

**ChemTech**

International Journal of ChemTech Research
CODEN(USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555
Vol.10 No.14,pp213-219,2017

A Novel Approach of Power Quality Improvement Using UPQC Along With Microgrid

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Abstract:The micro-grids are the interconnection of renewable resources available at the distribution side. Micro -grids can be operated in three different ways such as, grid connected mode, autonomous mode and micro generation mode. Solar panel, wind energy and battery are connected as source for integration of DG based grid connected microgrid system. Battery Energy storage system can store the energy and can be delivered to local load when solar or wind power is low. The environmental factors along with variations in load, capacitor switching, charging of transformers and use of nonlinear loads are lead to Power Quality problems such as sag, swell, harmonics, etc. To eliminate these power quality issues from the integration of DG based grid connected microgrid system, Unified Power Quality Conditioner (UPQC) is used. DG converters (with storage), the load and shunt part of the UPQC will be located after the PCC. The series part of the UPQC will be located before the PCC and in series with the grid. DC link can be connected to the storage system also. The UPQC is used to balance the voltage sags /swells, harmonic and reactive power compensation in the interconnected mode. The DG Converter along with storage can supply the active power and the shunt part of the UPQC can compensate the reactive power and harmonic power of the load during the islanding mode. The new control strategy is used for the integration and control of Unified Power Quality Conditioner in distribution generation based micro-grid system is simulated in MATLAB/Simulink model using Decision tree algorithm.

Keywords :Distribution Generation, DT algorithm, Islanding Detection, Microgrid, Power Quality, Synchronous reconnection, Unified Power Quality Conditioner.