Assessment of System Security and Resilience in Response to Sudden Disturbances in Standalone Hybrid Renewable Energy Systems

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Abstract

Evaluating the power reliability of electricity system to remain self-sufficient even after the occurrence of sudden disturbances is of significant importance since securing the sustainable energy supply is fundamental to the economy. The existing approaches on assessing the continuous power supply in the standalone hybrid renewable and battery system are highly associated with the reliability at the static condition. On the other hand, most of earlier research works have scarcely considered a dynamic condition, which correlates with the power system ability to overcome the sudden disruptions of constituents. However, it is obvious that its exclusion results in the overlook of essential dimension in the comprehensive notion of reliability assessments since power system is potentially affected by unpredictable and unavoidable sudden disturbances. Therefore, this paper is to develop a methodology for quantifying the power system ability to withstand the sudden disturbances for the potential application in hybrid renewable energy systems.