



# THE SOL-ION SYSTEM: PROTOTYPE DEPLOYMENT IN FRENCH OVERSEAS AND SOUTHERN GERMAN FIELD TRIAL LOCATIONS AND LOGGED PARAMETERS FOR PV STORAGE SYSTEM

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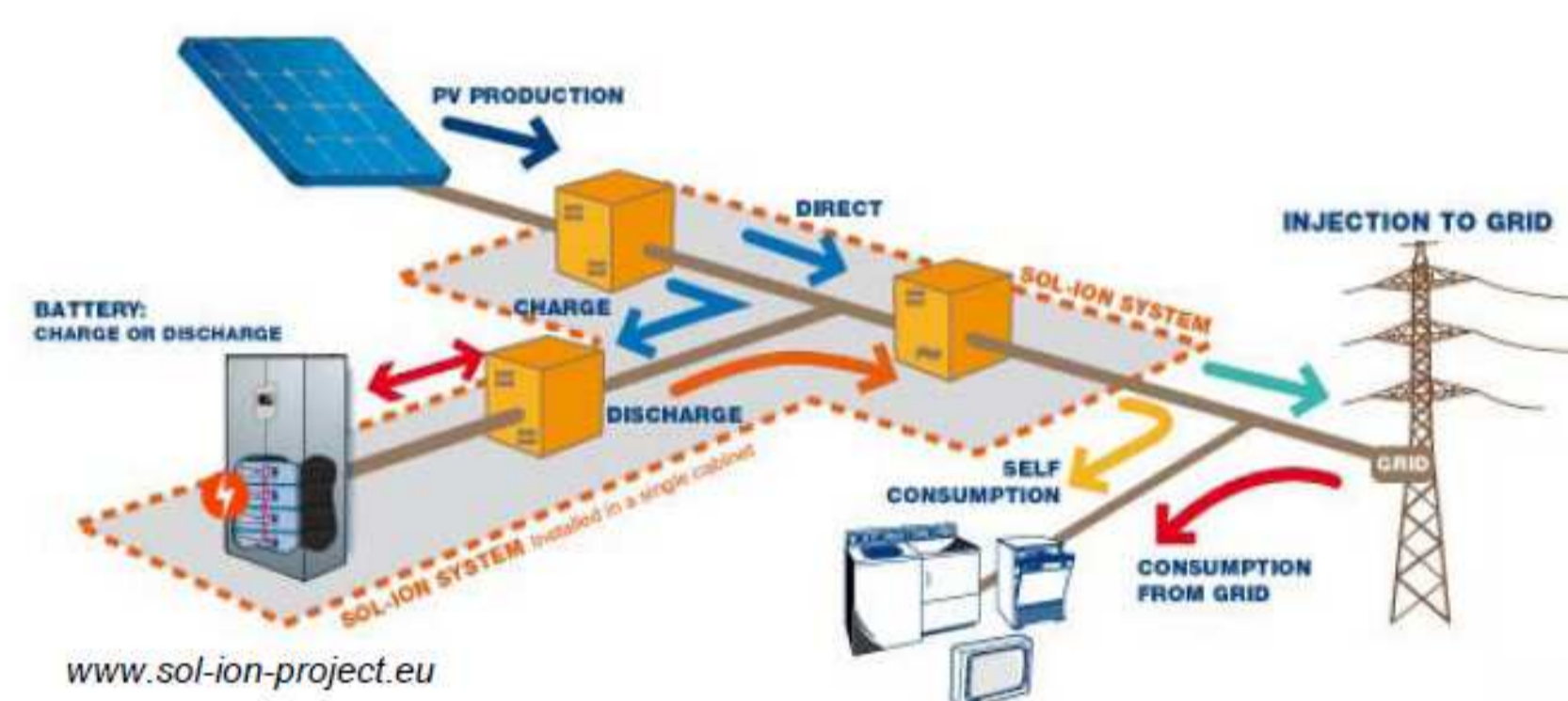
## Objective of Field Trial

- Expose newly developed PV Storage Systems “Sol-Ion” to a large number of installations and load profiles
- Validate modes of operation, determine performance of each system component and compare with simulations
- Improve models and fine-tune system performance through SW-changes (e.g. control-loops and interpretation of sensor data)
- Gain experience in installation procedures and handling, evaluate customer expectations and acceptance

## Field Trial Design

### Optimization of self-consumption

Southern German Test Region & ZSW



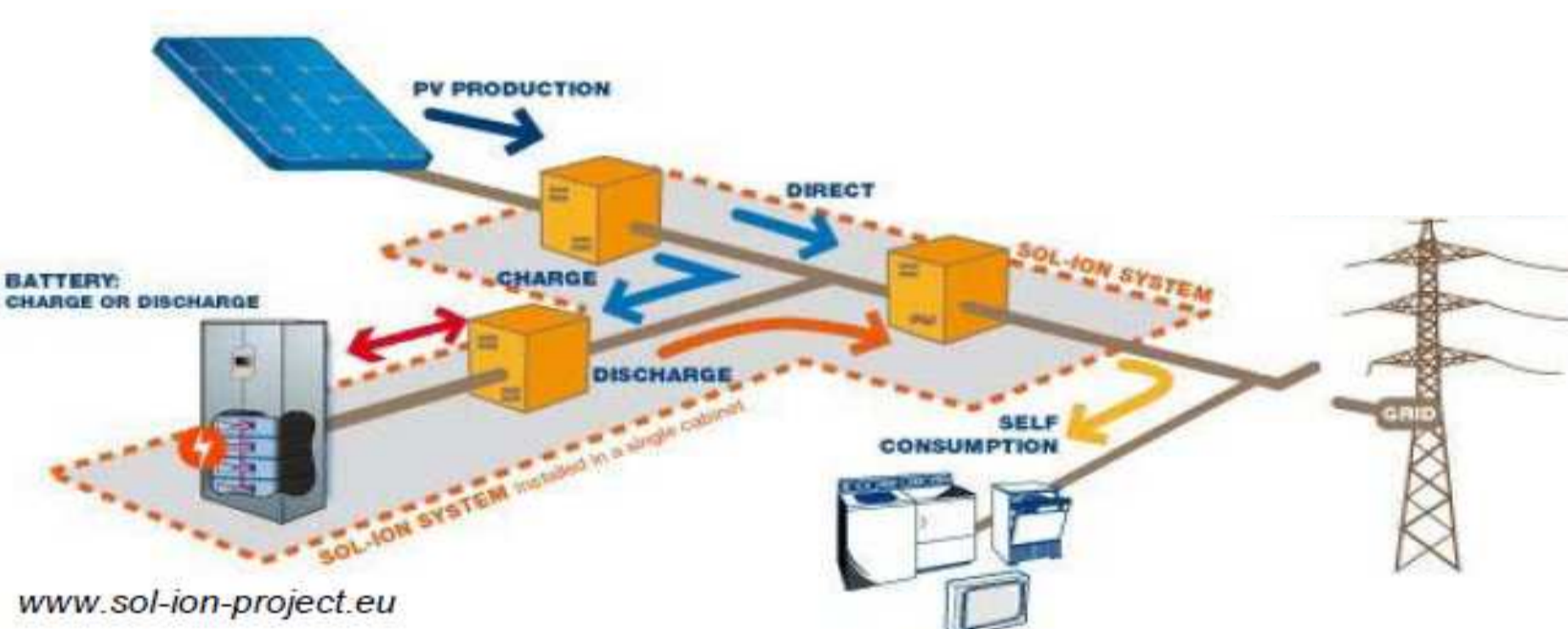
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#### SETUP

- 20 households – EON customers
- house wiring three phase
- Modes:
  - Optimization of self-consumption
  - Grid support during programmable hours
- separate contact to supply back-up function

### Stand-alone / Back-up for Grid failure

Guadeloupe



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#### SETUP

- 15 households
- 10 small businesses
- house wiring single phase
- Stand-alone operation depending on load and grid condition
- Overproduction feed into grid

### Test with electronic loads

Research Labs INES, IWES and ISEA

#### SETUP

- 5 kWp PV-Generator (INES) or SW-controlled source (IWES, ISEA)
- SW controlled loads
- Load profiles of 88 households with yearly consumption of 1.500 to 17.125 kWh/h (INES)

#### GOALS

- Validate operation modes
- Evaluate performance of each mode
- Evaluate impact of each component on the performance of the system
- Comparison of real data with measurement
- Improve models

### Installation at ZSW Solar Test Field

Optimization of self-consumption



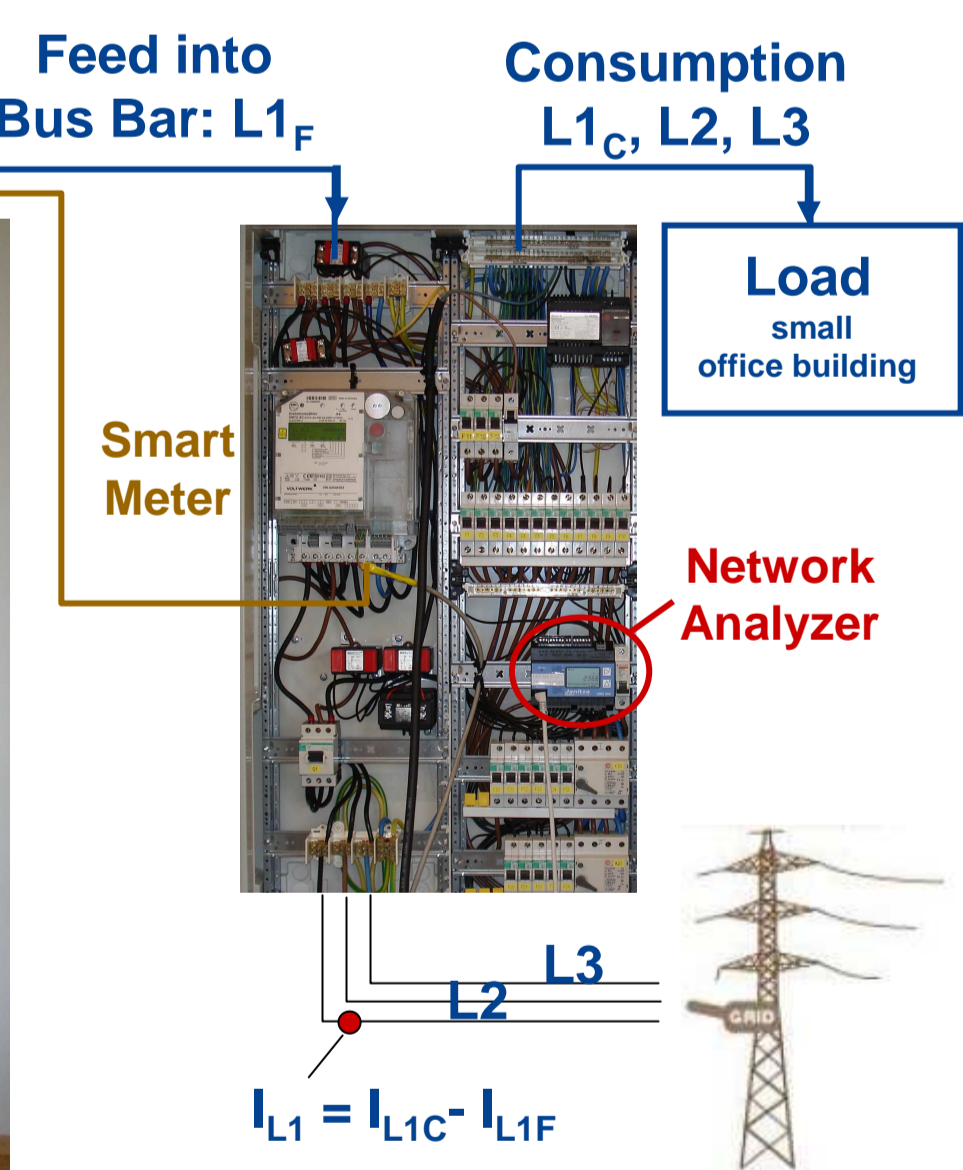
#### PV Generator

- 21 modules GS245m mounted on Galaxy Energy double carport
- 5145 Wp, 787.5 Voc



#### Sol-Ion System

- 5000 W<sub>max</sub> output from PV or Battery
- 8,8 kWh Li-Battery
- Laptop is logged into Sol-Ion Web-i/f and NW-Analyzer

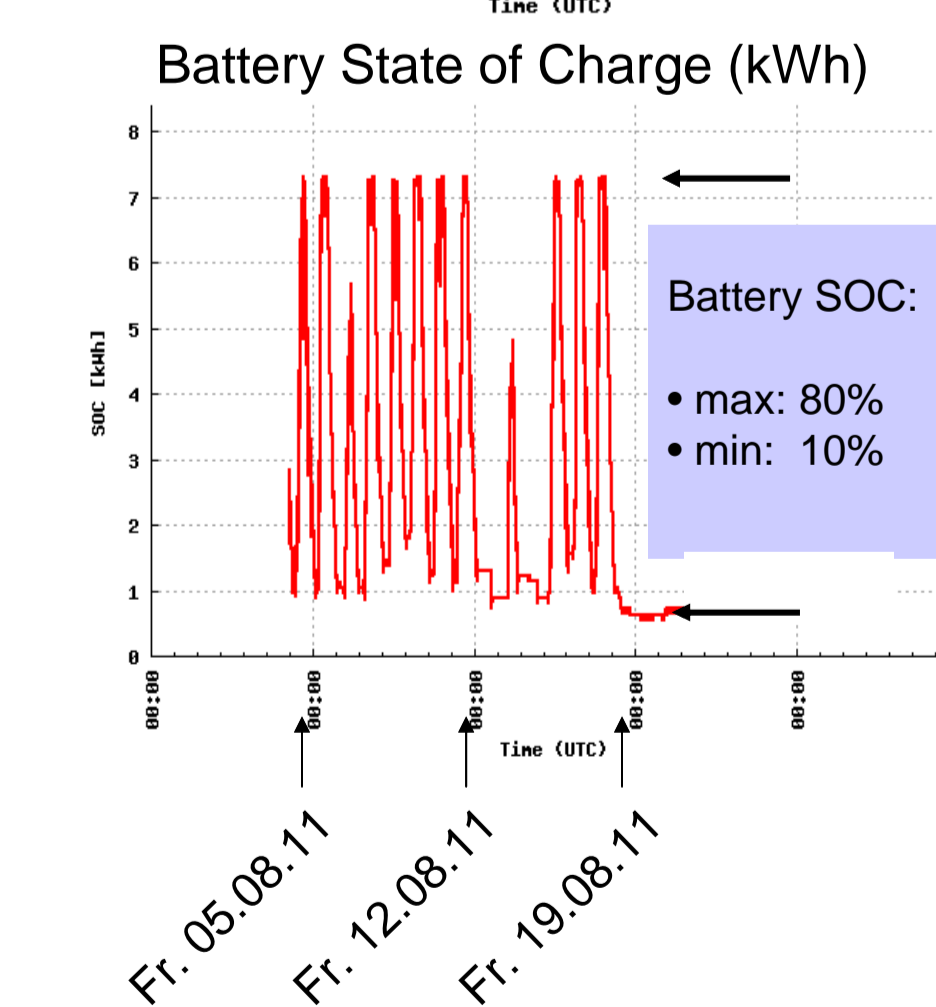
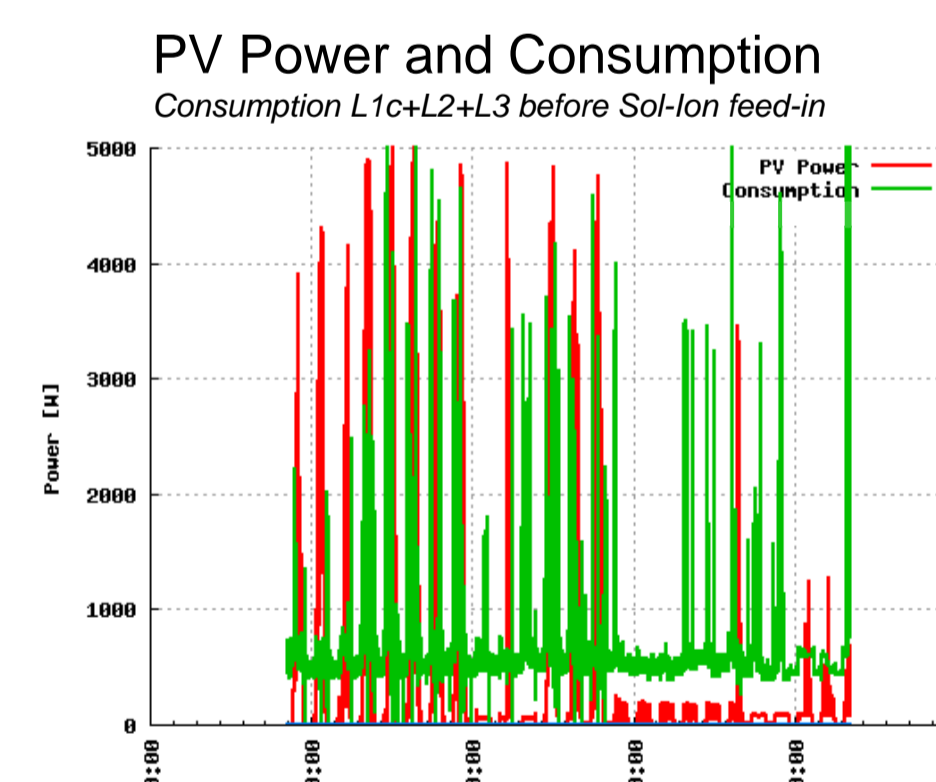


#### Fuse Box

- Feed into L1
- Smart Meter measures sum of powerflow from grid (L1+L2+L3)
- added NW-Analyzer with sensor @ L1<sub>C</sub>, L1<sub>F</sub>, L2, L3

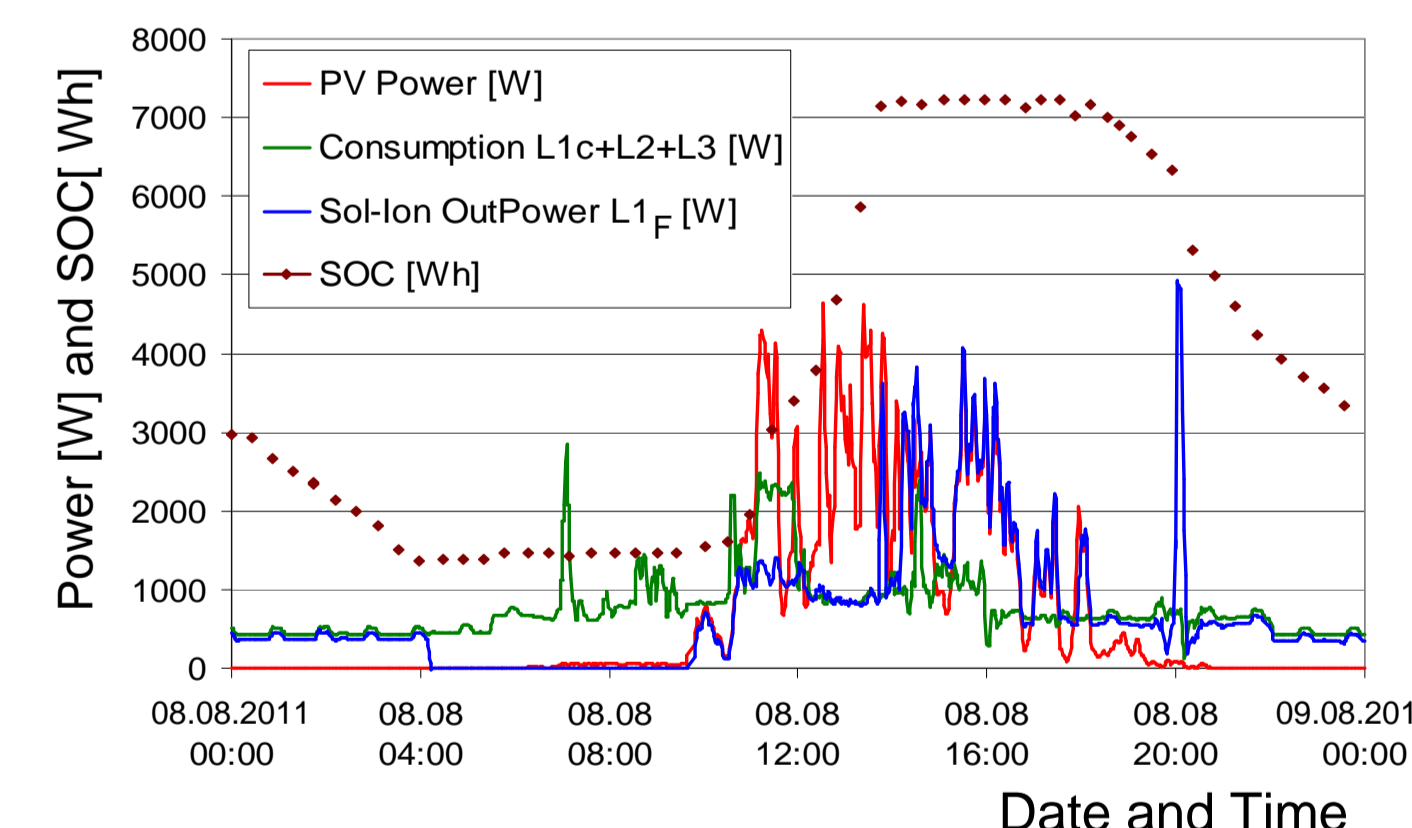
### Sol-Ion Screen-Shots

- Front display = Web-i/f



### Data Logging during field trial

- up to one data set per second



### Modes of Operation

1	2	3	4	5	6	7
1	2	3	4	5	6	7
1	2	3	4	5	6	7
1	2	3	4	5	6	7
1	2	3	4	5	6	7
1	2	3	4	5	6	7
1	2	3	4	5	6	7
1	2	3	4	5	6	7

## Conclusion and Outlook

The Sol-Ion System has passed the development, lab-test and certification stage. Systems have been produced in small volume, deployed at research-partner locations during the last months and are now being shipped and installed in 45 private customer locations. First data of 2 weeks continuous operation during August 2011 at ZSW shows, that the Energy Management System of Sol-Ion follows through the required modes of operation correctly during each day. Collection and analysis of data from the complete field-trial base, comparison with simulations and improvements to models and system will follow during the upcoming months.