

## **Hybrid electrochemical and thermal energy storage: a case study for efficient use of renewables.**

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The ever-increasing penetration of renewable sources to meet the energy demand for stationary use and for mobility, will require an increasingly efficient integration of PV and wind power generation with utilisation. In fact, the progressive electrification of technologies for the production of heat will make the latter increasingly compatible with power supply from renewable sources, with similar, if not greater, problems of lag between the maximum availability of energy from renewable sources and situations of maximum consumption of thermal energy. Furthermore, given the availability of heat pumps characterized by very high COP -Coefficient Of Performance - and EER - Energy Efficiency Ratio, it will be possible to exploit advantageously the "thermal leverage" effect to load thermal energy storage systems.

We will thus show in this presentation some preliminary results about the effects of the integration between the two storage technologies for a few applications, especially showing the main advantages obtainable for stationary use to maximize the integration efficiency with the production of energy from renewable sources, highlighting the effect of control actions on system performance. Some results will also be presented for sustainable mobility applications, to highlight the relevance of the synergy between the two technologies.

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