

Bastian Berlin

Modeling the wind energy potential in Sweden*

Wind energy is one of the fastest growing renewable energies in Sweden. Predictions of the wind energy potential can help stakeholders such as investors and municipalities in planning and investment decisions. The knowledge of the probability of how often wind speeds can occur at locations is essential to make an accurate prediction of the wind energy potential.

This study compared different ways of modeling the occurrence of wind speeds and compared their accuracy and their impact on the wind energy potential at meteorological stations in Sweden and for the whole country. Besides the common models, this study suggested a new way of modeling the wind speed occurrence based on different geographic features.

The results showed that there were considerable differences in the accuracy of the different models and the resulting wind energy potentials based on them. Especially the simplest model performed poorly in large areas in Sweden and was not representative for most wind conditions. The new model performed well in predicting the wind speed occurrence and was suggested as a good alternative to the common models.

Keywords: Physical Geography and Ecosystem analysis, wind energy potential, Weibull PDF, GAM, Rayleigh PDF, wind, Sweden

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