

عنوان مقاله:

A New Adaptive Load-Shedding and Restoration Strategy for Autonomous Operation of Microgrids: A Real-Time Study

محل انتشار:

ماهنامه بین المللی مهندسی، دوره 33، شماره 1 (سال: 1399)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

Islanding operation is one of the main features of a MicroGrid (MG), which is realized regarding the presence of distributed energy resources (DERs). However, in order to deal with the control challenges, which an MG faces during island operation, particularly when the transition is associated with certain excessive load, an efficient control strategy is required. This paper introduces a Central Management Agent (CMA) which maintains the stability of the MG, once it is islanded, by controlling an Energy Storage System (ESS) and a Central Synchronous Generator (CSG). Further, this paper proposes a new adaptive load-shedding/restoration schemes that calculates the amount of power imbalance based on frequency measurements combined with the mean value of the frequency gradient. The primacy of the proposed scheme over existing schemes, like instantaneous frequency gradient-based load shedding scheme, is its robustness against frequency oscillations. Moreover, the proposed method acts compatible with the control routine of DERs and the intermittent nature of the PV plant. As another salient feature of this paper, a Hardware In the Loop (HIL) testbed for real-time simulation is developed under which the proposed scheme and related communication with CMA along with other components are evaluated. The obtained results show that the control strategy can confidently conserve the stability of the MG in islanded mode and meet smooth reconnection to the grid-connected mode.

کلمات کلیدی:

microgrid, Load Shedding, Frequency Gradient, Energy storage system, Real-Time Simulation

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