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WIND-SOLAR HYBRID POWER SYSTEM FOR RURAL APPLICATIONS IN THE SOUTH EASTERN STATES OF NIGERIA

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ABSTRACT

A combination of wind and solar resources offers a unique possibility in generating electricity either as grid-connected or as stand alone hybrid power system. This paper investigates the marrying of the two resources where one, solar, is in abundant and the other, wind, is in limited supply. A case study of Nsukka is presented with data obtained at the Centre for Basic Space Science, University of Nigeria, Nsukka. The model power plant simulates a combination of a variable speed wind turbine and 6 by 2 solar PV array with the aim to satisfy the load demand of a 3-bedroom flat apartment and to charge a battery bank during the period of excess power. The battery bank supplies the load in the event of hybrid power deficiency. The model at the end gives hope that the low wind resource can be hybridized with the high solar profile to generate firm power for stand alone or grid-connected systems.

KEYWORDS: Hybrid system; low wind resource; solar insolation; load demand.