Aging-aware optimized operation of stationary batteries

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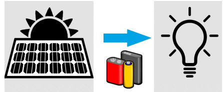
Introduction



- Batteries can match renewables to demand
- A Hybrid battery uses multiple battery technologies to combine their advantages
- Batteries aging depends on their operation

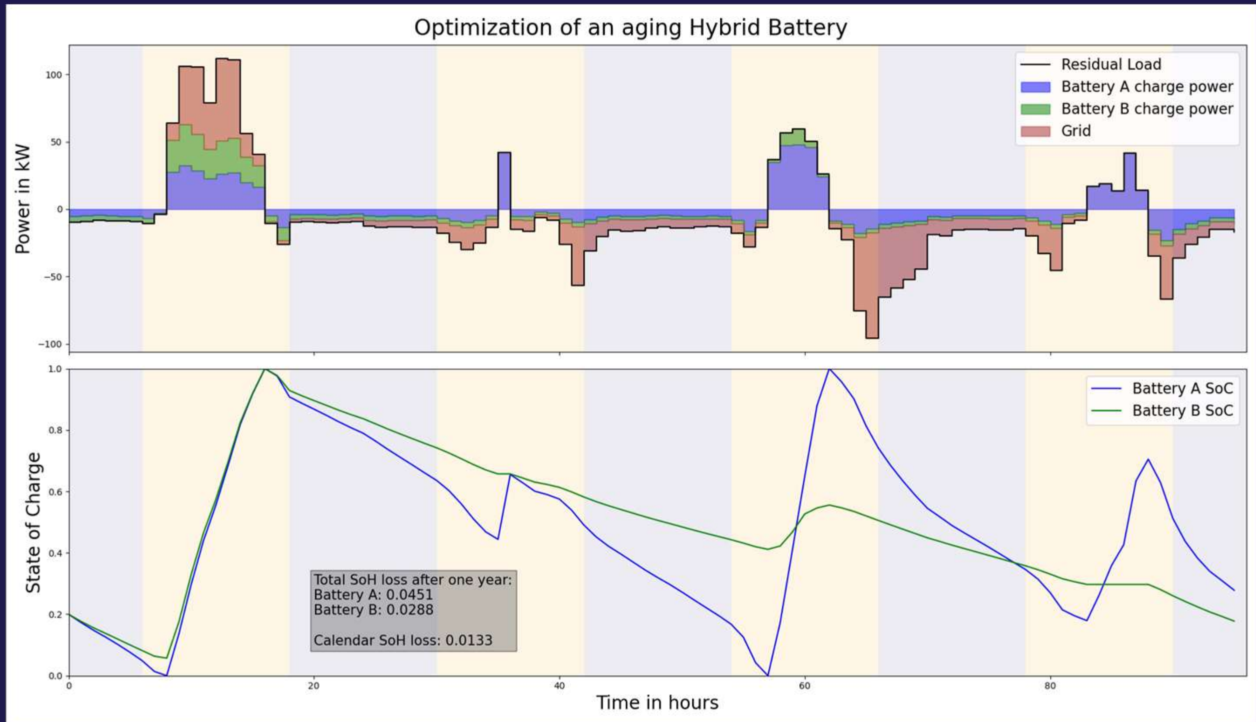
Methods

1. Use basic aging model with calendar and cyclic aging
2. Optimized control for one year
3. Use Hybrid Battery for Self-Consumption Maximization
4. Battery B has a higher replacement price than Battery A

Results

- Day: Batteries are charged
  Night: Batteries are discharged
- Battery A is used more than Battery B

Optimal control influences **aging** speed of **multi-technology batteries,** which **reduces costs.**



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Discussion

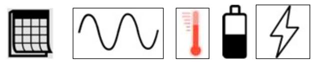
- The expensive battery ages slower, delaying its replacement
- Might be approximated with rule-based controller

Outlook

1. Use Battery Models built on measurements made by Fraunhofer ISE
2. Model Predictive Control
3. Use Battery for Time-Of-Use Application
4. Evaluate with ISE simulation framework, using Price, PV and Load profiles from ISE

Background

- Cyclic Aging: Battery Health decreases with every charging/discharge cycle
- Calendar Aging: Battery health decreases over time
- Aging is influenced by



Glossary

- Residual Load: Electrical Demand minus PV generation
- SoC: State of Charge
- SoH: State of Health
- Self-Consumption Maximization: Store output of own PV plant to cover load at night