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Energy Storage Systems and Future Trends

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Abstract- As a long-range vision, many countries is aimed to generate all of their heat and electricity without using fossil fuels. In the meantime, providing the sufficient power is convenient on demand is essential in new energy technologies whenever and wherever this power is needed. In view of this, the most of the recent researches have been focused on developing new technologies for storing renewably-generated electricity by transforming it into other forms of energy. For this reason, energy storage systems are the backbone of the future energy engineering. As well-known, energy storage systems can be divided into 4 subsections, such as: mechanical, electrochemical, electrical, and thermal.
In this paper, not only technical details but also practical applications for mechanical, electrochemical, electrical, and thermal energy storage systems have been given. Advantages and drawbacks of the energy storage systems have been presented with the comparison results, as well.

Keywords- Energy storage systems, smart grid, mechanical energy storage, electrochemical energy storage, electrical energy storage, thermal energy storage.