

Abstract

# Various Models for Predicting Wind Energy Production <sup>†</sup>

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**Abstract:** Windmills are one of the virtually limitless sources of energy that may be used to generate electricity. It is regarded as a renewable source, but more investigation is indeed required to design the scientific knowledge and techniques that guarantee homogeneity in creation, increasing the contribution of this origin to the electricity sector. This is because the wind exhibits sudden variants in speed, surface area, and other crucial factors. Comprehensive data collection methods of wind speed and phase are required for the assessment of wind resources in a location. Wind energy happens when the wind makes contact well with the wind turbine's rotors. These rotor rotates, converting wind speed into kinetic energy that powers the wind generator's rotor and produces energy. In addition to assessing the energy production for the coming periods, which is valuable knowledge in the deployment of the producing units and the regulation of the power system, it is crucial to estimate the forecasts of wind activity a minimum of one day in advance. This study creates a wind speed forecasting model for the ultra-short, short, medium, as well as long-term development of computational techniques. Utilizing wavelet-based prediction, artificial neural network approaches, Autoregressive Integrated Moving Average (ARIMA), and other hybrid models.

**Keywords:** wind energy; wavelet; prediction; wind speed