Wind energy generation assessment at specific sites in a Peninsula in Malaysia based on reliability indices

ABSTRACT

This paper presents a statistical analysis of wind speed data that can be extremely useful for installing a wind generation as a stand-alone system. The main objective is to define the wind power capacity's contribution to the adequacy of generation systems for the purpose of selecting wind farm locations at specific sites in Malaysia. The combined Sequential Monte Carlo simulation (SMCS) technique and the Weibull distribution models are employed to demonstrate the impact of wind power in power system reliability. To study this, the Roy Billinton Test System (RBTS) is considered and tested using wind data from two sites in Peninsular Malaysia, Mersing and Kuala Terengganu, and one site, Kudat, in Sabah. The results showed that Mersing and Kudat were best suitable for wind sites. In addition, the reliability indices are compared prior to the addition of the two wind farms to the considered RBTS system. The results reveal that the reliability indices are slightly improved for the RBTS system with wind power generation from both the potential sites.

Keyword: Reliability indices; Wind farms; Sequential Monte Carlo Simulation; Malaysia