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Motivational Game-Theory P2P Energy Trading: A Case Study in Malaysia

Abstract

Peer-to-peer (P2P) energy trading allows surplus energy to be traded between distributed energy resources (DER) and prosumers in the community microgrid. In Malaysia, P2P energy trading is still under development, where it is expected to be exclusively participated by commercial and industrial prosumers. This paper proposes how a motivational psychology framework can be used effectively to design P2P energy trading to increase user participation for residential prosumer. All the data such as power consumption and solar energy value are adjusted and modelled in such a way to facilitate the calculation of P2P energy trading in Malaysia. An auction-based P2P market clearing model is then proposed and solved by using the Linear Programming optimization approach. The numerical results show the sustainability and the potential of the proposed P2P energy trading model to attract residential customers to participate in energy trading.

Keywords

Distributed energy resources; Distribution grid; Game theory; Peer-to-peer energy trading; Smart grids