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ASSESSING THE POTENTIAL OF WIND ENERGY FOR ELECTRICAL POWER GENERATION IN DODOMA REGION, TANZANIA

ABSTRACT

Tanzania depends heavily on hydropower for her electricity demand and experiences power shortage during the dry seasons. This study investigates the wind power potential of Dodoma, a Central station of Tanzania which can be used to supplement the shortfall in hydro-electricity generation. The potential for wind-generated electricity was examined using three hourly wind data collected from Dodoma Meteorological station located at Dodoma Airport for the period between 2007 and 2012. Three hourly wind speed data measured at 10 m height was collected was used to determine the mean monthly wind speed, annual wind speed and the wind speed distribution. The wind data was extrapolated to 50 meters height by using Power Law. The wind resource at 50 meter yielded an annual mean wind speed of 5.5 m/s and mean wind power density of 280.5 W/m². Wind energy that can be harvested from this annual average wind speed is 23343.21 kWh per year. The average annual power output of the area is 366 kW, which brings the area into the moderate class-4 category of power potential making the area to be suitable for moderate wind farms. The windy season, which is from March to November, coincides with the dry season. It is recommended that by generating electricity from wind, the already limited hydrological resources in the country could be used for irrigation schemes instead of channeling them for developing new hydropower plant

Key words: Wind speed frequency; wind power density; wind power generation; Power potential; Wind energy; Wind speed