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Applications of small-scale, stand-alone wind energy conversion systems in rural Cross River State, Nigeria

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The study presents the wind energy potential (WEP) for six locations in Cross River State, Nigeria. The objective of the study was to assess the WEP of the selected sites for electricity generation, using small size wind energy conversion systems (WECs). The wind data were measured at 10 m height and ranged from 4 to 10 years. Additionally, the data were evaluated using the two-parameter Weibull function. Results obtained show that annual mean wind speed, v_m , and Weibull parameters k and c range from 3.21 to 4.55 m/s, 3.32 to 6.69 and 2.99 to 5.40 m/s, in that order. The cost per kWh of energy for the selected WECs fluctuated between $0.0626 \leq \text{COE} \leq 0.1375$ USD/kWh, while the avoidable CO₂ emissions exist between 0.64 and 38.21 tons/year. However, the probable savings made from diesel was not greater than 14,524.94 litres/year for the locations with high WEP for small-scale stand-alone applications.

Keywords:

[wind energystand-aloneCO₂ emissionsWeibullCross River](#)