

# **Remuneration mechanisms for investment in reactive power flexibility**

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## **Abstract-**

The practices for the procurement of voltage control capability need changing because of the evolution of the power system driven by the penetration of renewable sources, low carbon policies, and decentralisation. New providers have to be involved. Therefore, new mechanisms to achieve cost-effective solutions have to be encouraged. To this aim, a cost-based incentive mechanism and a weighted auction are proposed for procuring additional reactive power capacity. Both mechanisms are conceived for encouraging effective investment in voltage control by reducing the overall procurement cost. Hence, the voltage sensitivity of the reactive power provider is part of both mechanisms. Voltage sensitivity is evaluated through the Multi Infeed Interaction Factors while the American Electric Power methodology is used for identifying the reactive power costs. The proposed mechanisms are general, and they can be exploited in transmission and distribution networks irrespective of the asset, which provides the reactive capacity. A case study concerning the 39-bus New-England power system is presented for providing the proof of concept of the proposed mechanisms. The analysis of the two mechanisms's pros and cons highlights that the weighted auction creates competition and shows low risks related to the exercise of potential market power.

**Index Terms-** Voltage support; Reactive power; Market mechanism; Flexibility

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