



Energy Storage Technologies in Future Energy Systems

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Deadline for manuscript
submissions:

31 December 2021

Message from the Guest Editors

Concerning the significant rate of energy demand and investment limitations of expansion of the energy systems, such systems are encountering basic issues. On the other hand, the high penetration of renewable energy sources, such as photovoltaic cells and wind turbines, and the uncertainty associated with the power output of such plants have resulted in technical and operational challenges for electrical energy systems. Energy storage technologies as promising solutions to these problems are defined as practical and effective approaches for stabilizing the power supply to overcome such challenges and minimize energy peak demands. Energy storage systems take advantage of restraining power fluctuations according to the stochastic and intermittent nature of renewable energy sources. In addition, energy storage technologies are effective in reducing system imbalances, load shifting and reserves, and decreasing operation costs of the system. Accordingly, energy storage technology has been introduced as a practical solution for attaining power system stability by the US Department of Energy (DOE), which has been planned to be developed through energy storage system programs.





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