PAUL SCHERRER INSTITUT

PSI

GFA & SwissFEL Accelerator Seminar

LIQHYSMES –

a Novel Hybrid Energy Storage Option for Buffering Short- & Long-Term Imbalances between Electricity Supply & Load

Monday, 11 March 2013, 16.00 h, WBGB/019

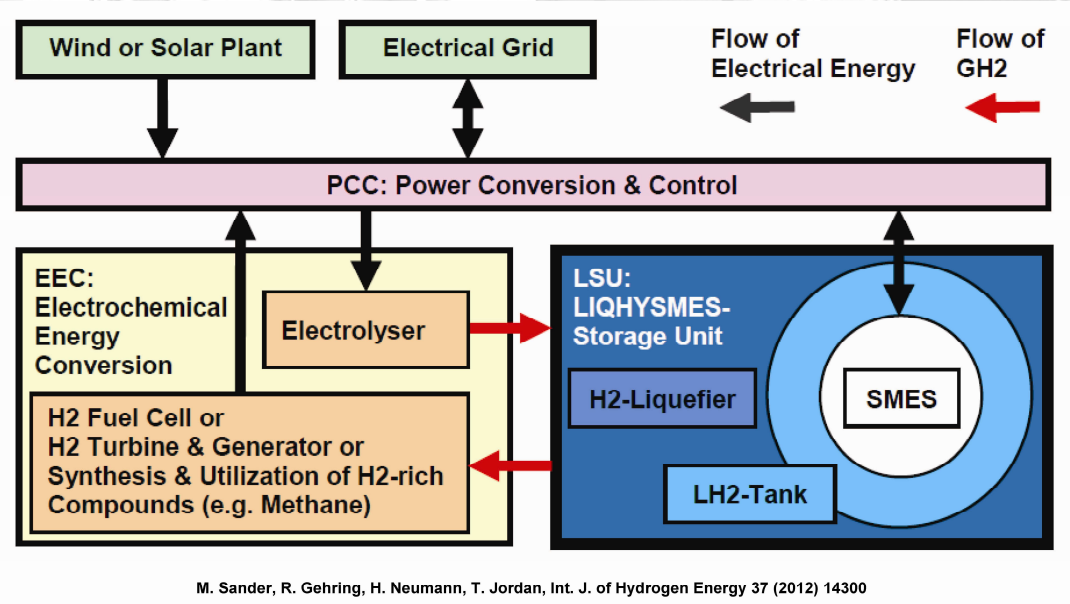
Dr. Michael Sander, KIT

First, a brief overview of the different storage technologies addressing different applications is given. Then some experimental work on superconducting magnetic energy storage (SMES) e.g. for an accelerator application at DESY carried out at the former Research Centre Karlsruhe (now KIT), will be presented before the currently pursued LIQHYSMES approach is explained in more detail.

Future electricity transmission and distribution networks will have to manage increasing contributions of variable renewable energy sources, and eventually energy storage systems providing tens to hundreds of MW and GWh will be needed for buffering imbalances between the varying supply of renewable energies and the fluctuating customers' demand.

The new hybrid energy storage concept, LIQHYSMES, combines the use of liquid hydrogen (LH2) as the bulk energy carrier with much faster and more efficient SMES. It allows buffering electricity supply and demand from (sub-) seconds to several days or weeks. The anticipated response and buffering capability of LIQHYSMES storage plants is analysed in simulations. Size, loss and cost issues are addressed.

The general concept is open and applicable to ANY combination of electrolysers, fuel cells or gas turbines, to ANY H2-based supply network (GH2, LH2 or H2-rich compounds like methane) and to ANY centralized or spatially separated "virtual" plant configuration.



M. Sander, R. Gehring, H. Neumann, T. Jordan, Int. J. of Hydrogen Energy 37 (2012) 14300

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