



Possibilities of wind energy utilisation in Hungary

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The main goal of the research presented was to clarify the possibilities of wind energy utilisation in Hungary. Available wind power was estimated for different regions of the country using climatological data from the 20th century. Based on hourly wind speed averages of the latest six-year-long data sets of 29 Hungarian climate stations supplementary wind characteristics were calculated applying a methodology corresponding to the European Wind Atlas. Furthermore, the Wind Atlas of Hungary was calculated, and the main energetic parameters were analysed. Wind profile measurements and data analysis was carried out at station Hegyhátsál, where multilevel wind speed time series are available for the 1995-2004 period. The structure of the vertical wind profile, and the relationships between atmospheric stability and different errors of empirical wind profile formulas were analysed using the data of four measuring levels. In order to estimate stream field modification effects of topography and roughness, the WAsP model was applied. The adaptability of the model has been verified for Hungary. In order to analyse the most important characteristics of the available wind power field modification effects of topography and roughness were evaluated, horizontal and vertical extrapolation of the measured wind data was carried out in several case studies for different regions of the country. Finally, simulated mean wind speed and available wind power maps of Hungary are drawn. Based on the results of our research, it has been demonstrated that Hungary has extractable wind power resources that was already used in the ancient times. These results suggest that wind being a renewable energy resource can play an important role in Hungary in the near future.