

Assessment of wind power potential in the North region of Malaysia, Chuping Perlis

Abstract

The wind turbines is a main device that convert the kinetic energy from blades to electrical energy. Before installing wind turbines, the Weibull probability distribution must be calculated to determine the certain wind speed probability. Many problems will come if there no analysis the characteristics of wind in selected location, such as wind speed that not suitable for building wind farm to supply the population in that area. Shape and scale factors, which be controlled in a variety of ways, influence the Weibull distribution. Many studies have looked into which of the various Weibull parameter estimation methods is the most dependable. However, because the results of these investigations were inconsistent, research into more trustworthy Weibull parameter estimation methods is still ongoing. An analysis of data collected Chuping, Perlis for two years was conducted in this study (from 2018 to 2019). By using statistical analysis to evaluate the Weibull distribution method, this study used three methods to compared the Weibull parameters and identified the most reliable and effective method to obtain the Weibull probability distribution by using a three approach that compares the variances of RMSE, MSE and R2, which provides comprehensive insight into level error and volatility. Modified maximum likelihood method, graphical method, and power density method are the three methods used in this study. Therefore, the graphical method has the best accuracy in the wind speed distribution prediction, several methods such as the modified maximum likelihood method, and the power density method have the worst prediction of the wind speed distribution based on all the statistical method variances for this region.

Keywords

Graphic methods; Kinetic energy; Kinetics; Maximum likelihood estimation; Parameter estimation; Statistical methods; Wind power; Wind speed; Wind turbines