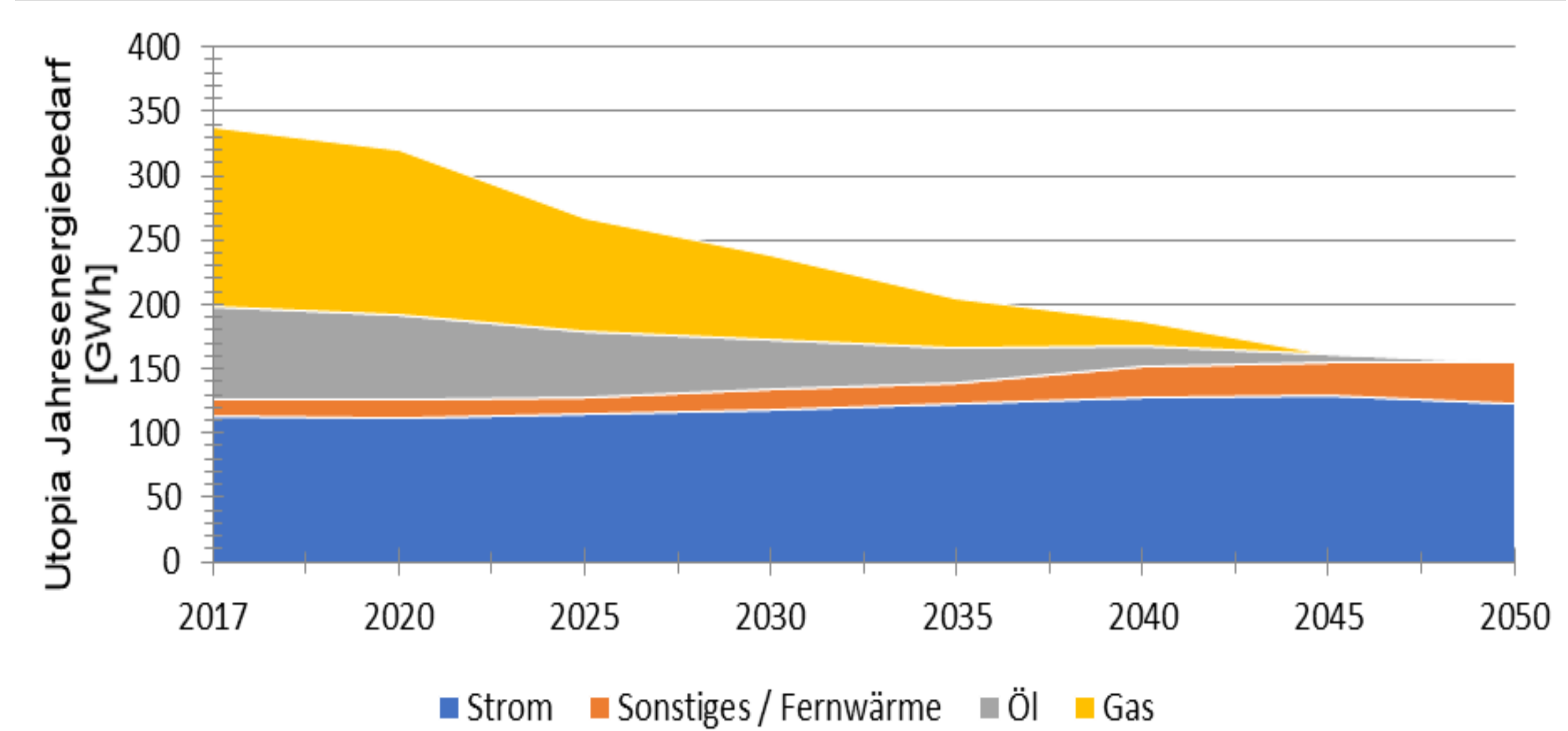
Project partners:

City of Burgdorf / Localnet AG / State of Bern

PV and smart users



Annual loads in a decarbonised city of Burgdorf (UTOPIA) - peak loads in summer due to climate change



Overall energy consumption decreased (no fossil energy anymore) in UTOPIA scenario (decarbonisation)

How can Burgdorf be decarbonised in 2050?

- The Swiss Energy Strategy 2050 is easy to implement with political measures including re-enforced renewable energy.
- DISTOPIA scenario: The energy consumption increased, climate change is accelerated, and there is a strong dependence on fossil energy.
- UTOPIA scenario:

The renovation of existing buildings is a challenge (2% / year of all buildings); all cars are electric.

If all energy is produced with PV -> 160 MW peak in the grid (as compared to currently 20 MW).

If PV peaks are curtailed, and with smart users (heat pumps, Evs) -> the expansion of the grid is limited from 131 MW to 32 MW.

-> Changing 70 of the 101 transformers over a period of 30 years is necessary (and feasible).

Even if all electricity is produced with local PV (in reality, it will be 50%, because of hydro power), the 160 MWp are much cheaper than today.

-> PV currently costs 5-10Rp/ kWh and the PV price will decrease to 3Rp/ kWh in 2030 for big PV plants.



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