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“Study on Ancillary Service Modeling and Compensation Strategy for Improving Large Scale of Wind Power Integration”

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Abstract

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In China, there is no separate ancillary service market and the current ancillary service is the adjunctive service of power energy, the ancillary services are provided according to the system requirement and dispatched by the dispatching centers, then ancillary service providers are compensated after the services are provided, and there are also some ancillary services are compulsory to provide without compensation.

The wind power has the natural fluctuating and intermittence operation performance, wind power generation has to be balanced with other generation sources whose power can be adjust timely to ensure the overall balance, and then the reliability and efficiency of the whole power system can be ensured. The integration of wind power will no doubt increase the requirement of ancillary service which conventional coal power hydro power, gas generation, storage battery, etc. can provide and it will smooth out such kind of power fluctuation. While the current ancillary service compensation strategy in China does not take consideration of the increase of ancillary service requirement caused by wind power, it results that the service providers need provide more ancillary service without compensation and that the conventional generations are unwilling to provide such kind of service for wind power, which will ultimately lead to large curtailments because of the insufficiency of the ancillary service.

In this paper, the ancillary service requirement and cost model with the wind power integration is established, the ancillary service cost changes with the wind power integration are analyzed. Based on the current situation of power system ancillary service and wind power accommodation in China, and from the point of economic operation and dispatch



strategy of the whole power system, the cost and requirement changes of the ancillary service with the wind power integration are analyzed. And then based on the current situation and with the overseas experience as reference the ancillary service cost caused by the wind power is analyzed, potential influence on the wind power accommodation by the different ancillary service strategies is expatiated. Finally the countermeasures for improving large scale of wind power accommodation from the aspect of ancillary service is put forward, also the corresponding ancillary service suggestions which can promote wind power accommodation is put forward, in the one hand ensuring the ancillary service providers' profit, on the other hand from the sufficient ancillary service the curtailment can be just reduced.