Presentation # 14

Presenter: Andrew Yan, Hydro One Networks
Title: Temporary Over-Voltage (TOV) on four-wire systems due to Distributed Generation in feeds to L-G Faults.

Abstract

Hydro One Networks has experienced a substantial growth in distributed generation connected to its distribution system (8.32 kV to 44 kV). This Distributed Generators (DG) is mostly wind and solar generation farms with capacities ranging up to 10 MW.

The four-wire distribution system in Hydro One supplies power to many single phase loads. Without the connection of DG, the TOV characteristics of the system during LG fault are designed to ensure no detrimental impact to the single phase loads connected to the un-faulted phases. However, with the DG connection, the system's TOV characteristics during LG faults may be changed, resulting detrimental effects on the single phase loads.

Hydro One has conducted a considerable number of Temporary Over-Voltage (TOV) studies during LG fault conditions on four-wire systems with the connection of DG. The main objective of this work was to determine the need for grounding devices to ensure the TOV characteristics of the distribution system remain unchanged after the DG connection. While previous work and TOV studies had been focused mainly on DG islanded mode, the approach used in Hydro One's studies was more comprehensive to ensure no TOV issue for the system during the whole fault clearing process – during LG faults with both the grid source and the DG connected in parallel, and during the islanding mode.