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Energy Trading for Cooperative Microgrids with Renewable Energy Resources

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Abstract : Micro-grid equipped with heterogeneous energy resources present the idea of small scale distributed energy management (DEM). DEM helps in minimizing the transmission and operation costs, power management and peak load demands. Micro-grids are collections of small, independent controllable power-generating units and renewable energy resources. Micro-grids also motivate to enable active customer participation by giving accessibility of real-time information and control to the customer. The capability of fast restoration against faulty situation, integration of renewable energy resources and Information and Communication Technologies (ICT) make micro-grid as an ideal system for distributed power systems. Micro-grids can have a bank of energy storage devices. The energy management system of micro-grid can perform real-time energy forecasting of renewable resources, energy storage elements and controllable loads in making proper short-term scheduling to minimize total operating costs. We present a review of existing micro-grids optimization objectives/goals, constraints, solution approaches and tools used in micro-grids for energy management. Cost-benefit analysis of micro-grid reveals that cooperation among different micro-grids can play a vital role in the reduction of import energy cost and system stability. Cooperative micro-grids energy trading is an approach to electrical distribution energy resources that allows local energy demands more control over the optimization of power resources and uses. Cooperation among different micro-grids brings the interconnectivity and power trading issues. According to the literature, it shows that open area of research is available for cooperative micro-grids energy trading. In this paper, we proposed and formulated the efficient energy management/trading module for interconnected micro-grids. It is believed that this research will open new directions in future for energy trading in cooperative micro-grids/interconnected micro-grids.

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