Validation of a Energy Management Strategy for a BIPV System with a Lithium Ion Battery Demonstrator

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BIPV System Demonstrator

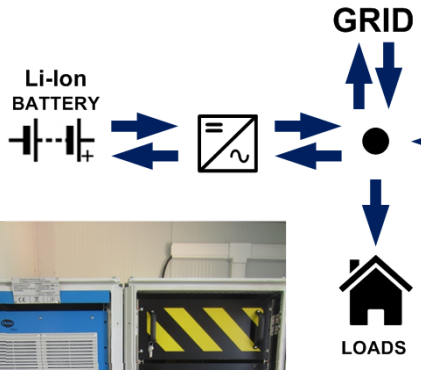
Lithium Ion Battery:

- 5kW nominal power
- 31.8kWh capacity
- 302.4 V Vmax / 194.4 V Vmin
- 5C (200A) max discharge
- 3C (120A) max charge

Battery Inverter: 5kW nominal power

PV installation: 3.224 kWp (a-Si)

PV inverter: 5kW nominal power



Self Consumption Optimization Strategy

General Objective:
Study of grid interface in rooftop PV systems with energy storage.
The specific objective for this energy strategy is to maximize the consumption of locally produced PV power, hence minimizing the injection of power into the electrical grid.

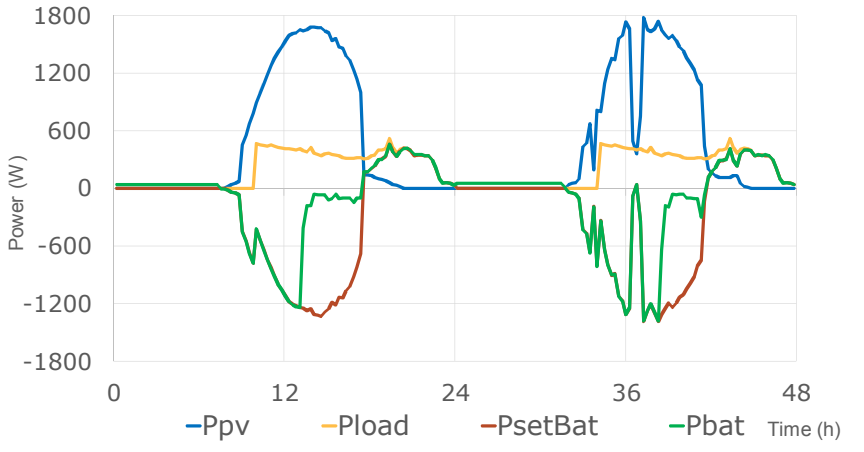
Implementation:

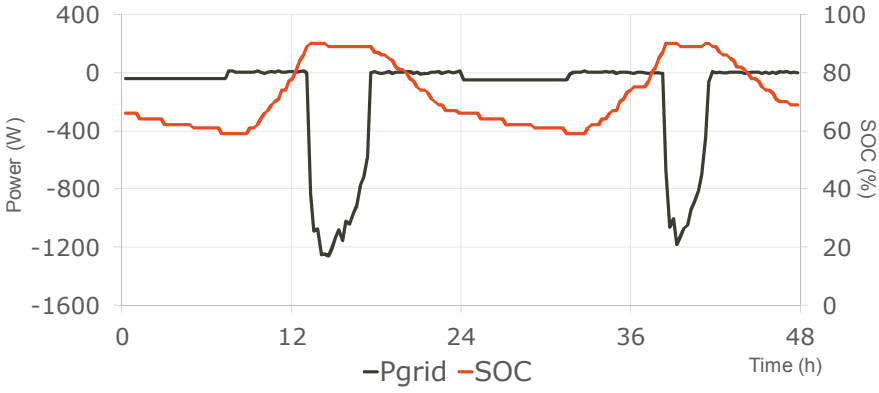
$P_{setBat} = P_{pv} - P_{load}$

$P_{grid} = P_{setBat} - P_{bat}$

Due to battery operational limits (voltage and SOC), a control to avoid overdischarge/charge was implemented.

Conclusions:
Within the battery operational SOC limits the strategy achieved a minimized peak power (50W) exchange with the grid.





P_{setBat}	AC Power command to battery inverters
P_{pv}	PV AC power
P_{load}	Loads AC power consumption
P_{grid}	AC Power exchange with the grid
P_{bat}	Measured battery inverters AC power
SOC	Battery state of charge

For more information see also poster "Validation of a Energy Management Strategy for a BIPV System with a Vanadium Battery Demonstrator".