Presentation # 13

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Title: The Impact of Distributed Generation on Protections and Some Solutions

Abstract

A significant amount of new generation capacity is being planned through the installation of Distributed Generation (DG) facilities on Hydro One distribution system. This increase is driven by the Ontario Planning Authority (OPA) and its market request for the need for additional generation in Ontario.

Hydro One's (HON) distribution system has been largely planned, designed, and operated as a radial system for the last 80 years. Most of the planned DGs are smaller distributed generators (10 MW or less), and are predominately wind generation farms. A majority of these are planned to be connected to Hydro One Networks' system at the sub-transmission level (44/27.6/13.8 kV).

The introduction of distribution connected generation provides a source for redistribution of the fault current on the feeder circuit, can cause the loss of relay coordination, potential over-voltages, transformer station relay impacts, and in general, will cause significant protection system differences as the distribution system transforms from a simple single source system to a multi-source system.

Such a high penetration of DGs on HON's transformer stations and distribution feeders further impacts simple radial feeder operation. These impacts are reviewed from a protection perspective, with the objective of identifying issues and providing strategic solutions, to permit the connection of these DGs on the HON distribution system.

The presentation will be organized into two parts firstly; protection issues will be identified and discussed, followed by suggested solutions that can be used to address the resolution of such protection issues.