An investigation on the wind characteristics of a location in Yalova, Turkey

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This paper presents an investigation and analyzes of wind energy characteristics of a location in Yalova, Turkey and offers some usable options about how to make use of wind of such places. One year hourly wind data in time series format was obtained from Turkish Electrical Company in 2012 and analyzed considering some statistical formulations and approaches. In this study, average wind speed, dominant wind direction, power density values at different heights and probability density distribution such as Weibull and Rayleigh were calculated in order to determine the wind characteristic of the region correctly. Dominant wind direction of the location is determined as North-West and average wind speed of the location varies between 1,3m/s and 1,60m/s regarding different hub heights. Additionally, annual mean power density values indicates a change between 3,75W/m^2 and 7,5 W/m^2 while Weibull parameters for the location are calculated as 1,55 for k and 1,45m/s for c. As a result, it was determined that this location is not windy and since average wind speed and wind power density of the location is too less to generate electricity with traditional three-blades wind turbines, non-traditional wind turbines that can even generate electricity at very low wind speeds can be utilized there.