



Technologies reshaping the electricity supply industry
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Decentralization and Cooperative Management in Electric Energy System

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Abstract

As the number of distributed energy resources, such as PV, EV, and storage devices, connected to the power grid is expected to increase irreversibly, the next generation power system will be essentially more decentralized. However, the power system still needs to be operated so that the quality of electricity such as frequency and voltage should be maintained within each prescribed range to assure proper and safe usage of electricity. Therefore, it is straightforwardly clear that integration and collective operation of multiple DERs are indispensable in the future grid operation. With this understanding, we had developed the energy management test bed and developed methodologies of operation as well as standard communication interfaces. In addition, we had proposed versatile modeling platform for smart cities with cooperative energy management systems, which can be widely used to evaluate issues regarding the local power grid, sustainability of the city and so forth. An example from our preliminary studies will be visually displayed.