



Wind energy potential in North-Western of Poland

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Decreasing level of resources of coal and lignite, petroleum and natural gas, as well as increasing environmental pollution associated with the production of electricity in conventional power plants have contributed to the need to search the alternative sources of energy. In recent years wind power energy has become one of the most popular source of renewable energy. In 2013, in Poland, the installed wind power capacity was 3,389.54 MWh, which accounted for 61.5% of the total renewable energy sources. Due to rapid technological progress in this field, wind energy is the fastest growing sector of renewable energy sources in Poland.

In installation of wind system is important to evaluate the structure of wind in a particular area, especially speed and its variability. The purpose of this analysis is examination of the wind characteristics in North-Western of Poland and determination of the energy potential of this region. The influence of atmospheric circulation on the occurrence of useful wind speed for wind energy is also carried out.

In the study are used data on the wind speed and direction from wind data collection tower in Żeńsko for over a 2-year period (2008-2009). Wind speed was measured at two heights 25 and 50 m above ground level. Selected for this analysis localization is lakeland landscape, typical for North-Western part of Poland. The atmospheric circulation is described by using Calendar of circulation types after Lityński.

Characteristics such as annual, seasonal, monthly and diurnal wind speed variations have been examined. Wind speed data reveal that the windy months in Żeńsko are from November to March. The evaluation of the wind potential energy in this region being investigated by metrological method using the tables of cumulated frequencies of mean speed. The influence of air masses flow and circulation macrotypes is also carried out. The highest available energy is with advection air masses from NW and the lowest with advection from E and NE.

The results can be used in predicting of wind energy production, variations depending on synoptic situation.