

Power Management Strategy for Solar-Wind-Diesel Stand-Alone Hybrid Energy System

Authors : Md. Aminul Islam, Adel Merabet, Rachid Beguenane, Hussein Ibrahim

Abstract : This paper presents a simulation and mathematical model of stand-alone solar-wind-diesel based hybrid energy system (HES). A power management system is designed for multiple energy resources in a stand-alone hybrid energy system. Both Solar photovoltaic and wind energy conversion system consists of maximum power point tracking (MPPT), voltage regulation, and basic power electronic interfaces. An additional diesel generator is included to support and improve the reliability of stand-alone system when renewable energy sources are not available. A power management strategy is introduced to distribute the generated power among resistive load banks. The frequency regulation is developed with conventional phase locked loop (PLL) system. The power management algorithm was applied in Matlab®/Simulink® to simulate the results.

Keywords : solar photovoltaic, wind energy, diesel engine, hybrid energy system, power management, frequency and voltage regulation

Conference Title : ICTD 2014 : International Conference on Transmission and Distribution

Conference Location : Toronto, Canada

Conference Dates : June 16-17, 2014