

**sweet** swiss energy research  
for the energy transition



**PATHFINDER**

# SWEET Conference

04 September 2024

**ETH** zürich

 **Empa**

PAUL SCHERRER INSTITUT  


**zhaw**

HOCHSCHULE  
LUZERN



UNIVERSITÉ  
DE GENÈVE

**EPFL**

 **TU Delft**

# Synthesis on the role of flexibility and sector coupling in the Swiss energy system

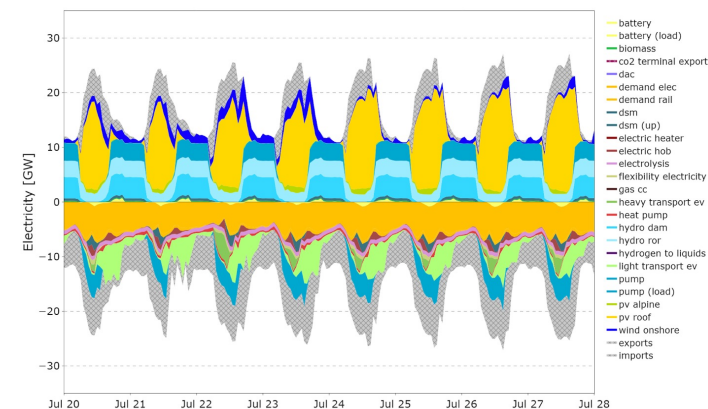
## Sector coupling through electrification

To achieve net-zero, electrification of transport and heating sectors is the preferred path to decarbonize.

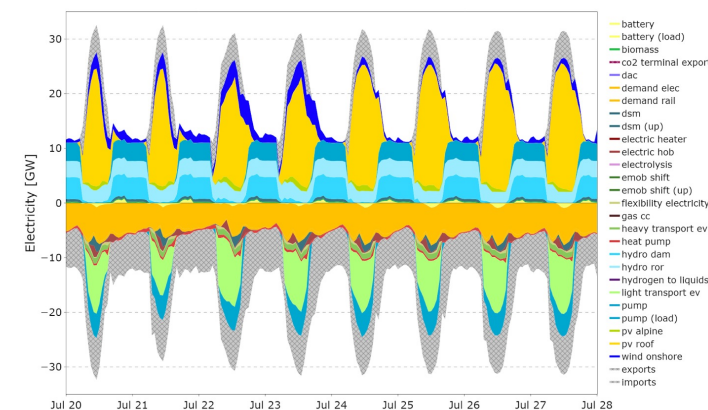
## EVs and HPs offer valuable demand flexibility

The 2050 energy (mainly electricity) system will need more short-term and seasonal flexibility, with EVs and HPs offering valuable demand flexibility to optimize the use of resources like PV and hydro.

**Synthesis report II** will provide recommendations to enhance sector coupling and system flexibility at national scale. Due to the local and distributed nature of PV, EVs, and HPs, more detailed analysis at the local level is required.



Weekly dispatch (hourly) of electricity production and consumption in Switzerland in the **abroad-high-progressive-noEVflex** scenario for a summer week.



Weekly dispatch (hourly) of electricity production and consumption in Switzerland in the **abroad-high-progressive** scenario for a summer week.

# Synthesis on the flexibility from electromobility and buildings at local scale

## **Flexible EV charging, supplemented by flexible HP operation**

Flexible EV charging and HP operation are needed if demand electrification outpaces infrastructure upgrades, particularly in distribution grids.

## **EV and HP flexibility is driven by the PV penetration**

As PV penetration increases in Switzerland and across Europe, EV and HP flexibility will be motivated by PV penetration (at both distribution and bulk-power system level).

## **Effective regulatory and market mechanisms and control algorithms**

Mechanisms such as dynamic tariffs, local flexibility markets, and occasional curtailment are key to maximizing demand-side flexibility from EV charging and HP operation.

**Synthesis report III** will provide recommendations to different stakeholders to promote system flexibility at local scale.

