



BUILDING ENERGY MANAGEMENT SYSTEM

EMPA TRAINING SESSION

12 NOVEMBER 2019

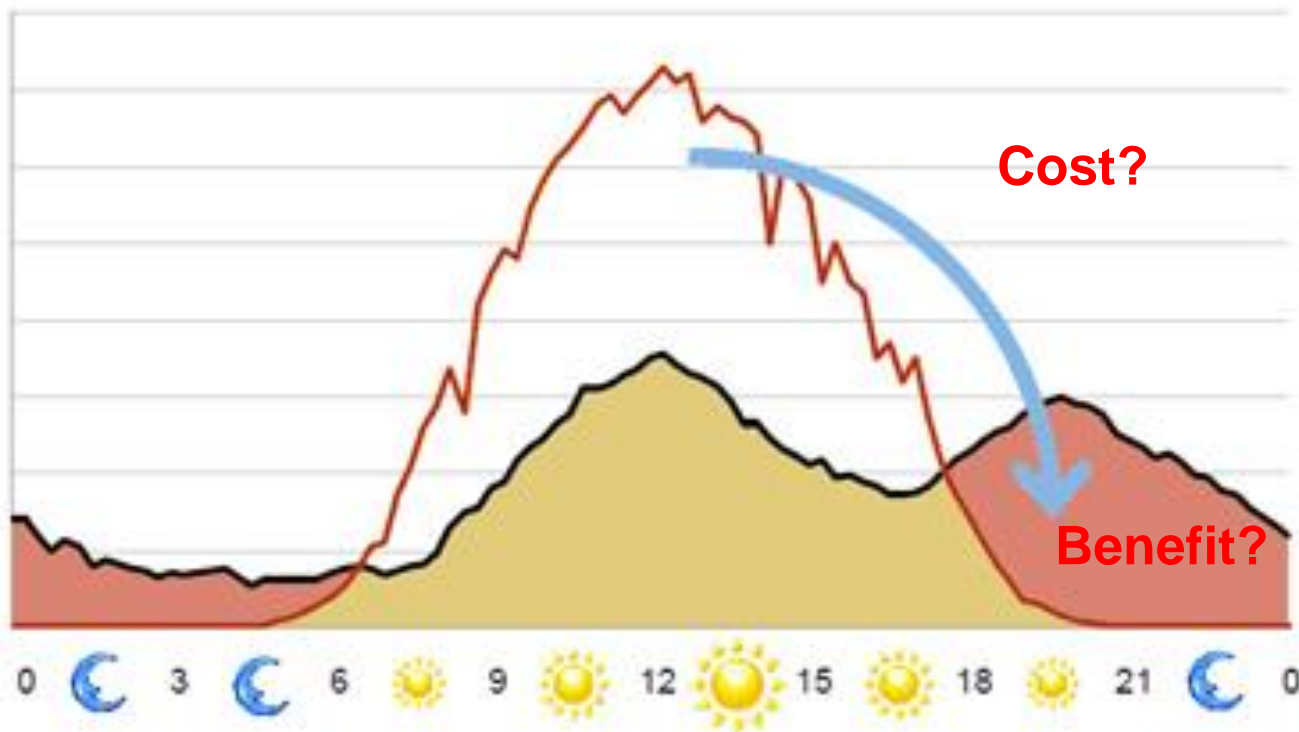
Ricardo Alonso – Tecnalia



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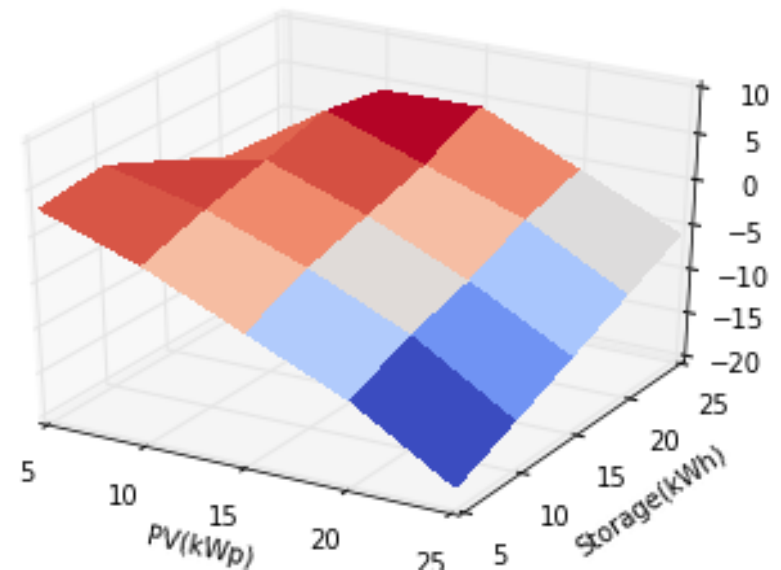
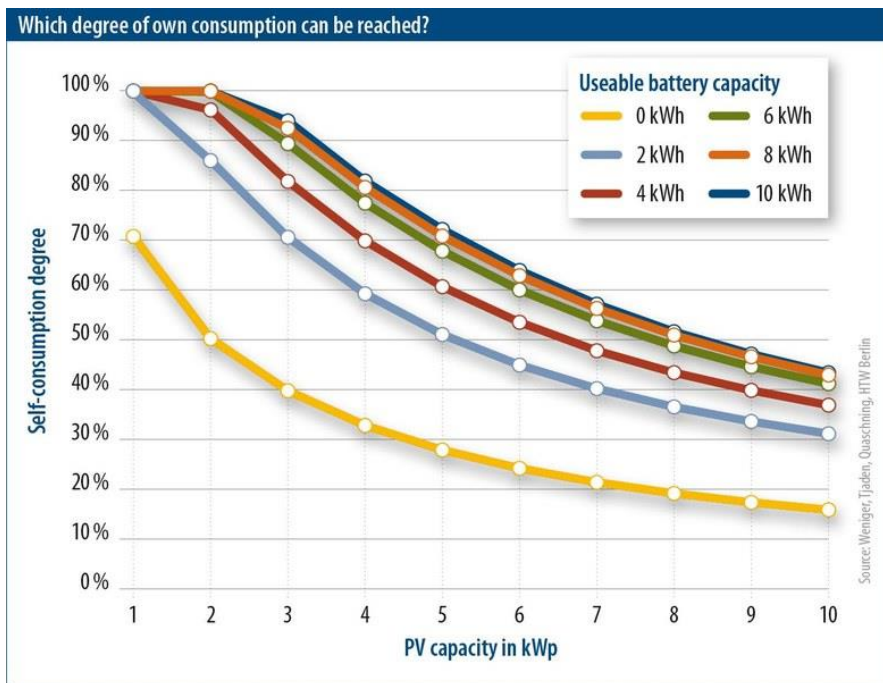
Storage PV systems

- ✓ They allow to match BIPV generation and consumption getting the most value from BIPV excess.



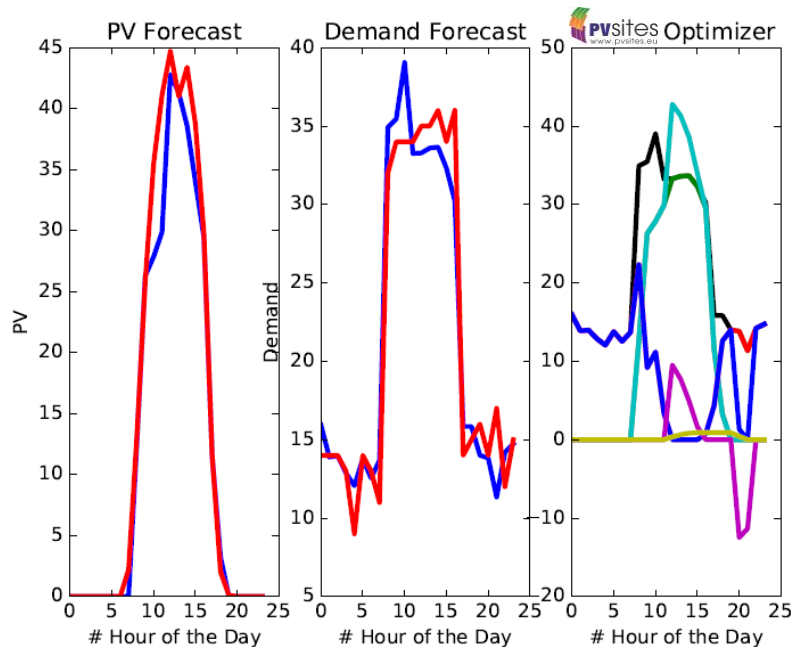
Cost of Storage

- ✓ **LCOS (c€/kWh)** must be reduced by means of:
 - ✓ **Learning curve** of different technologies and **economies of scale**
 - ✓ An **optimal selection and sizing** of storage system
 - ✓ An **optimal operation** of storage providing the same service

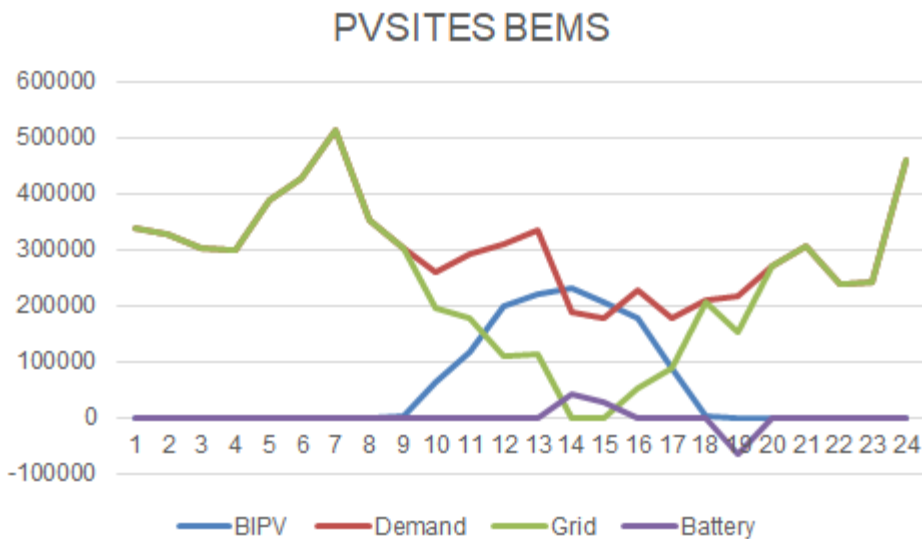
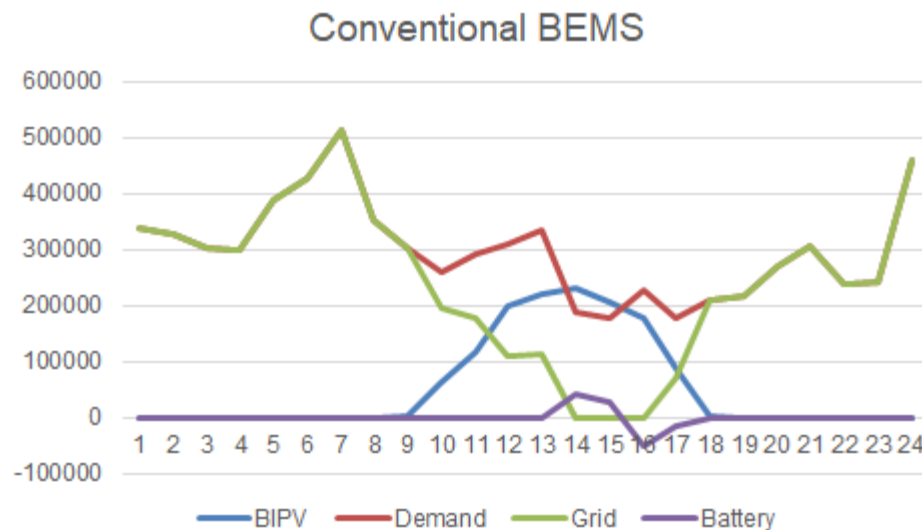


Benefit from Storage

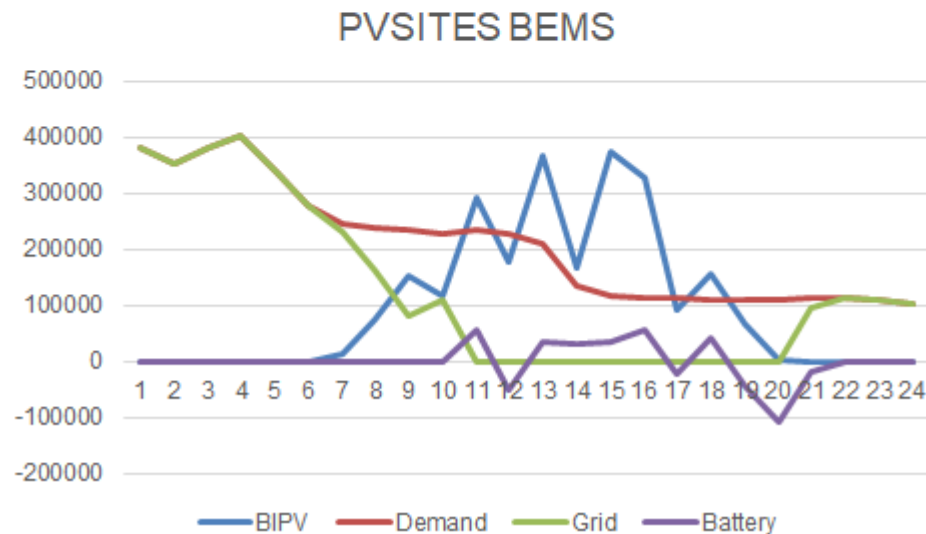
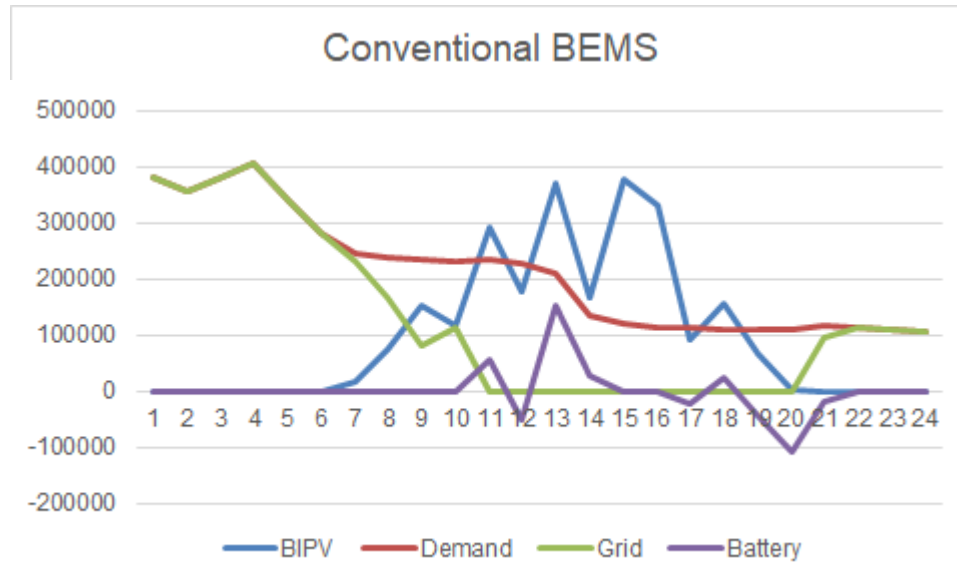
- ✓ **Benefits from self-consumption of stored energy** must be increased by means of:
 - ✓ Self-consumption in hours with higher purchase electricity tariffs.
 - ✓ Offering simultaneously added value services, like peak-shaving.
- ✓ For this purpose, BIPV generation and electrical demand **forecasting** tools are needed.



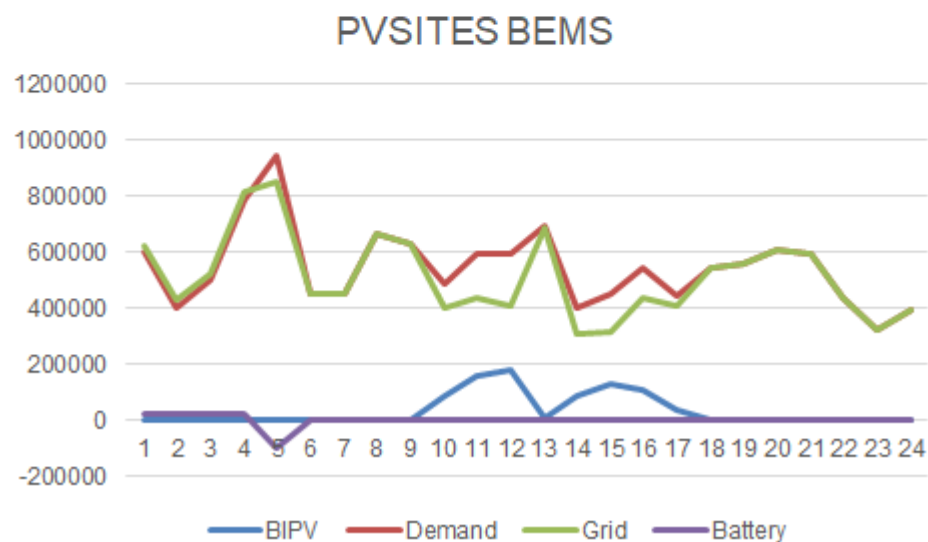
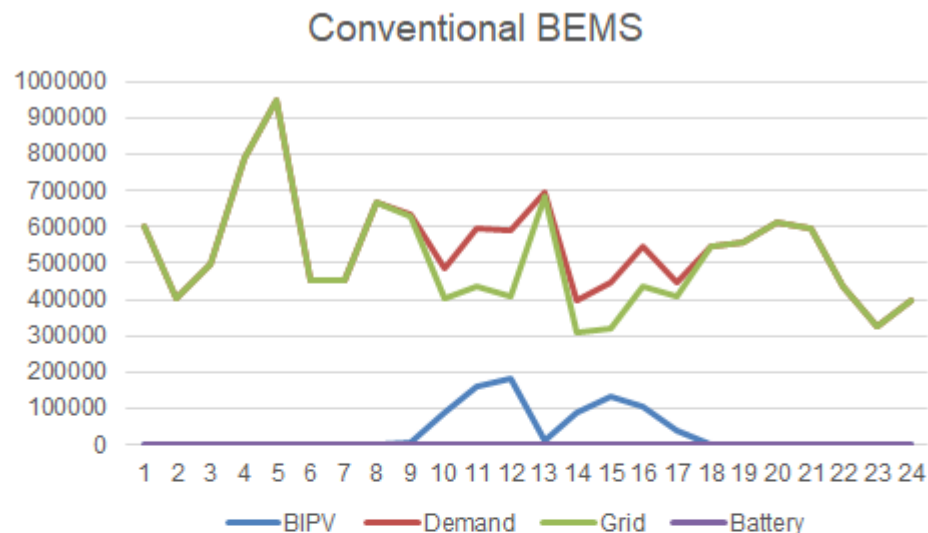
Self-consumption optimization



Battery charge optimization

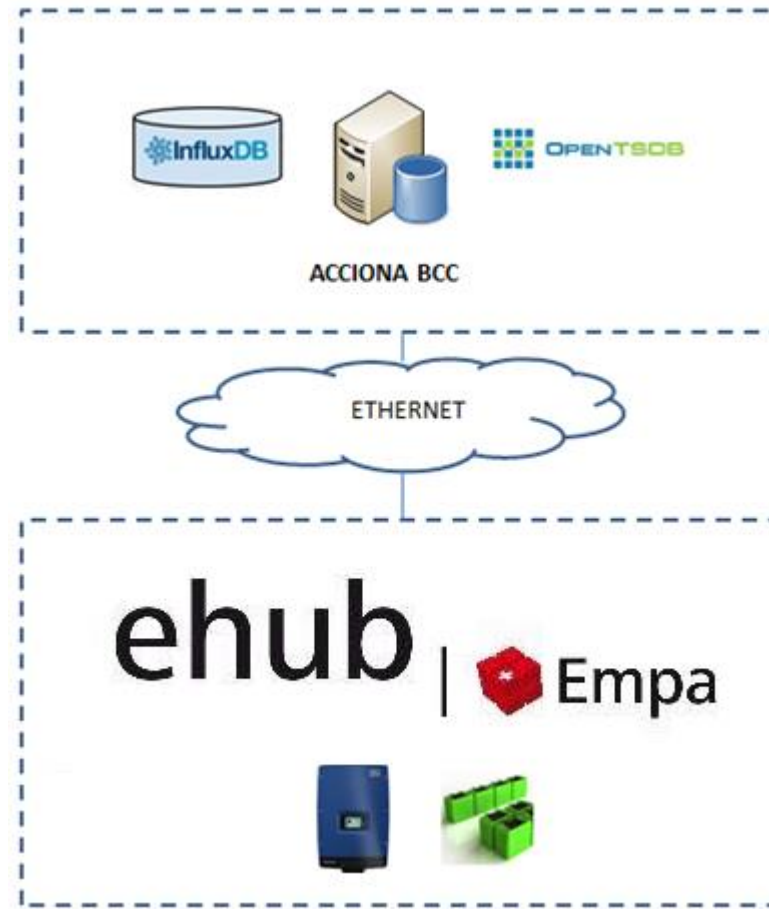


Peak-shaving

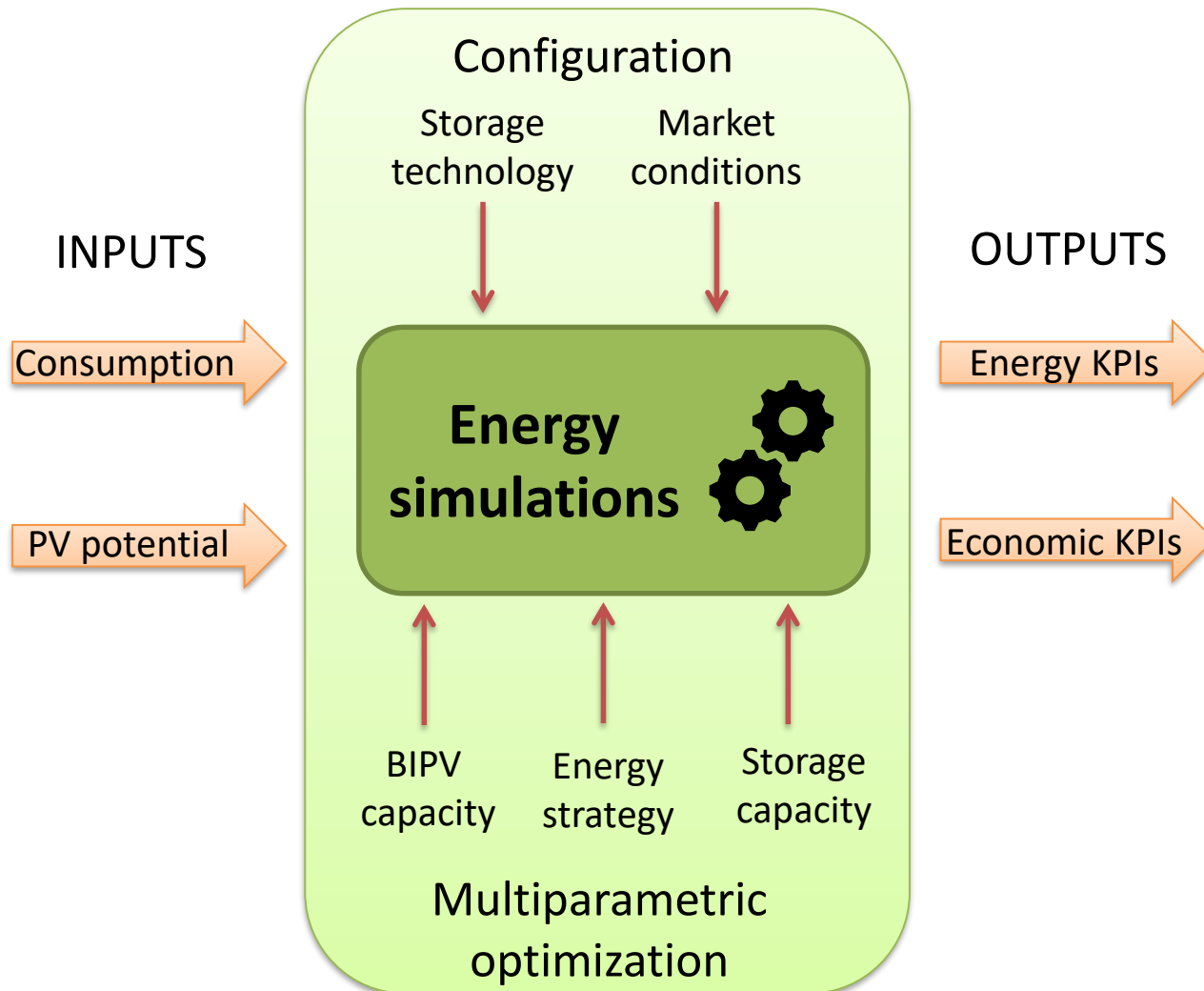


Local real-time energy control

- ✓ **Responsible for the real-time monitoring and control** of generation, demand and storage, correcting potential deviations

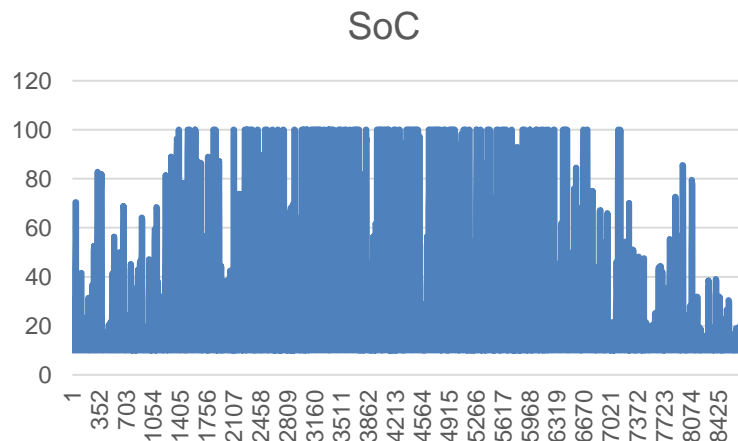


Planning tool



EMPA sizing

- ✓ EV charger supplied by BIPV with individual grid connection point.
 - ✓ BIPV capacity: 7.2kWp limited by carport surface (98m²).
 - ✓ Storage capacity (20kW/20kWh).
- ✓ Expected energy indicators:
 - ✓ BIPV generation: 6.2MWh.
 - ✓ Direct self-consumption: 0.75MWh (12% of BIPV and 13% of total demand).
 - ✓ From batteries: 3.8MWh (61% of BIPV and 66% of total demand) and 40% peak-shaving.



Lessons learnt

- ✓ Difficulties to find commercial storage inverters able to be controlled by BEMS developed by a third party:
 - ✓ Lack of standardization and interoperable open-protocols.
 - ✓ Loss of battery guarantee.

