Title: Assessment of wind energy resources for electricity generation using WECS in North Central region, Nigeria.

Author(s): Ohunakin, O.S.

Outlet: Elsevier: Renewable and Sustainable Energy Reviews

Date:

Abstract: This paper presents a statistical analysis of wind characteristics of five locations covering the North-Central (NC) geo-political zone, Nigeria, namely Bida, Minna, Makurdi, Ilorin and Lokoja using Weibull distribution functions on a 36-year (1971–2007) wind speed data at 10m height collected by the meteorological stations of NIMET in the region. The monthly, seasonal and annual variations were examined while wind speeds at different hub heights were got by extrapolating the10m data using the power law. The results from this investigation showed that all the five sites will only be adequate for non-connected electrical and mechanical applications with consideration to their respective annual mean wind speeds of 2.747, 4.289, 4.570, 4.386 and 3.158 m/s and annual average power densities of 16.569, 94.113, 76.399, 71.823 and 26.089 W/m^2 for Bida, Minna, Makurdi, Ilorin and Lokoja in that order. Weibull parameters k and c together with the energies for the respective locations were computed while further observation revealed that Bida, Minna, Makurdi and Ilorin are windier in the morning than afternoon periods for many months in a year whereas Lokoja had a windy afternoon. Additionally, four wind turbines Dewind 48-600 kW, Dewind D6-1250kW, DewindD7-1500kW and Dewind D8-2000kW were technically assessed for electricity generation by calculating their respective yearly energy output and capacity factor in all the locations.