

IET Renewable Power Generation Call for Papers

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For a Special Issue on:

Multi-carrier Energy Storage for Harnessing Renewable Generation

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Global warming and climate change have been attracting increasing attention from the public and government agencies during recent decades. The proliferation of renewable energy can help to reduce fossil fuel consumption as well as carbon emissions. However, the variability and uncertainty of wind and solar power, the mainstream renewable resources, also exert unprecedented challenges on the planning and operation of power systems, whereby supply and demand must be balanced on a moment-by-moment basis.

Traditionally independent energy infrastructures, including the electric power grid, natural gas system and district heating system, are undergoing a rapid transition to a highly integrated energy system, inspired by cutting-edge technology in energy conversion and industrial equipment. These interactions provide exciting opportunities to store electrical energy in the form of heat, hydrogen/gas, etc., which is scalable and relatively inexpensive. Typical examples of this approach include hydrogen storage and thermal storage. Advanced compressed-air energy storage is also relevant here, which has recently been reported to have the potential of producing electrical, heating and cooling energy. Multi-carrier energy storage better exploits the complementary nature of different energy carriers, and could become a promising solution for mitigating renewable power uncertainty and variability.

Topics of interest include, but are not limited to:

- Concepts and technical viability of new multi-carrier energy storage systems
- Modelling, simulation and control of multi-carrier energy storage systems
- Planning, operation and flexibility contribution of multi-carrier energy storage systems in bulk power systems for supporting grid integration of large-scale renewable generation
- Design and management of multi-carrier energy storage systems at the demand side for harnessing distributed renewable generation and improving the holistic efficiency of energy utilization
- Economic merits, regulatory policies and business models of multi-carrier energy storage systems
- Engineering experiences and demonstration of multi-carrier energy storage systems in power grids with renewable generation

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