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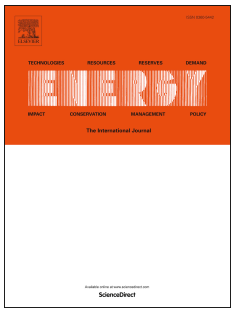

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Multi-objective energy management of a micro-grid considering uncertainty in wind power forecasting

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Abstract

In recent years, wind power has played a significant role in energy generation of micro-grids (MGs). However, randomness nature of wind speed leading to uncertainty in wind power forecast, imposes some problems such as overestimating wind power on optimized scheduling of MG. In this paper, we propose an adaptive probabilistic concept of confidence interval (APCCI) to address these problems. The main purpose of the proposed APCCI is to modify the risk we endure to schedule wind power with other distributed energy resources (DERs) in order to degrade the unnecessary rigors and upgrade the other ones. The forecasting method which is used in this paper is artificial neural network (ANN). In order to increase the accuracy of forecasting, wavelet decomposition (WD) is applied to the wind power time series then the results are sent to ANN. After that, dependable levels for the predicted wind power based on APCCI are obtained. An energy storage system (ESS) is utilized not only to decrease the impact of forecasting errors on the MG but also to increase the flexibility of the planning. A comprehensive formu-

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