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

• 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

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 / (INES)
• Validate operation modes
• Evaluate performance of each mode
• Evaluate impact of each component on the performance of the system
• Comparison of real date with measurement
• Improve models

Installation at ZSW Solar Test Field
Optimization of self-consumption

PV Generator
• 21 modules 33245m mounted on Galaxy
Energy double carport
• 5145 Wp, 787.5 Voc

Sol-Ion System
• 5000 W_output from PV or Battery
• 8.8 kW Li-Battery
• Laptop is logged into Sol-Ion Web-if 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, L1, L2, L3

Stand-alone / Back-up for Grid failure
Guadeloupe

Feed into Bus Bar: L1

Consumption L1, L2, L3

Load from solar system

Network Analyzer

PV Power and Consumption
Consumption: KWh (left Y-Axis), Power: kW (right Y-Axis)• Battery State of Charge
SOC [

Sol-Ion Screen-Shots
• Front display = Web-if

Data Logging during field trial
• up to one data set per second

Modes of Operation

1. Consume from battery
2. Consume from grid
3. Consume from grid and PV
4. Cons. from PV and charge battery
5. Cons. from PV and feed into grid
6. Consume from PV and battery
7. Consume from battery and support grid from battery (configurable)

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 simulators and improvements to models and system will follow during the upcoming months.

Acknowledgement: Financial support from BMU (German Federal Ministry for Environment, Nature Conservation and Nuclear Safety) and DGE (French Ministry of Economy, Finance and Employment) for the Sol-ion Project is greatly acknowledged. This Franco-German project was labeled by EUROGIA in 2007.