

Title: Economic Analysis Of Wind Energy Conversion Systems Using Levelized Cost Of Electricity And Present Value Cost Methods In Nigeria

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Abstract: Technical electricity generation assessment and economic analysis of six wind energy conversion systems in the categories small, medium, and large (with power ratings of 20, 35, 275, 500, 1,000, and 2,000 kW) were examined in this study. Electricity cost values were estimated based on the levelized cost of electricity (LCOE) and present value cost (PVC) methods for six locations selected across all the geopolitical zones of Nigeria. This was done using wind speed data that span between 25 and 37 years, measured at the height of 10 m. The result showed that the annual average energy output ranges from 2.242 MW h in Uyo with P10-20 turbine to 12,521.55 MW h in Kano using Vestas V80-2 MW wind turbine. Furthermore, of all the selected sites, Kano gave the least costs of electricity production per kilowatt hour with Vestas V80-2 MW model at 67-m hub heights, while the highest is obtained in Uyo with GEV-HP (1 MW) model at 70-m hub heights for the LCOE and PVC height for both the LCOE and PVC methods. In addition, sensitivity of the selected parameters to the levelized cost of electricity was also carried out.