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Abstract Dispersed energy resources and storage devices may be grouped as a Virtual Power Plant (VPP). In a competitive electricity market, VPP can exchange energy through a pool market or bilateral contracts. In order to maximize the profit, VPP needs to determine the optimal operating schedule. This paper provides a new decision-making framework based on information gap decision theory (IGDT) for robust self-scheduling of VPPs in power markets. In the proposed approach, the energy price is the uncertain parameter while the decision variables are the energy that needs to be exchanged in the pool market and through bilateral contracts, the reserve which should be provided, dispatch of distributed energy resources, the load which is needed to be curtailed, and the state of charging/discharging of energy storage devices. The proposed method specifies the self-scheduling considering the risk-taking level of the decision maker. A case study has been used to validate the proposed framework.

Keywords Decision making, Distributed energy resources, Power markets, Scheduling, Uncertain systems.