International Renewable Energy Storage Conference

IRES

IRES 2021 Poster Exhibition

15 TH INTERNATIONAL RENEWABLE ENERGY STORAGE CONFERENCE

#140

Background

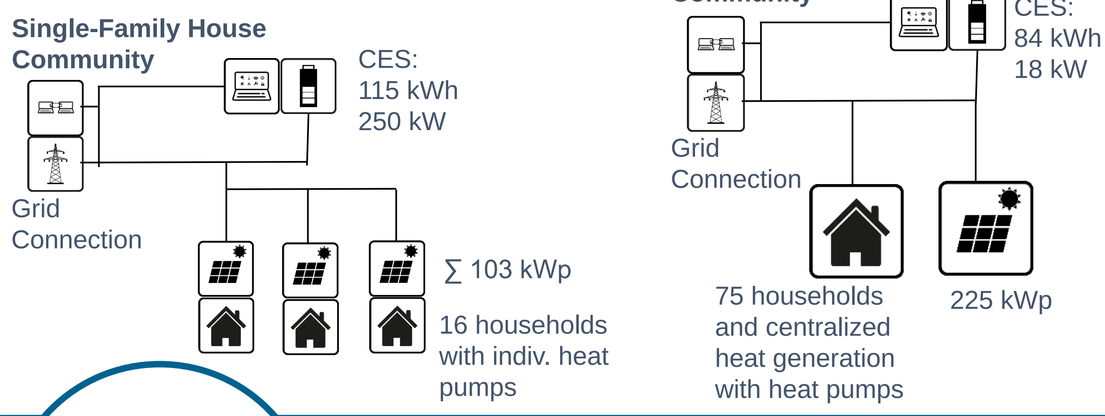
- Batteries in residential sector primary used for optimizing self-consumption
- Fluctuating production and demand lead to unused capacity throughout the year
- CES only used for optimizing self-consumption not yet profitable (in Germany)

➡ Batteries should be used for multiple applications

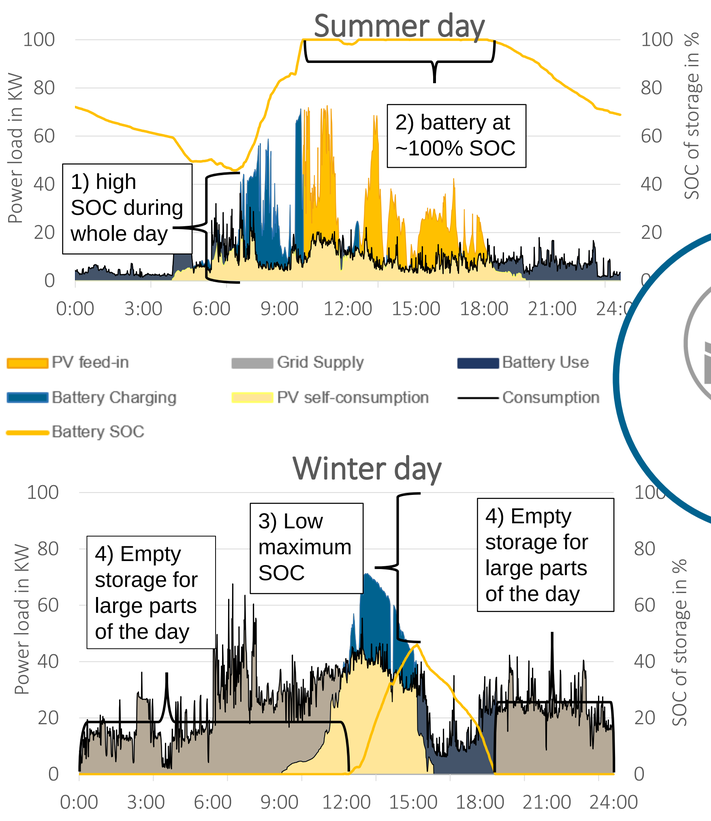
Research questions: What services CES can perform to reach profitability and how does reserved capacity for other services compromise self-consumption?

Methods

- Expert-interviews, stakeholder workshops, desk research, enhanced business model canvas
- Simulation of energy flows in two communities
- Calculation of multi-use-effects



Inefficiencies in single-use



Multi-use of Community Energy Storage (CES)

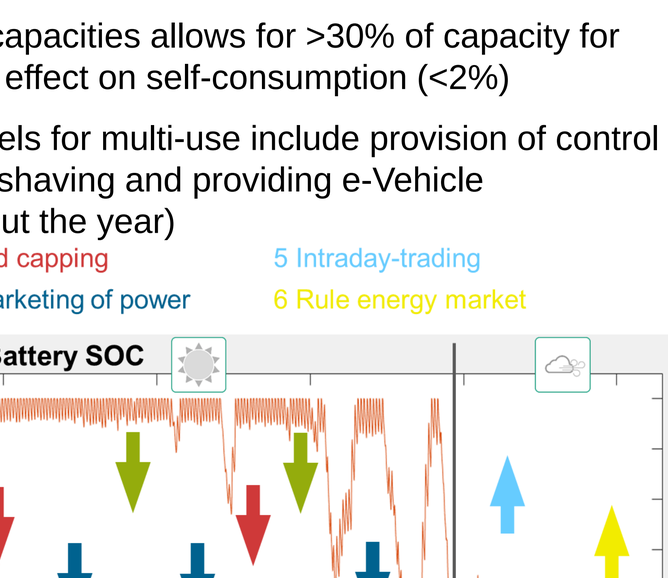
Services, Business Models and their Compatibility with Increasing Self-consumption as Primary Service

Available capacity for supplementary services with flexible allocation of capacity

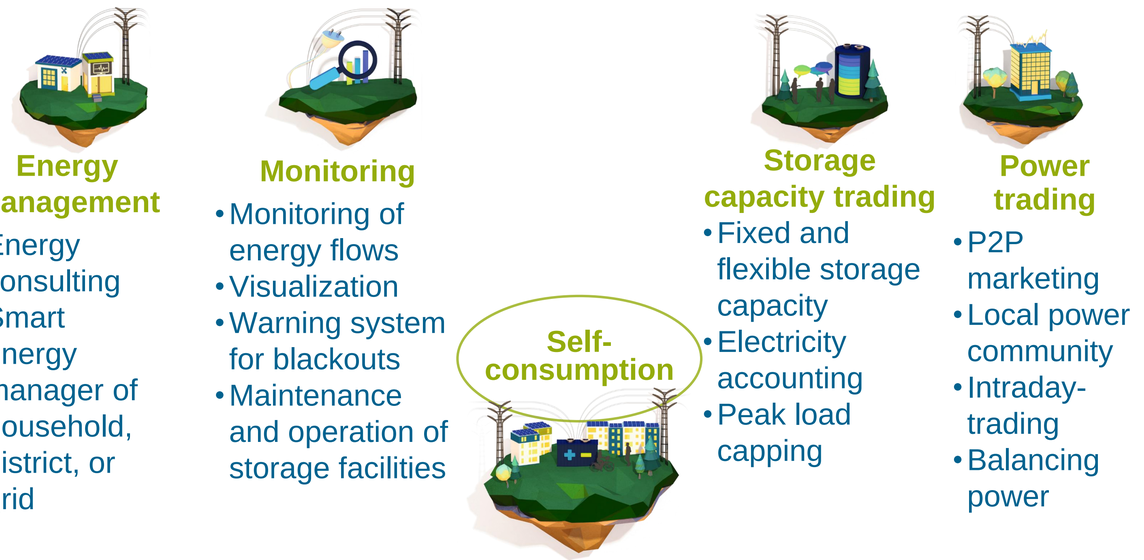
- Without compromising self-consumption

	Minutely	Daily	Weekly	Monthly
MFH-Community	83.8%	45.6%	16.5%	1.4%
SFH-Community	62.2%	45.0%	17.1%	1.8%

- Capacity for other services vs. self-consumption



Services and business models other than optimizing self-consumption



Energy management
- Energy consulting
- Smart energy manager of household, district, or grid

Monitoring
- Monitoring of energy flows
- Visualization
- Warning system for blackouts
- Maintenance and operation of storage facilities

Storage capacity trading
- Fixed and flexible storage capacity
- Electricity accounting
- Peak load capping

Power trading
- P2P marketing
- Local power community
- Intraday-trading
- Balancing power

Cross-sector services
- Charging power for e-vehicles
- Cross-Selling
- Electricity price insurance
- Utilization of waste heat from storage

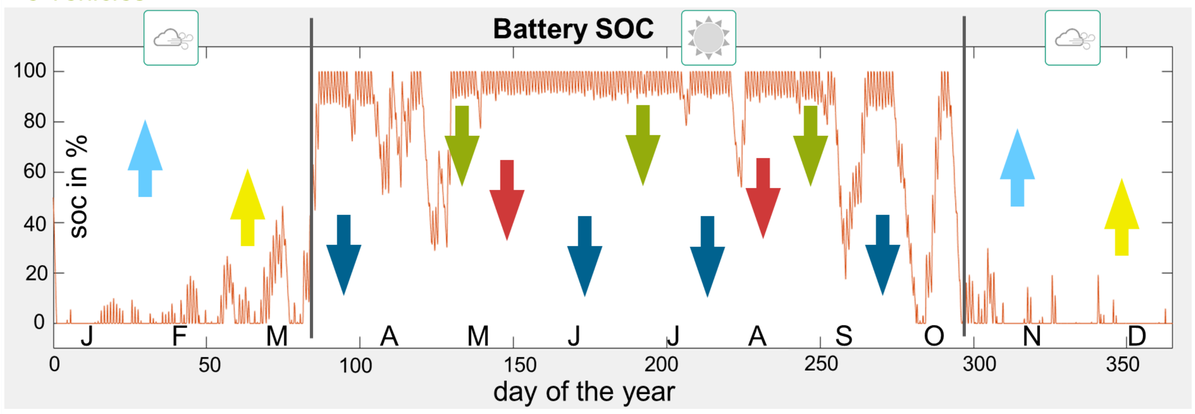
Grid stability
- Avoidance of energy plant curtailments
- Provision of reactive power
- Aggregation & direct marketing of flexibility
- Redispatch

Self-sufficient systems
- Black start
- Emergency power
- Island grid

Conclusion

- Supplementary services enhance rate of capacity utilization (multi-use)
- Flexible allocation of capacities enables multi-use
- Weekly/monthly allocation of capacities allows for >30% of capacity for other services with only minor effect on self-consumption (<2%)
- Most promising business models for multi-use include provision of control energy, performing peak load shaving and providing e-Vehicle infrastructure (varies throughout the year)

1 Self-consumption
2 Charging infrastructure e-vehicles
3 Peak load capping
4 Direct marketing of power
5 Intraday-trading
6 Rule energy market



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Authors and Contact:

- **Jan Knoefel**
  Institute for Ecological Economy Research | Potsdamer Str. 105 | D - 10785 Berlin
  E-mail: jan.knoefel@ioew.de
- **Frieder Schnabel**
  Fraunhofer Institute for Industrial Engineering IAO | Nobelstr. 12 | D - 70569 Stuttgart
  E-mail: frieder.schnabel@iao.fraunhofer.de

INSTITUT FÜR ÖKOLOGISCHE WIRTSCHAFTSFORSCHUNG

Fraunhofer IAO