From Campus Lab to Real-World Energy Networks: Holistic Energy System Concepts with Multiple Storage Technologies

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With increasing use of renewable energies, our naturally fluctuating energy supply from sun and wind is becoming a growing challenge. Energy storage systems serve to balance out the resulting temporal discrepancies between energy supply and demand. Various electrical, thermal and chemical storage options are available and are the subject of research at the University of Bayreuth.

Over many years, the City of Wunsiedel, located in a nearby rural area, has followed a vision to become a “green energy city”. Through its municipal utilities an energy park was realised which is already well-known in Germany. For example, it includes and combines a wood pellets plant, an 8.75 MW PEM electrolyser for hydrogen production and electric batteries.

The energy park and the whole municipality open a unique opportunity to analyse and improve a real energy system with the interplay of many components by using real data and considering the target of economic efficiency in a competitive market. For this purpose, the University of Bayreuth and the City of Wunsiedel have founded the Future Energy Lab as a joint R&D venture. Concept and cooperation are already considered as a model for other municipalities that are benefiting from the experience.

The presentation will outline the joint activities in general and through specific project examples involving energy storage. It also touches on the necessary political and legal framework conditions as well as the importance of citizen participation.