

Title: Techno-Economic Evaluation Of Wind Energy In South-West Nigeria

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Abstract: In this study, an analysis of the wind energy potential in the southwest geo-political region of Nigeria was conducted. A 37-year (1971–2007) wind speed data set measured at 10 m height, obtained from eight meteorological stations within the region was analysed using a 2-parameter Weibull function. Besides, a techno-economic evaluation of large wind energy conversion systems with power ratings ranging from 0.6 to 2MW at different hub heights based on the levelized unit cost of electricity was made for the different sites considered. The result showed that electricity cost varied from 0.06997 and 0.11195 $\$/(\text{kW}\$h)$ to 2.86611 and 4.58578 $\$/(\text{kW}\$h)$ at limit values of turbine specific cost band intervals of 1000 and 1600 $\$/\text{kW}$. It was further shown that Lagos, having the highest accumulated power outputs of 430.10 kW/a from DeWind D7 at 70m hub height, is the most preferred for economically usable power generation in terms of the levelized unit cost.