Future needs for energy storage in Alpine region

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Abstract: With Renewable energy directive the EU has committed itself to a significant reduction in greenhouse gas emissions which will be achieved mainly by increasing energy efficiency and share of renewable energy sources at European level. Electricity systems need to be flexible to guarantee the equilibrium between generation and consumption.

- Conventional energy sources provide stable frequency and voltage of the electric grid
- Energy production from the renewable sources is highly unpredictable and intermittent
- With reduction of electric energy production from conventional sources, facilities for coping with huge production variation are needed

Methodologies for estimation of currently available hydro pumped storage and assessment of short- and long-term future needs:

- Assessment of storage capacity in Alpine space based on available data and HPP database (available volume in reservoir of impoundment and diversion HE facility, reservoirs of PSHPP)
- SWOT analysis of PSHPP for alpine region and comparison with other storage options
- New-developed model for estimation of future need for energy storage capacity based on analysis of past consumption and future trends in share of renewable electric energy sources and reduction of conventional energy sources, evolution of electric energy market, electromobility, climate conditions, etc.

Novelty - Value / Relevance to ...

- Comparison and evaluation of different possibilities for energy storage (HPHPP, batteries, hydrogen technologies, etc.)
- Determination of the most promising energy storage strategies for the alpine region
- Assessment of the need for PHS due to large share of RES and electromobility
- Recommendation for peer to peer trading with local PHS, modification of legislation, etc.

Forum statement

- Energy storage capabilities must be in the future very much increased

Keywords: Energy storage; Sustainable development; Alpine Region; Renewable electric energy generation

Graphics: Increase PHS on generation level. Peer to peer trading with local energy storage.