

Plenarvortrag

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Energy Systems: The Importance of Energy Storage —

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It is an important goal to gradually substitute energy conversion based on fossil fuels by one based on regenerative energies. As a consequence, electricity and heat or cool production moves from a centralized (one producer * many consumers) to a decentralized operation (many producers * many consumers). Thus, a completely revised architecture of energy systems is necessary. Such novel architectures have to be supported by technical possibilities, a central one of them being suitable storage devices for electricity and heat. While the efficiency is largely determined by the structure (=architecture) of energy systems, chal-

lenges lie in the technical performance of storage devices. For electrical storage criteria are energy density and power density (volumetric as well as gravimetric density) and costs. There are different technical approaches such as storage in batteries (charge in encased chemical energy), in super-capacitors (charge in physical systems), and chemicals (such as hydrogen) for long term storage, the latter requires a converter (e.g. a fuel cell) to make electricity. Purely physical systems such as compressed air or pumped hydroelectricity are also possibilities worth considering. An important parameter is the time for which storage should be accomplished and what corresponding self-discharge amounts to. Technology needs to be evaluated under the aspect of centralized versus de-centralized energy systems. These two parameters are the most important in the consideration of energy storage systems.