Application of WRF Mesoscale Model for Prediction of Wind Energy Resources in Tanzania

This study gives an overview of the wind energy resource distribution within and of the coast of Tanzania. Wind speed predictions using WRF model at 60 m a.g.l, which is typically the height of turbine hub, are compared with the wind speed values obtained by extrapolating Final Analysis (FNL) wind speed data at 10m a.g.l using power law. The WRF Model is used for 72-hours wind speed and direction forecasting where the initial boundary of the model is provided by Final Analysis data (FNL) available at UCAR with resolution of 1 × 1 degree. The WRF model has good results in comparison to power law because the variation is very small. At 1200 and 1800 hours over the areas near the land WRF predicts low wind speed than power law. WRF model predicts more offshore wind strength in the night than the noon. At 1300 to 1400 hrs the wind speed in the offshore part of Tanzania is mostly below 9 m/s as predicted by WRF model. Based on the limited studies, it has been observed that the wind energy potential exists in the offshore zones of Tanzania. This study encourage exploring the possibilities of harnessing the offshore wind energy potentials available in Tanzania. The approach adopted could be configuring WRF models with high horizontal resolution and many domains and carrying out detailed theoretical assessment of the wind energy resources, supplemented by actual measurements of the wind pattern using met-masts at different locations across and offshore of Tanzania.