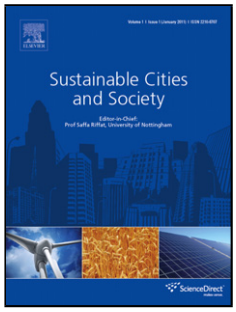


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# Autonomous Microgrid Operation Subsequent to an Anti-Islanding Scheme

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## Highlights

- Developing an intensified harmonic based active islanding detection technique for microgrid protection with reduced non-detection zone and minimum time for detection.
- Designing a suitable control strategy that takes power control with proper voltage and frequency regulation, considering the massive change in system impedance for both grid-connected and islanded mode of operation.
- Ensuring system stability with detailed analysis and an optimal power sharing, subsequent to an anti-islanding scheme.
- Illustrating an efficient controller for DG operation, minimizing the impact of transients and power unbalance to attain a post-islanding stability of a microgrid.

## Abstract

A microgrid is a scaled-down power grid, comprising of distributed power generations (DPGs) and loads. It generally operates in conjunction with the utility grid, but can also isolate to operate in "islanded mode" and serve independently according to the physical and/or economic circumstances. However, while incorporating the DPGs with the main grid, anti-islanding becomes a vital operational requirement. Thus, a novel anti-islanding scheme based on harmonic distortion is proposed in this study. To realize the full benefit of high DPGs penetration, stable operation of an islanded microgrid becomes a vital concern after the detection of an islanding event. Hence, this paper also investigates the capability of DPG units to sustain the transition, along with the post-islanding stability. Furthermore, the study also investigates the problem of power sharing during post-islanding condition and incorporates an intelligent power sharing technique for power balance, satisfying both voltage and frequency constraints. The studies show that the proposed approach not only ensures quick islanding detection with a reduced non-detection zone but also the stability of the microgrid, even during islanding transients. The time domain simulation results are found