MODELLING OF THE ENERGY INCOME FOR BRAŞOV URBAN AREA – WIND POWER

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Wind power is the conversion of wind energy into a useful form, such as electricity, using wind turbines. This paper proposes a study concerning the availability of wind power for Braşov city area. The meteorological data used have been recorded with a Delta-T weather station, over a time span of three years, 2006-2008.

In order to calculate the performance of an existing system or the energy generated from a system in the design stage, appropriate weather data have been required. In this regard, both an analysis of the influence of the measurement interval of solar radiation and wind speed, and a good fit for the data measured in a typical hybrid energy system are of paramount importance, not only with regard to technical reliability but, also in the minimization of total system cost (kWh costs). In a good design of wind power systems, the objectives which must be reached are the minimization of the overall cost and the maximization of the energy performance of the system.

By its geographical position, the depression of Braşov is distinguished by the moderate continental climate. Towards the meridional direction, the climate of this geographical urban area is influenced by cold, polar air masses advections, as well as by warm air masses of southern provenience. The aeolian regime of the Braşov depression comprises the characteristics of long intramountain depressions that favour an atmospheric circulation territorially divided. The height and the morphological openings (passes) assure an active ventilation of the depression and imprinting its central area with less ordinary aeolien characteristics for the depression climates [3].

Considering the wind power calculations for Braşov urban area and the analysis of the diagrams presented, there can be expressed the conclusions below.

- ✓ The yearly wind potential registered for the three years analysed was: in 2006 - 41.62kWh/m^2, in 2007 – 87.59kWh/m^2 and in 2008 - 68.91kWh/m^2.
- ✓ The highest values of the monthly wind power were registered in March 2006, January and July 2007 and in March and December 2008.
- ✓ Because of the too low values recorded for the wind speed, the wind turbines' using is not recommended for this area.
- ✓ The obtained wind power for the Braşov area is much lower than the solar power [2]; for the Braşov area, the PV systems are recommended.
- ✓ Although solar energy is not available during cloudy weather or by night, while wind energy is available much of the time, in the particular case of Braşov area, the small value of wind speed leads to small values of wind power.

REFERENCES

[1] Bostan, I. Conversion Systems of Renewable Energies. Chişinău. Tehnica- Info Publishing, 2007.
[2] Butuc, B. Modelling the Energy Income for the Braşov Urban Area. Annals of the University of Oradea, Editura Universității din Oradea, 2009.
[3] Marcu, M., Huber, V. Air Thermal Stratification in the Depression Area Forms. "Depression Effect". Phytogeographical Implications. Anale I.C.A.S., 46, p. 141-150.