

Wind power potential of the volga federal district and rationale of the use of low-power wind-driven power-plants

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Abstract

Russia there was developed an energy strategy for the development of the country until 2030, where it has also paid attention to the development of wind power engineering. This paper describes the wind conditions in the vast territory of the Volga Federal District and considers the possibility of using wind energy with a uniform measurement material, as well as evaluates the wind power potential of the Volga Federal District. The paper discusses the wind regime in the territory of the Volga Federal District using time series of mean monthly wind speeds at 183 meteorological stations in the period 1966-2009. There were analyzed the mean values, measures of variability, anomalies of wind speeds, linear trends, correlations between points, etc. We have revealed an inhomogeneous distribution of the mean monthly wind speeds (MMWS) in the territory, and the general trend of lowering wind flows. The wind power potential of the Volga Federal District in the atmosphere layer of 10-150 m was assessed. The analysis led to the conclusion that one of the priority directions of development of wind power in the near future will be a stand-alone use of small and medium-sized wind-driven power plants in remote areas where the population density is low, there is no large electrical networks, and it is appropriate to use wind-powered generating plants for energy supply purposes.

Keywords

Linear trend, Possible wind power resources, Wind power potential, Wind speed, Wind speed variability