WIND VARIABILITY AND POWER CAPACITY ASSESSMENT FOR A COMPLEX WIND FARM PROJECT IN INDIA

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Abstract

In the Indian context, if wind energy has to contribute substantially in the next decade then the long term wind resource variability needs to be thoroughly understood especially for complex terrains. In recent years, mesoscale atmospheric modeling has become an increasingly accepted tool for evaluating the wind variability and the financial viability of the wind energy projects with special emphasis to complex terrains. The paper presents the analysis of 25 years of wind speeds and power prediction using fine tuned data from Numerical Weather Prediction model at a complex terrain project site in Kerala. The simulated data from the model has been validated/calibrated to match the observed / on-site data during the measurement period at C-WET mast locations. The probability exceedance values for simulated project-average both for wind speeds and power capacity are projected. In the context it is concluded that by blending the best of direct onsite measurements with the atmospheric model data will give a reliable, credible and comprehensive understanding of the wind resources which will help in maximizing the performances of the wind farms developed in complex terrains suiting to the Indian conditions thus mitigating the risk of investors / developers.

Keywords: Wind, numeric weather prediction model, Mesoscale model, wind resource