

Day-Ahead Wind Power Forecasting Using Numerical Weather Prediction

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Abstract

Wind energy is one of the renewable energy types with the highest installed capacity in renewable energy sources. Due to the nature of renewable energy, the fluctuations experienced in the production cause various negative effects such as voltage fluctuations and frequency changes in the management of the electricity grid. Therefore, forecasting the generation of renewable energy provides convenience for the management of the electricity grid. In this study, a wind power forecast is carried out for the next 24 hours using data from a wind power plant in Turkey. While numerical weather predictions of the power plant area and measured wind speed in the wind power plant are used as data, artificial neural networks are selected for the forecast method. Also, to increase the accuracy of the forecasting, Numerical weather forecast values were compared with the actual wind values measured at the power plant, and numerical weather forecast values were reduced to the power plant area. Forecasting results are compared with the persistence method and forecasting results made by the wind power plant.

Keywords: artificial neural networks, day ahead forecasts, short-term wind power forecast, wind power.