

# **Integrating Wind Energy into Weak Power Grid Using Fuzzy Controlled TSC compensator**

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## **Abstract**

Wind energy has been developed significantly over last decade and has been noted as the most rapidly growing technology and most cost-effective ways to generate electricity from renewable sources. On the other hand, the voltage of wind turbine driven generator is variable due to intermittent nature of wind energy. Therefore, the integration of large wind scheme can pose inherent security problems such as voltage fluctuations and power quality.

Voltage control, power quality and reactive power compensation in a distribution network with embedded wind energy conversion system represent the main goal of this paper. The dynamic simulation of the proposed voltage stabilization TSC scheme is presented using fuzzy logic based controller. The Wind Energy Scheme comprises three key parts. The wind energy system, induction generator, TSC compensator with the associated fuzzy logic controller and the distribution wind-grid integrated AC system feeding the hybrid load.

The integrated wind-grid scheme with all subsystems has been digitally simulated using the Matlab Simulink/SimPower software environment. The fuzzy logic controlled TSC scheme was fully validated to ensure voltage stabilization and efficient wind energy utilization

### **Key words**

Renewable Wind Energy, Reactive power compensation, Fuzzy logic controller, Voltage Stabilization and Efficient Utilization of wind Energy.