

Design of true hybrid solar wind turbine for smaller hybrid renewable energy power plants

ABSTRACT

Contemporary hybrid solar-wind farms are commonly implemented using separate solar photovoltaic (PV) cell arrays and wind turbines, where the electricity currents generated from both devices are combined. However, this solution requires a large amount of space to cater for the PV arrays and wind turbines of the system. This paper proposes a new type of renewable energy electric generator with a small power production footprint (PPF) that allows reduction of land usage. The True Hybrid Wind-Solar (THWS) generator allows for the solar panels to rotate along with a VAWT wind turbine that is attached through a specially designed electromechanical coupling mechanism. The working principle behind the connections is described in this paper. The design of a hybrid circuit module that serves to combine the currents generated via the solar cells and the wind generator and also to automatically disconnect inactive wind or solar generators is described. The latter is important in order to eliminate unwanted load generated from the inactive generators within the THWS itself.

Keyword: Renewable energy; Solar photovoltaics; Solar power; Solar wind turbine; Vertical axis wind turbine; Wind power