

Title: Performance Evaluation of Wind Turbines For Energy Generation In Niger Delta, Nigeria.

Author(s): Muyiwa S. Adaramola, Olanrewaju M. Oyewola, Olayinka S. Ohunakin, Olaolu O. Akinnawonu

Outlet: Elsevier Publisher: Sustainable Energy Technologies and Assessments

Date:

Abstract: This paper evaluates wind energy potentials of seven selected locations spreading across Niger-Delta region of Nigeria using wind speed data that extend over 9 to 37 years and subjected to 2-parameter Weibull distribution functions. The performance of four wind turbine models ranging from 35 to 500 kW was simulated in all the locations considered. The results show that the performance of all the wind energy conversion systems gave the least energy output values at Ikom. In addition, annual energy output ranged from 4.07 MWh at Ikom to 145.57 MWh at Ogoja with Polaris America (100 kW) and Zeus Energy (500 kW) wind turbines respectively. It was also observed that, irrespective of the site, G-3120 (35 kW) wind turbine has the highest capacity factor among the models considered. Therefore, for wind energy development, G-3120 model or wind turbine with similar rated wind speed would be most suitable in all the locations. The number of inhabitants that can be served by the energy produced using G-3120 turbine in each location was estimated.