



ANALYSIS OF WIND SHEAR IN DIFFERENT REGIONS OF LITHUANIA

M. Marčiukaitis

Lithuanian Energy Institute

Breslaujos g. 3, LT-44403 Kaunas – Lithuania

ABSTRACT

Wind shear is an important factor as it directly impacts the power available at different wind turbine hub heights and strongly influences the dynamic loads on the turbine rotor and consequently the overall power output. Wind shear characterization for wind turbine site assessment is a complex task, as it depends on numerous factors, including the speed of the wind, the height above the ground, the ground's surface roughness variation, the atmospheric stability, and the nature of the terrain. The objective of this work is to determine the accuracies of different wind shear methods based on the measurement data from different sites. In addition the influence of wind shear on wind turbine power output is estimated, average wind shear variations due to seasonal and diurnal effects and atmospheric characteristics is presented. The results showed that the most accurate predictions of hub height wind speed were obtained when calm periods (< 3 m/s) were not considered. Also the greatest wind shear was found during the day time and the summer time. In the coastal region average annual wind shear varied up to 20 % between different sites. Analysis also showed that using log or power laws may result in significant inaccuracies of hub height mean wind speed predictions.

Keywords: wind shear, wind turbines, wind power assessment