

Aggregator economic optimization based on three-stage dispatching of electric vehicles

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Abstract

With the development of smart distribution network and the proposal of dual carbon target, the importance of demand side management in improving the flexible operation of power system is becoming more and more prominent. In order to solve the problems of excessive load peak valley difference, insufficient utilization of demand side resources, and unreasonable pricing of aggregators, this paper propose an economic optimization scheme for aggregators based on electric vehicle three-stage dispatching. First, the loss aversion analysis is conducted on the willingness of electric vehicle users to participate in dispatching. The contract signing methods between aggregators and electric vehicles are divided into three categories: complete dispatching, rolling reward and punishment mechanism dispatching, and free dispatching. Next, the response model of electric vehicle users based on the improved cloud model is obtained. Then, the aggregators conduct three-phase optimal dispatching for electric vehicles according to the bid winning peak shaving capacity. Phase 1 according to the time of regional differences, the dispatching of reward power set rewards and punishment mechanism, phase 2 to determine the full freedom dispatching of electric vehicles, three kinds of dispatching and dynamic load capacity of electricity, phase 3 according to the phase 1 and 2, the amount of information and user loss aversion, the user response model of final rolling rewards and punishment mechanism, get the aggregators final pricing schemes, Finally, a numerical example is given to verify the feasibility of the proposed method.

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