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**Abstract** Energy management plays a critical role to accomplish a reliable and efficient operation of a Microgrid (MG). As the power from renewable energy sources and load demand is uncertain energy management problem (EMP) of a MG becomes complex. This paper studies the EMP for a grid connected MG consisting of dispatchable distributed generators (DDGs), battery, and renewable generation such as wind power, respectively. In order to handle the uncertainties ascending from wind power and load demand, information gap decision theory (IGDT) is adopted in this paper. An illustrative case study is presented to demonstrate the applicability of the proposed method. Results show that least robustness is achieved on modeling uncertainty in both wind power and load demand in comparison to the modeling of uncertainty in either parameter.

**Keywords** Microgrid, Uncertainty, Energy management, Information gap decision theory