

High Reliability Distribution Systems in Microgrids

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Microgrids can be a viable option for enhancing the reliability and the efficiency of electric power systems. Microgrids can also be implemented to serve the hourly demand with specific power quality requirements while there are incentives to incorporate small-scale renewable energy resources or cheaper and cleaner energy options. Microgrids can also satisfy the hourly demand at remote locations where the expansion of grid is either impossible or has no economical justifications. Microgrids can boost the proximity of DG and demand which will decrease outage times, increase the power quality, and enhance the reliability of demand. However, the design of distribution systems in such cases will play an important role in managing the essence of microgrids implementations.

The emergence of microgrids will also impose a multitude of technical, economical and regulatory issues.

In this presentation, the high reliability distribution system (HRDS) is introduced as a viable option for improving the operational reliability of microgrids. It will be demonstrated that the incorporation of HRDS switches in distribution systems will help improve the microgrid reliability indices including the system average interruption frequency index (SAIFI), system average interruption duration index (SAIDI), customer average interruption frequency index (CAIDI) and customer average interruption frequency index (CAIFI). A case study implemented at the Campus of Illinois Institute of Technology will be discussed.