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The Transient Reactive Power Regulation Capability of SVC for Large Scale WECS Connected to Distribution Networks

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Abstract : The recent interest in alternative and renewable energy systems results in increased installed capacity ratio of such systems in total energy production of the world. Specifically, wind energy conversion systems (WECS) draw significant attention among possible alternative energy options, recently. On the contrary of the positive points of penetrating WECS in all over the world in terms of environment protection, energy independence of the countries, etc., there are significant problems to be solved for the grid connection of large scale WECS. The reactive power regulation, voltage variation suppression, etc. can be presented as major issues to be considered in this regard. Thus, this paper evaluates the application of a Static VAr Compensator (SVC) unit for the reactive power regulation and operation continuity of WECS during a fault condition. The system is modeled employing the IEEE 13 node test system. Thus, it is possible to evaluate the system performance with an overall grid simulation model close to real grid systems. The overall simulation model is developed in MATLAB/Simulink/SimPowerSystems® environments and the obtained results effectively match the target of the provided study.

Keywords : IEEE 13 bus distribution system, reactive power regulation, static VAr compensator, wind energy conversion system
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