

Impact of Series Reactive Compensation on Increasing a Distribution Network Distributed Generation Hosting Capacity

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Abstract : The distributed generation hosting capacity of a distribution network is typically limited at a given connection point by the upper voltage limit that can be violated due to the injection of active power into the distribution network. The upper voltage limit violation concern becomes more important as the network equivalent resistance increases with respect to its equivalent reactance. This paper investigates the impact of modifying the distribution network equivalent reactance at the point of connection such that the upper voltage limit is violated at a higher distributed generation penetration, than it would without the addition of series reactive compensation. The results show that series reactive compensation proves efficient in certain situations (based on the ratio of equivalent network reactance to equivalent network resistance at the point of connection). As opposed to the conventional case of capacitive compensation of a distribution network to reduce voltage drop, inductive compensation is seen to be more appropriate for alleviation of distributed-generation-induced voltage rise.

Keywords : distributed generation, distribution networks, series compensation, voltage rise

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