sweet swiss energy research for the energy transition

PATHFNDR

Electromobility + buildings

Can my electric vehicle and heat pump contribute to power system adequacy?

Work package 1

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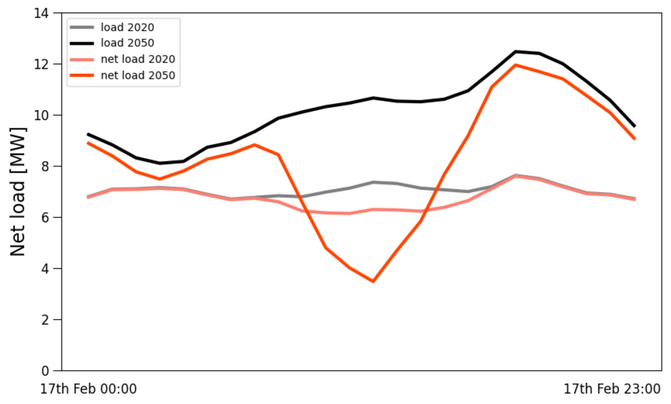
1. Will we have a reliable power system in 2050?

Energy transition challenges:
- The electrification of heating and transport will lead **to increased electricity demand**.
- Higher penetration of VRES will lead **to higher net load variability.**

Can we harness flexibility from EVs and HPs to ensure power system adequacy?



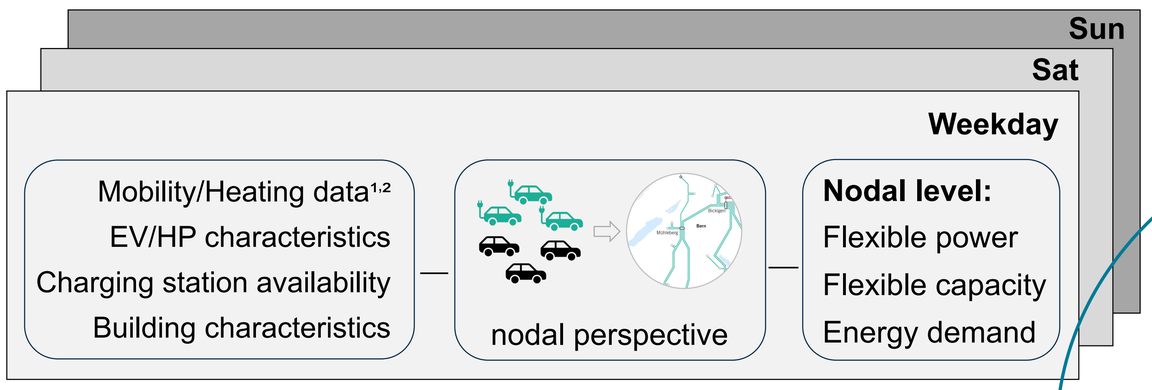
2. CONTRIBUTION TO PATHFDNR

We assess the adequacy of the net-zero energy system pathways

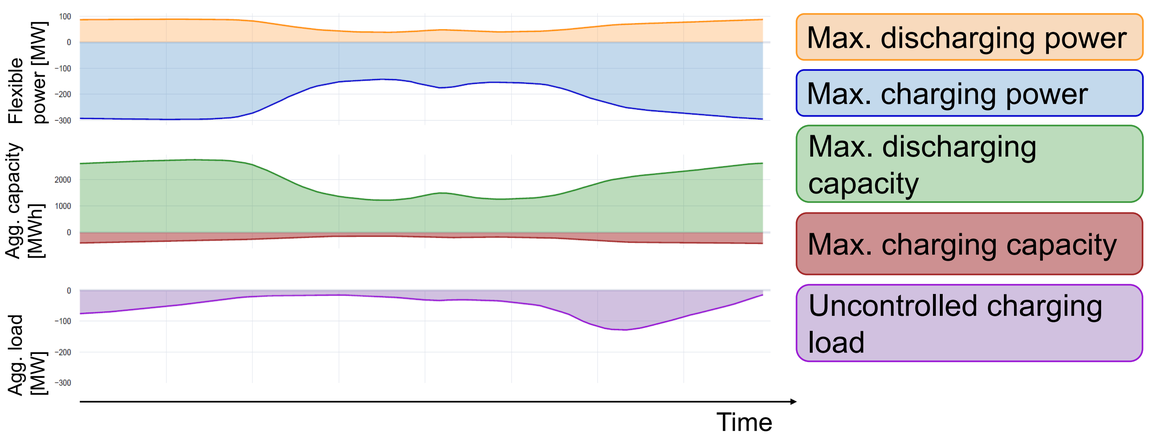
We assess if and how flexibility from heating and mobility can contribute to the power system adequacy

2.1. EV and HP flexibility

Quantification of EVs and HPs flexibility provision

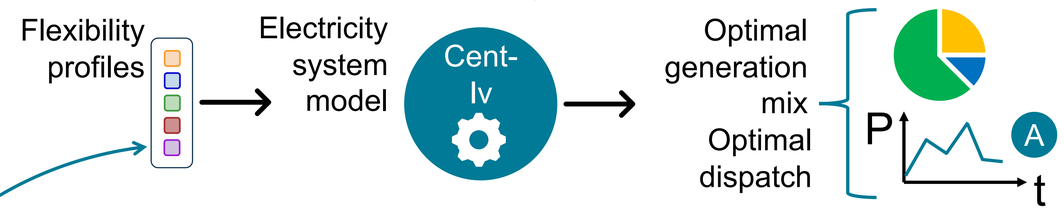


Characterization of flexibility through hourly profiles[3]



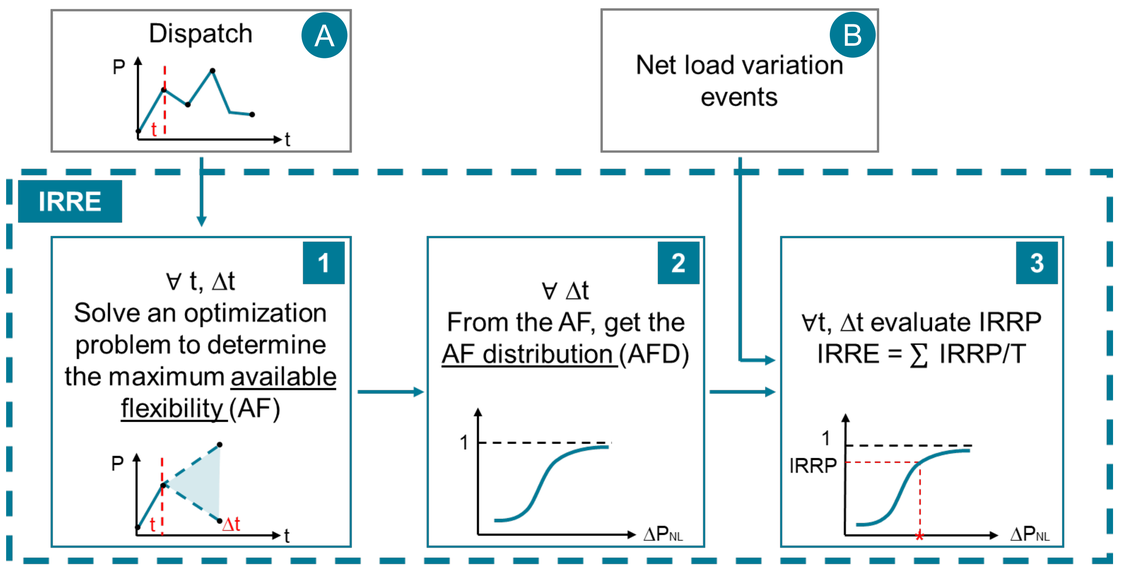
2.2. Quantification of system adequacy

Simulation of EV and HP optimal flexibility provision



Power system adequacy quantification

Quantify system adequacy under **large VRES penetration**, focusing on the **impact of net load ramps** in the **minutes-to-hours** timescale.
Method: **Insufficient Ramping Resources Expectation (IRRE)**[4] metric.



3. RESULTS

Without EV and HP flexibility we expect to see a decrease in system adequacy in 2050 (i.e. an increase in IRRE).

How much will EVs and HPs contribute to the future net-zero power system's adequacy?

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