

## The Potential of Small Scale Environmentally Friendly Renewable Hybrid Photovoltaic and Wind Energy Generated System at Terengganu State Coastal Area

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### Abstract

*This paper presents a study of data on solar radiation and wind resources used to generate the renewable electrical power in the Terengganu state coastal area. This study utilized the data collected from the University Malaysia Terengganu Renewable Energy Research Station (UMTRERS) and Kuala Terengganu International Airport (KTIA) for years 2004, 2005 and 2006. The generated power analysis was conducted using MATLAB, based on the power produced from the Unisolar U.S 64 photovoltaic module with an area of 1 m<sup>2</sup> and the BWC.XL wind turbine with a blade area of 4.9 m<sup>2</sup>. The statistical method of the Weibull distribution was used to analyze the wind data to determine the potential of wind energy. Moreover, extrapolation of the 23 m data, using the power law, was used to determine the wind data at heights of 30, 40, 60, 80, 100 and 120 m. A wind turbine with a capacity of 1 to 50 kW was used to estimate the power generated. Furthermore, a general study was implemented based on the power produced from both sources for supplying renewable electricity for the basic utilization of households in the Terengganu coastal area habitation. The results showed that the average annual energies from the photovoltaic module and wind turbine were 95.18 kWh/m<sup>2</sup>yr and 339.09 kWh/m<sup>2</sup>yr, respectively. In addition the ideal height for continuously powering a household was higher than 50 m for the wind turbine size of over 50 kW for the UMTRERS site.*

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