



Power Quality Improvement by Using Statcom Control Scheme in Wind Energy Generation Interface to Grid

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ABSTRACT

“Electric Power Quality (EPQ) is a term that refers to maintaining the near sinusoidal waveform of power distribution bus voltages and currents at rated magnitude and frequency.” Today customers are more aware of the seriousness that the power quality possesses, this prompts the utilities to assure good quality of power to their customer. The power quality is basically customer-centric. The increased focus on utilities toward to maintaining reliable power supply by employing power quality improvement tools has reduced the power outages and blackout considerably. Good power quality is the characteristic of reliable power supply. Low power factor, harmonic pollution, load imbalance, fast voltage variations are some common parameters which are used to define the power quality. If the power quality issues are not checked, i.e., the parameters that define power quality doesn't fall within the predefined standards than it will lead to high electricity bill, high running cost in industries, malfunctioning of equipments, challenges in connecting renewables. Capacitor banks, FACTS devices, harmonic filters, SVC's, STATCOM are the solutions to achieve the power quality. The performance of Wind turbine generators is affected by poor quality power, at the same time these wind power generating plant affects the power quality negatively. This paper presents the STATCOM system with the BESS and studies the impact on the power quality in a system which consist of wind turbine generator, nonlinear load, hysteresis controller for controlling the operation of STATCOM and grid. The model is simulated in the MATLAB/Simulink. This scheme mitigates the power quality issues, improves voltage profile and also reduces harmonic distortion of the waveforms. BESS level out the imbalances caused by real power due to intermittent nature of wind power available due to varying wind speeds.

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I. Introduction

Power is the very crucial input for the growth of any economy. Therefore, it is considered as a core industry as it facilitates development across various sectors, such as agriculture,

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