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# SCCER FEEB&D
# Flexibility and Capacity

## SUPPLY SECURITY CHALLENGE

Energy performance improvement in buildings currently focuses on total demand reduction. The increasing electrification of building services leads to higher peak loads at various scales. This could endanger supply security and threaten climate mitigation targets.

## PARADIGM SHIFT

**Flexible** energy systems can respond effectively to foreseeable and unforeseeable events.

**Capacity** indicators measure the required capacity of the energy system to supply a building at all points in time. This encompasses total energy and the time distribution of demand, e.g., peak power.

These are complementary: the smaller the peak load, the more flexibility is created in the system. Supply security can be enhanced by minimizing the capacity requirements of buildings. Increased self-consumption and self-sufficiency is a cornerstone of such a strategy as it it enhances grid flexibility through reduced peak loads.

## HOW

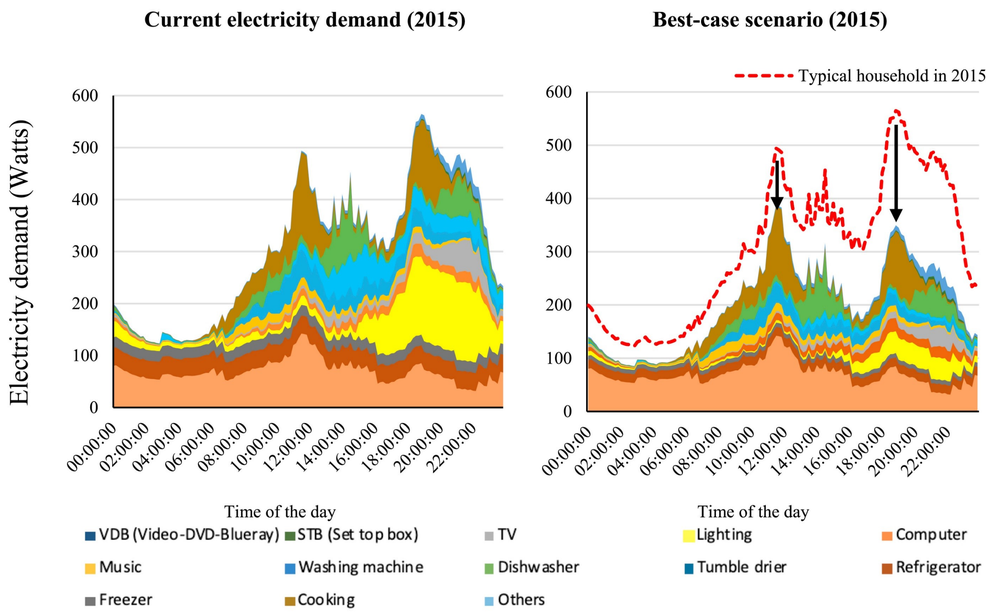
Establish **incentives** or marketplaces to **exploit flexibility.**

Implement **capacity indicators.**

Subsidise large-scale deep and energy effective retrofitting.

Introduce **digital monitoring of buildings** (smart meters and sensors).

**Consider** the **operation** of buildings during the planning phase in order not to exceed the required capacity limits.




Comparison of domestic appliance electricity demand profiles for a mean Swiss household in 2015 with a best-case scenario in which all the appliances are replaced with the currently most efficient version.

## KEY FINDINGS

Self-consumption (the share of auto-consumed self-generated PV electricity) depends on the complementary technologies installed. Thermal and electrical storage technologies are thus key for high self-consumption values. Combinations of these storage technologies are particularly beneficial if further battery applications such a demand peak shaving are considered.

- Self-consumption in a single-family home with a heat pump and thermal storage reaches 30-40%; including a battery can boost this up to 60%.

There is a strong relation between improving building energy efficiency and reducing the peak load.

- The peak energy load of single-family houses with lower thermal performance is approximately 2.5 times higher than for high thermal performance buildings. In buildings with low thermal performance, the heat pump operation strongly impacts the peak load while it has only a small impact for buildings with high thermal performance.

The importance of complementary technologies calls for a coordinated regulatory approach.

- Building energy codes currently focus on energy demand while high feed-in tariffs for PV electricity disincentivise storage technologies, which undermines energy security, energy equity and environmental sustainability goals.

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