Control of VSC-HVDC in offshore AC islands with wind power plants: Comparison of two alternatives

The subject of this paper is the control of offshore AC collection and export networks behind a voltage source converter based high voltage direct current transmission system. The inertia-less nature of such grids makes the control of voltages and power flows potentially more flexible, but at the same time more prone to instabilities. Focus in this paper is on a voltage source converter based high voltage direct current connected wind power plant. Two state-of-art controllers for the offshore high voltage direct current converter station are compared, both at no-load and when wind turbine converters are producing power and controlled with usual vector current control. Sensitivity analyses help identify critical factors influencing stability. The influence of lumping the wind power plant into one converter is assessed by comparison with the full model. The conclusions identify the preferred control technique.

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