

ON THE FUTURE PROSPECTS OF LONG-TERM ELECTRICITY STORAGE

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In the next decades increasing amounts of electricity from intermittent renewable energy sources (RES-E) like wind and solar in electricity systems are expected. To balance electricity supply and demand over time it is very likely that new – especially long-term storages – are needed.

The core objective of this paper is to investigate what are the market prospects of such long-term-electricity storages like pumped hydro, and power-to-gas- technologies (PtG) like hydrogen and methane up to 2030. Our method of approach is based on dynamic technological learning for the development of investment costs and efficiency of long-term storages based on quantities for technologies described in IEA (2011).

The results are: Up to 2030 decreases in the prices of PtG technologies will take place due to learning effects. For large pumped hydro storages the costs will rather increase mainly due to a lack of sites with reasonable costs and lack of acceptance. By 2030 under most favourable learning conditions the costs of hydrogen and methane for 2000 fullloadhours per year will be between 0.15 EUR/kWh and 0.20 EUR/kWh. Efficiency of pumped hydro will remain at about 80%, efficiency of hydrogen will increase from 60 to 70% and of methane from 48% to 60% under favourable conditions.

The major conclusions are: For PtG it will become hard to compete in the electricity markets despite high technological learning potentials. Yet, given the lack of environmentally benign fuels for mobility hydrogen and methane from renewables might become an alternative for fueling cars.