

Supergrid Modeling and Operation and Control of Multi Terminal DC Grids for the Deployment of a Meshed HVDC Grid in South Asia

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Abstract : The Indian subcontinent is facing a massive challenge with regards to energy security in member countries, to provide reliable electricity to facilitate development across various sectors of the economy and consequently achieve the developmental targets. The instability of the current precarious situation is observable in the frequent system failures and blackouts. The deployment of interconnected electricity 'Supergrid' designed to carry huge quanta of power across the Indian sub-continent is proposed in this paper. Besides enabling energy security in the subcontinent, it will also provide a platform for Renewable Energy Sources (RES) integration. This paper assesses the need and conditions for a Supergrid deployment and consequently proposes a meshed topology based on Voltage Source High Voltage Direct Current (VSC-HVDC) converters for the Supergrid modeling. Various control schemes for the control of voltage and power are utilized for the regulation of the network parameters. A 3 terminal Multi Terminal Direct Current (MTDC) network is used for the simulations.

Keywords : super grid, wind and solar energy, high voltage direct current, electricity management, load flow analysis

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