THE DESIGN, FABRICATION, AND ASSESSMENT OF A VERTICAL AXIS WIND TURBINE BLADE FOR ELECTRICITY GENERATION AT A LOW WIND PROFILE

A Project Study Proposal

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By

Calasara, Kristine P.

Adorio, Noriel S.

Llacuna, Vincent G.

Nualda, Chandra Marie N.

Reyes, Roland Anthony V.

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Calasara, Kristine P. Adorio, Noriel S. Llacuna, Vincent G. Nualda, Chandra Marie N. Reyes, Roland Anthony V.

ABSTRACT

Wind energy is a fast-growing clean energy source. The technology has significant challenges on account of the unpredictability of the wind source. Small-scale wind turbines are becoming a less popular option when wind conditions are favorable; yet, they have tremendous potential, especially during weather and seasons when it is not possible to generate solar energy. This study utilizes a design of a two-stage, two-blade with one-fin Savonius wind turbine. The assessment of this study was held on the premises of the Central Philippine University Wind Tunnel Research, Development, and Testing Laboratory, testing the electricity generation of the designed wind turbine at a low wind profile. The Turbine is equipped with its own 6 18650 Lithium ion batteries to store the harvested energy for it to be used in the future. Two trials were conducted to ensure the consistency of the data. It was concluded that the turbine at 2.2 m/s can produce 1.9 volts or 0.5 watts. At 3.6 m/s the solar charger that was used started operating at 5.55 volts or 6.0495 watts. This is sufficient enough to charge a mobile device. The trial ended at 5.3 m/s garnering 9.415 volts or 36.3419 watts. The calculated coefficient of power resulted in 70.69%