

EUR24_XX - Design and Modelling of AC/DC hybrid interconnected power networks case study

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Abstract:

The focus of this study is to develop a base model of hybrid AC/DC interconnected systems through main bi-directional interlinking converter and test the performance of different renewable energy systems integrated into the main types of microgrids structures : DC microgrid, AC microgrid and hybrid AC/DC microgrid on MATLAB/SIMULINK. The hybrid AC/DC microgrid is examined under 5 possible scenarios in Plymouth: Islanded mode at winter and summer months, Grid connected mode at winter and summer months and during a sudden fault, focusing on voltage stability of main AC or DC buses. The results indicated that primary and local controlling scheme were suitable for individual integration of DC MG and AC MG but not when combined as hybrid. However, after sudden fault while grid connected, the primary control succeeded in maintaining stable DC and AC bus voltages. DC microgrid is suitable to be applied in Plymouth with mainly PV system and BESS. Several power quality issues and harmonics were noticed, and future solutions are proposed .Thus, integrating hybrid AC/DC microgrid at Plymouth in the future seems promising with grid connected systems and islanded DC microgrids.