

Analysis of wind characteristics of Olderkesi region in Narok county

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Abstract

Most wind regimes in relation to wind power in Narok and Kenya as a whole are generally hardly understood due to limited information on characteristics of the wind regime. The scanty or no information is majorly due to few studies on wind characteristics and wind power density for most parts of the country (such as Narok) currently witnessed in literature. This paper reports a study of wind data of Olderkesi region in Narok county to establish the wind characteristics relevant to wind power development by employing two parameter Weibull distribution function analysis technique. The study found out that wind regime in Olderkesi is turbulent in general with the maximum turbulence intensity (TI) occurring in the month of May with TI of 0.97. While, the turbulence is lowest in the month of September with TI of 0.42. This implies that wind turbines in the area must be able to handle mechanical stress due to turbulent wind regime. Mean wind speed was found to be maximum in the month of September (4.06 m/s) and lowest in the month of January (1.26 m/s) with average daily wind speed of 3.2 m/s at 10 m height which is just below the cut-in wind speed (3.5 m/s) for most utility scale wind turbines. However, the mean wind speed is higher than the cut-in wind speed (1.5 -2 m/s) for domestic scale wind turbines. From the mean wind speed, the regime belongs to light breeze type of wind. The study also established that the most suitable time for wind power generation in Olderkesi is between 0600 Hrs to 1400 Hrs based on the mean wind speed evolution over the day. The annual mean power density of the area was found to be 20.20 W/m² which is a class I wind power. Therefore, the area is suitable only for a domestic scale wind power extraction but not utility scale wind power extraction at 10 m anemometer height. The characteristics suggested that wind power production at 10 m in Olderkesi is only viable for domestic scale wind power extraction and its characterized generally low wind speeds.

Key words: Wind power density, turbulence intensity and mean wind speed