

Title: Control System for Hybrid Wind Diesel System Supplying an Isolated Load

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A simulation based research study has been conducted, in which a control system developed for hybrid wind-diesel system (HWDS) is presented. The proposed system will consist of a wind turbine generation (WTG) system, power converters, diesel generator (DG) unit and dump loads. Developed control strategy operates the HWDS in three operating modes: wind-only (WO), diesel-only (DO) and wind-diesel (WD) modes.

In WO mode, only the WTG is operated (under high wind speed sufficient to supply whole power demand) while the diesel generator is disconnected and switched off by valve control. In this mode the WTG is controlled to achieve maximum power extraction from the wind using maximum power point tracking control. An external reactive power compensator is used to balance reactive power requirement and regulate the voltage supply.

In DO mode, the control strategy developed operates and controls only the power generation of DG unit to supply active and reactive power to load. In this mode the WTG is disconnected (under very low wind speed) by circuit breaker isolating it completely from supplying the load.

In WD mode, the wind speed is not sufficient for WTG to supply complete power demand, so the power generation required is shared between WTG and DG unit to supply the power demand.

Controlled dump loads are active in all modes of operation to consume excessive power generated and in turn regulating the frequency of power system. The complete system is modeled and simulated using standard simpowersystems blocks in Matlab-Simulink software package.