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Calculating Available Feeder Capacity for New Distributed Energy Resource (DER) Projects

The steps below describe the general process for determining the available capacity on a distribution feeder for new Distributed Energy Resource (DER) connections.

1. System DER Inventory by Feeder.

Establish and maintain a complete inventory of all existing generation connected to each feeder. At a minimum, this inventory should identify the nameplate rating of each installation, the type of generation technology used, such as inverter-based or synchronous generation, and the specific feeder to which the generation is connected. Accurate feeder-level information is critical, as all subsequent capacity calculations depend on the reliability of this data.

2. Evaluate Feeder Limiting Factors.

Identify and understand the applicable generation limits for each feeder. Many utilities, including Wellington North Power Inc. (WNP) apply standards similar to those used by Hydro One, which generally consider four limiting factors.

a) Thermal Feeder.

Thermal feeder limits restrict the amount of generation based on feeder current ratings, typically either 200 amperes or 400 amperes depending on the feeder voltage class.

b) Thermal Station.

Thermal station limits restrict total generation connected at a station, generally limiting generation to sixty percent of the transformer MVA nameplate rating, plus the minimum load at the station.

c) Small Generation and Micro-generation Penetration Limit.

Small generation or micro-generation penetration limits apply to installations rated at ten kilowatts or less and restrict aggregate micro-generation on a feeder to no more than seven percent of feeder peak load for F-class feeders or no more than ten percent for M-class feeders.

d) Short-circuit Limit.

Short-circuit limits require that the connection of new generation not cause fault levels to exceed either station equipment ratings or the limits specified in the Transmission System Code.

3. Existing Feeder Utilization.

Calculate the existing utilization on each feeder. Using the generation inventory, assess current conditions against each applicable limit, including total connected generation for thermal feeder considerations, total station-connected generation for thermal station considerations, total micro-generation penetration expressed as a percentage of feeder peak load, and the contribution of connected generation to short-circuit levels. Each feeder must be evaluated against all applicable constraints.

4. Calculate Remaining Feeder Capacity.

Determine the remaining feeder capacity. For each limiting category, remaining capacity is calculated as the applicable limit minus the existing connected generation. The smallest remaining value across all applicable constraints represents the available feeder capacity from the local distribution company perspective.

5. Upstream Constraints.

Confirm upstream transmission constraints. The calculated available feeder capacity must be compared with any limits provided by the upstream transmission provider. The governing available capacity is always the lower of the local distribution company feeder or station limit and the upstream transmission limit.
