

Research case study > transmission and distribution

Anti-islanding detection

Version 1 (updated May 31, 2017)

Context: Distributed generation (DG) such as photovoltaic (PV) and wind turbines (WT) have become popular generators in modern power systems. Protection against islanding, when a portion of the system becomes electrically isolated from the rest but remains energized, is a main challenge in DG applications.



Problem: Current islanding detection (ID) methods have a trade off between performance, cost and neutrality in respect to DG technology and are typically only valid for individual inverter systems. These islanding detection methods might fail due to their interaction and cancellation due to the high penetration of grid-connected renewable energies.

Solution: A proposed Local anti-islanding Protection Relay (LPR) which does not need a communication medium, dedication communication line nor power line. This system does not inject any positive feedback force into the PCC.

Impact: This project has presented an independent and powerful anti-islanding tool that is economically attractive, with high performance, to utilities and DG owners compared to other technologies available.

CUE's role: CUE researchers conducted a comprehensive review of islanding detection technologies for grid connected inverters. They also developed a DC side base value selection method and the LPR scheme. Researchers also completed successful experimental scenarios to test the LPR.

 Completed

Sponsors:

Hydro One, Mitacs

Timeline:

August 2013–November 2016

Research Team:

David Xu, Xiaoqiang Guo, Huafeng Xiao

Key stats

36 patents reviewed**1** scaled-down multi-DG feeder system built
Suitable for **single & three-phase** systems