Investigation on the Combined Effect of VSC-based Sources and Synchronous Condensers under Grid Unbalanced Faults

The short circuit response of voltage source converters (VSCs) could be significantly different from that of synchronous condensers (SCs) under unbalanced faults. This paper investigates the combined effect of VSC-based sources and synchronous condensers under grid unbalanced faults considering two groups of VSC fault-ride-through (FRT) control strategies. It aims to provide an evaluation of the different control strategies and to explore the impact of equipping a synchronous condenser at the point of common coupling (PCC). By examining the combined short circuit currents, PCC voltages, DC-side voltages and system frequency responses, this study points out the merits and demerits of the examined control strategies; illustrates the benefits of synchronous condensers on mitigating the disadvantages of certain control strategies; and provides suggestions on selecting the control strategies for the VSC when incorporating a synchronous condenser at the PCC.

General information
Publication status: Published
Contributors: Jia, J., Yang, G., Nielsen, A. H., Gevorgian, V.
Number of pages: 11
Pages: 1898-1908
Publication date: 2019
Peer-reviewed: Yes

Publication information
Journal: IEEE Transactions on Power Delivery
Volume: 34
Issue number: 5
ISSN (Print): 0885-8977
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
Original language: English
Keywords: Converter, Inertia, Short circuit power, Synchronous condensers, Unbalanced faults
Electronic versions:
08703887.pdf
DOIs:
10.1109/TPWRD.2019.2914342
Source: Findit
Source ID: 2446985253
Research output: Contribution to journal → Journal article – Annual report year: 2019 → Research → peer-review