Article Abstract

Title:	Determination of recoverable wind energy for electricity generation using wind energy conversion system in Tunisia
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Journal:	*International Journal of Engineering, Science and Technology*, Vol. 3, No. 5, 2011, pp. 83-92.
Abstract:	Utilization of renewable energy source, essentially the wind energy, has been growing rapidly in the whole world due to environmental pollution, consumption of the limited fossil fuels and global warming. Moreover, wind resource determination is a fundamental step in planning a wind energy project and exhaustive knowledge of the wind characteristic at a site of installation is needed to estimate the performance of a wind energy conversion system. The current paper presents an investigation of the wind power potential using real wind data for five sites in Tunisia: Jendouba, Bizerte, Sfax, Gafsa and Jarzis. The Weibull distribution functions and the Betz theory are applied to describe the wind speed distribution and to determinate the wind power density for these sites. Also, mathematical models are used to calculate the recoverable wind power and the wind energy produced by a wind turbine. According to the power calculations done for the five sites, annual mean power density based on Weibull function is 63.591W/m^2 in June in Gafsa and in May and June in Jarzis whereas the minimum average value is obtained in Jendouba as 6.521W/m^2 in October. In addition, a study of the produced wind energy by three different types of wind turbine is elaborated. The results confirm that the Jarzis site presents the better wind energy potential for the utilization. Therefore, it is the most favorable site for the wind installations in the five studied sites.
Keywords:	determination, wind energy potential, wind speed, wind power density, Weibull and Betz theories