

Economic assessment of voltage and reactive power control provision by wind farms

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Abstract— The aim of this paper is to quantify the cost of the provision of voltage control by wind power generation. A methodology for evaluating the economic impact of providing different types of voltage control is proposed. This evaluation examines the increase in costs caused by the change in active power losses due to the provision of wind farms voltage control. These losses are computed for different controllers: (a) wind farms are operated at a fixed power factor, (b) wind farms provide proportional voltage control, and (c) wind farms provide reactive power to minimize power losses. Furthermore, these three possibilities are compared with the option of adding flexible alternating current transmission system devices, which are another alternative for supporting the grid by controlling voltage. The methodology outlined is applied to a real and representative Spanish wind harvesting network.

Index Terms— losses reduction; voltage control; wind power

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