

Calculation of the elastic demand curve for a day-ahead secondary reserve market

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Abstract-

The level of secondary reserve needed in a power system is traditionally settled by system operators according to engineering criteria. This paper proposes a novel methodology to determine the optimum level of secondary reserve based on both engineering and economic criteria. Within the proposed approach a price elastic-quantity demand curve for the secondary reserve is built. This approach assumes that the provision of secondary reserve is made under a competitive market. In this market, the supply curve that collects the bids from generators providing secondary reserve is matched with the calculated elastic demand cost curve. The cross of the supply and demand curves determines the optimal level of secondary reserve and the price for provision of the service. The developed approach is illustrated with a case study based on the current day-ahead secondary reserve market in Spain.

Index Terms- Ancillary services, elastic demand curve, load following, power regulation, power reserve market.

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Citation:

Soler, D.; Frías, P.; Gómez, T.; Platero, C.A. "Calculation of the elastic demand curve for a day-ahead secondary reserve market", IEEE Transactions on Power Systems, vol.25, no.2, pp.615-623, May, 2010.