

Mehdi Shamsirband, Javad Salehi, Farhad Samadi Gazijahani, 2019, Look-ahead risk-averse power scheduling of heterogeneous electric vehicles aggregations enabling V2G and G2V systems based on information gap decision theory, *Electric Power Systems Research*, 173:56–70, DOI: 10.1016/j.epsr.2019.04.018

Abstract The violent uncertainty of renewables imposes substantial challenges into the revenue adequacy and cost recovery of electricity markets. Electric vehicles (EVs) can bring up significant benefits such as mitigating the sharp fluctuations of renewables and assisting them to merge into the markets that will lead to reduce the procurement costs and carbon emissions from the transportation sector. To this end, an information gap decision theory is extended to manage the revenue risk of EV managers and harnessing the system in confronting with intense uncertainty. The proposed model can provide satisfactory solution to guarantee the predefined profit for EV managers while satisfying the requirements of distribution network. Look-ahead active and reactive powers scheduling of various EV aggregations are arranged incorporating vehicle-to-grid (V2G) and grid-to-vehicle (G2V) options in the daily travel route of EVs. The proposed multi-objective problem is formulated based on augmented ε -constraint technique, where the main objective is to maximize the profit of EV managers constrained by operating costs of system. An innovative hybrid algorithm based on GWO&PSO is developed to optimize the problem. Simulation results are shown to illustrate the effectiveness of proposed approach in the modified IEEE 33-bus system equipped with several smart parking lots.