

Optimal Scheduling of Load and Operational Strategy of a Load Aggregator to Maximize Profit with PEVs

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Abstract : This project proposes optimal scheduling of imported power of a load aggregator with the utilization of EVs to maximize its profit. As with the increase of renewable energy resources, electricity price in competitive market becomes more uncertain and, on the other hand, with the penetration of renewable distributed generators in the distribution network the predicted load of a load aggregator also becomes uncertain in real time. Though there is uncertainties in both load and price, the use of EVs storage capacity can make the operation of load aggregator flexible. LA submits its offer to day-ahead market based on predicted loads and optimized use of its EVs to maximize its profit, as well as in real time operation it uses its energy storage capacity in such a way that it can maximize its profit. In this project, load aggregators profit maximization algorithm is formulated and the optimization problem is solved with the help of CVX. As in real time operation the forecasted loads differ from actual load, the mismatches are settled in real time balancing market. Simulation results compare the profit of a load aggregator with a hypothetical group of 1000 EVs and without EVs.

Keywords : CVX, electricity market, load aggregator, load and price uncertainties, profit maximization, real time balancing operation

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