



DER Hosting Capacity Calculation Methodology

This document describes North Bay Hydro Distribution Limited (NBHDL)'s approach to calculating available hosting capacity for Distributed Energy Resources (DERs) on its distribution system. The methodology is provided to meet the transparency requirements introduced under Section 4.4.2 of the Distribution System Code (DSC) and the DER Connection Procedures (DERCP), Version 3.

The intent of this methodology is to explain, at a high level, how available DER hosting capacity is determined for feeders and stations across the distribution system. Hosting capacity values are intended to support *preliminary screening only* and do not replace the need for a formal Connection Impact Assessment (CIA), nor do they represent a guarantee of connection approval.

This methodology applies to both inverter-based and non-inverter-based DERs and is applicable to exporting and non-exporting generation facilities of all sizes subject to the DERCP. The published hosting capacity reflects distribution system limitations owned by NBHDL only and may be further limited by upstream system constraints.

Generation Inventory

NBHDL maintains a comprehensive and regularly updated inventory of all DERs connected to its distribution system. This inventory forms the foundation for all hosting capacity calculations. At a minimum, the inventory records each DER's nameplate rating, generation technology (such as inverter-based or synchronous), exporting or non-exporting status, and the specific feeder and station to which it is connected.

The accuracy and completeness of this feeder- and station-level data are critical, as all subsequent hosting capacity determinations depend on the integrity of this information.

System Constraints Considered

DER hosting capacity is determined by evaluating multiple system constraints. The available hosting capacity for any feeder or station is defined by the most restrictive condition among those constraints, ensuring that system equipment ratings, operating requirements, and safety margins are respected.

Minimum Load Considerations

Reverse power flow into distribution stations is not permitted due to a combination of transformer design limitations, station protection schemes, and upstream transmission interface requirements. As a result, DER output under minimum load conditions must not exceed local system load.

This constraint is assessed at both the feeder bus level and the station transformer level. Under minimum load conditions, DER generation combined with existing connected generation must remain less than or equal to the minimum recorded system load to prevent backfeed toward the transmission system.

Available hosting capacity under this criterion is calculated as the difference between the minimum system load and the total existing connected DER generation. In practice, this minimum load condition is frequently the governing factor for DER hosting capacity rather than thermal equipment ratings.

$$\text{Available Capacity} = \text{Minimum System Load} - \text{Existing Connected DER Generation}$$

Short-Circuit Capacity Considerations

DERs contribute fault current to the electrical system during fault conditions. The total short-circuit current at a station must remain within the interrupting and withstand ratings of station equipment.

Short-circuit contribution assumptions are applied consistently and are based on standard industry practices.

- Inverter-based DERs are assumed to contribute fault current equal to 1.2 times their full-load current
- Rotating-machine DERs are assumed to contribute up to six times their full-load current.

Available short circuit capacity (SCC) is determined by subtracting existing short-circuit current and DER short circuit current contributions from the applicable equipment short-circuit current ratings. Where the addition of DER would cause short-circuit limits to be exceeded, hosting capacity is restricted accordingly.

Available Short Circuit Capacity (SCC) = Equipment Rating – Existing Station Short Circuit Capacity (SCC) – DER Short-Circuit (SC) Contribution

Determination of Available Hosting Capacity

For each feeder and associated station, NBHDL assesses existing DER utilization against all applicable constraints, including minimum load limits, short-circuit capacity limits, and thermal ratings. The available hosting capacity is determined by calculating the remaining margin under each constraint.

The lowest remaining available capacity across all evaluated constraints represents the final DER hosting capacity from the distribution system perspective.

Upstream System Constraints

In cases where feeders or stations are supplied by upstream facilities not owned by NBHDL, additional constraints may be imposed by the upstream system owner, such as the transmitter.

In all circumstances, the governing hosting capacity is the lower of the distribution system-calculated capacity and any upstream system limits. Hosting capacity published by NBHDL will never exceed limits established by upstream facilities.

Limitations of Hosting Capacity Values

Published hosting capacity values represent screening-level estimates based on system conditions at the time of calculation. Hosting capacity may change over time due to new DER connections, system upgrades, load growth, or changes in operating conditions.

Final determination of connection feasibility is established through the DER connection process in accordance with the DSC and DERCP, including completion of a Connection Impact Assessment where required.

Review and Maintenance

NBHDL reviews DER hosting capacity information regularly to ensure it reflects current system conditions. Supporting calculation methodologies and assumptions are retained internally and may be provided to the Ontario Energy Board upon request.

This methodology is published to meet transparency requirements only and does not constitute an offer to connect.