

Hybridization of energy storage units for energy transition applications: a focus on control and coordination approaches

Abstract: Hybridization of energy storage units is a topic of interest in the nowadays context of transition towards more sustainable ways of energy production and consumption. Extensive research continues to be devoted to this topic, whereas various technical solutions have already been successfully implemented for a plethora of applications.

This talk aims in a first step at overviewing the necessity of storage units in an increasingly renewable-based, decentralized energy production, then at explaining the role of hybridization of different storage technologies for more versatility and flexibility in what is generally known as a smart grid context. Then, the focus will be on how to make the different storage sources to optimally and robustly cooperate towards a common goal. It is about obtaining a “fusion” of different heterogeneous sources. The answer to this problem obviously requires advanced control approaches being employed. An overview of most effective and widely used control strategies is envisaged – accompanied by some illustrative application results – out of which robust control techniques will be given a special attention.

This talk will end by attempting a look towards the future, namely by identifying some open questions and research directions worthy to further investigate.