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Title: Energy storage equipment self-sufficiency time

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Is self-sufficiency a metric for energy storage?

Abstract--Self-sufficiency is an important metric for various energy concepts, as it reflects what share of the local consumption is covered by local generation. However, the equation commonly used in literature cannot be applied to systems with an energy storage that actively exchanges energy with the grid.

What is self-sufficiency in energy systems?

The common definition of self-sufficiency was originally designed for systems without storage. However, future systems will rely strongly on storage units. Storage units can introduce new levels of complexity to the calculation of self-sufficiency, namely grid export of previously imported energy, differences in storage levels, and energy losses.

What role does storage play in the calculation of self-sufficiency?

Liu et al. analyse load matching in zero energy buildings, and define the self-sufficiency as the ratio of directly used PV energy for the consumption of the buildings. However, it is unclear what role the storage in their investigation plays and how it is included in the calculation of self-sufficiency.

What is self-sufficiency if a system operates in islanded mode?

However, assuming a system operates in islanded mode with zero grid exchange, the self-sufficiency is expected to be 100 %, since all local consumption is covered Fig. 4. Self-sufficiency for varying levels of storage round-trip efficiency and locally produced energy. by local generation.

Feb 14, 2023&ensp;&#0183;&ensp;1 Department of Physics, Washington University, St. Louis, MO, United States 2 Sante Fe Institute, Santa Fe, NM, United States We determine the energy storage needed to ...

Self-sufficiency time of energy storage equipment We mathematically derive self-sufficiency in general terms for a system with local generation, local consumption, a storage unit and a grid ...

