

BESS-FACILITATED LOCAL ENERGY MARKET: A CASE STUDY ON TYPICAL AUSTRALIAN CONSUMERS

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Abstract

In this paper, we outline the results of a case study using real Australian customer data to evaluate the performance of peer-to-peer (P2P) trading in the local energy market (LEM) in comparison with business-as-usual (BAU), where the prosumers sell their excess generation via feed-in-tariff (FiT) and consumers buy energy from the grid. The battery energy storage system (BESS) is also included in the LEM model to introduce greater flexibility and capture the implications on electricity costs along with grid export and import. The performed P2P case study consists of 260 participants in a typical Australian suburb. Of these participants, 180 are consumers, 40 are prosumers with solar photovoltaic (PV) systems, and 40 are prosumers with solar PVs and BESSs. When compared to the BAU, the results show that consumers, prosumers with solar PV systems, and prosumers check with solar PV and BESS can reduce their average electricity costs by 5.7%, 8.6%, and 22.7% respectively. Further, grid export and import are reduced by 42.6% and 16.5% respectively. It is to be highlighted that the aforesaid savings and grid benefits are without altering the network fees and retailer margins. This demonstrates mitigation in congestion and lesser dependency on the grid and reducing or deferring capital expenses for network augmentation.