



Balancing Intermittent Renewables - The Potential of Pumped Hydro Power Storage



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Abstract

As the share of intermittent renewable energy generation rises within the German grid, solutions are required to deal with temporary overproduction of electricity as well as shortfalls. Pumped hydro-storage systems are natural partners of wind and solar power, using excess power to pump water uphill into storage basins and releasing it at times of low renewables output or peak demand. This is a well-proven, reliable technology. However, suitable sites are limited in Germany and where they exist, opposition towards new plants is high, due to the disruption to landscape and bio-habitats. In addition, integration under current market condition is economically difficult. There are recent developments in battery storage technology in particular, which may be better suited to a largely decentralised energy system. Battery stores could potentially be integrated into the built environment, sparing virgin landscape. Nevertheless, battery stores cause also environmental impacts, albeit in different impact categories (e.g. use of scarce natural resources). The proposed contribution will outline consequences of increasing renewables on the grid in Germany as contextual information. The resulting changes to the energy market and policy implications will also be covered. Based on a scientific study for a site in southern Germany, the contribution explores advantages and disadvantages of pumped hydro storage and battery stores over their entire life cycle, drawing primarily on LCA-data. Scientific results so far suggest that pumped hydro storage still holds environmental advantages and should continue to play a role in the German energy system.

References

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