

Large-scale energy storage for renewables

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The forced extension of renewable energies (RE) is mandatory if worldwide targets for CO₂-reduction are seriously followed. However, due to the volatile character of its power generation there will be an increasing mismatch between generation and demand. The storage of excess production will become essential in the future in order to enable viable business cases. The estimated storage demand for many countries with related CO₂ reduction plans will be in the TWh range.

There are many concepts and technologies to store electric energy. The presentation will discuss the different options and illustrate the unique role of hydrogen. Among the three options for large-scale storage – pumped hydro, compressed air and hydrogen - hydrogen is the only viable option to address capacities >10 GWh. Moreover, it is a multifunctional chemical energy carrier. It provides the option to be re-electrified without CO₂ emissions. But it is also a valuable raw material in chemical industry with a market volume of approx. 100 billion USD.

Enabling component of the hydrogen storage concept is the electrolyzer system. It must – among a number of other features – be reliable under industrial working conditions and its efficiency must be optimized for intermittent operation. With the intention to provide solutions for future energy grids Siemens developed the PEM system called “SILYZER”.

The presentation will discuss the different options of energy storage and illustrate the unique role of hydrogen. In particular it will be reported on the Siemens development of electrolyzer technology and related projects.