

Title: Wind characteristics and wind energy potential assessment in Uyo, Nigeria

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Abstract: This paper examines the wind power potential of Uyo, a capital city in the Niger Delta region of Nigeria. A 21- year data obtained from the Nigerian Meteorological Agency (NIMET), were statistically analyzed using the Weibull and Rayleigh distribution functions. The result of the study showed that Uyo has a mean wind speed of 3.17 m/s with a maximum value of 3.67 m/s in April while the corresponding mean wind power density is approximately 19.91 W/m² for the whole year, thereby making the selected site to fall under Class 1 of the international system of wind classification. Further investigations revealed the South-Westerly and Westerly to be responsible for the high wind values recorded in the area and also prove Weibull model to represent the actual data better than Rayleigh according to an evaluation that is based on Chi-square (χ^2), root mean square error (RMSE) and correlation coefficient (R^2).