

RI DG Design QuickGuide

Purpose:

This Distributed Generation (DG) Design QuickGuide has been developed to highlight some of the key elements of DG system design that are most often missed by contractors, who submit DG interconnection applications to National Grid in Rhode Island. This document is not a complete list of all requirements for all DG designs, and it is not meant to replace the interconnection standards in any way. Instead, it is intended to be used only after the designer has become familiar with the appropriate interconnection standards! By following the advice in this document, contractors will help facilitate a quicker, more concise screening and/or study process for the applications they submit.

Note: Please refer to [National Grid's DG website](#) and the [References](#) section at the end of this document for a list of relevant interconnection standards for Rhode Island.

General Tips:

- Ensure all major pieces of electrical equipment are visible (and clearly labeled) on the one-line diagram, the site plan, and the three-line diagram (if applicable). This includes, but is certainly not limited to:
 - Generators/Inverters (proposed and existing)
 - Note the manufacturer & model number(s)
 - Note the operating phase/voltage/power (AC) ratings
 - AC Utility Disconnect Switch (located outside, always accessible)
 - Any Service Equipment (and ratings) on the property, such as:
 - Service/Distribution Panels
 - Switchgears
 - Service Transformers (customer- or utility-owned)
 - Any other breakers (including main breakers), fuses, disconnects, etc.
 - Note any trip rating(s) and/or operating rating(s)
 - Meters (customer- and utility-owned) on the property
 - Note any meter numbers (if possible)
 - Conduits, wiring, junction boxes, etc.
- Note on the site plan *and* electrical diagram(s) which pieces of equipment are located inside and outside. Also, it is useful to note which pieces of equipment (if any) are “grouped and adjacent” to avoid ambiguity.
- Ensure that the project location is clearly defined (e.g. the address is noted, property lines or road names are visible, and the cardinal orientation is correct on the site plan).
- Supply the manufacturer’s technical specifications (a.k.a. “cut-sheets” or “data sheets”) for all generators/inverters, customer-owned transformers, grounding and protection equipment.

For Line-side Taps:

- Ensure that the DG disconnecting means is listed as “Service Equipment” and labeled as such on the electrical diagram(s).
- The DG disconnecting means and all other Service Disconnects (e.g. main breakers) on/in/at the building are “grouped and adjacent” (and this is evident on the design diagrams).
 - If all of the Service Disconnects on/in/at the building cannot be “grouped and adjacent” additional labeling requirements will be identified during the screening review, and a written variance by the local AHJ will be required.

For Stand-Alone DG systems:

- It is helpful to identify the existing utility pole (or pad-mounted transformer) number (e.g. “P-123 on Apple Rd”) nearest to the proposed point of interconnection (if possible).

For any projects >60kW:

- A dedicated phone line will need to be installed at the utility meter to which the DG system is interconnected. This should be noted on the electrical diagram(s). Refer to the [National Grid Phone Line Installation Guide](#) for the most up-to-date requirements.

For any project $\geq 500\text{kW}$ (and/or non-UL-1741 certified DG systems):

- It is important to identify a specific generator/inverter model and operating settings prior to the start of the impact study. *Note: Replacing or modifying the generator/inverter after the impact study begins may require certain parts of the impact study to be re-evaluated, which may add to the cost of the study and/or delay the completion deadline.*
- The nameplate ratings, configurations, and grounding characteristics of the service transformer must be noted or displayed on the electrical diagram(s).
- A customer-owned protective relay scheme (external to the generator/inverter) will be required. The configuration of any protective relays connected to the DG system should be displayed on the electrical design diagrams. *Note: Detailed manufacturer’s specifications and operating settings must be supplied.* Refer to the [ESB 750](#) and [ESB 756](#) documents for additional guidance.
 - At a minimum, the following protective relays will be required:
 - Active Under Voltage (27)
 - Voltage Controlled Over Current (51C) - *Configured to trip an interrupting device on high-side of the Customer’s interface transformer.*
 - Over Voltage (59)
 - Over Frequency (81O)
 - Under Frequency (81U)
 - Additional protective relay requirements (such as “Zero Sequence Over Voltage (59N)” or Anti-Islanding protections) may be identified during the screening/study phase of the application review.
- A Witness Test will be required. Refer to the [National Grid Witness Test Procedure Guidelines](#) for more details.

References:

- A. **R.I.P.U.C. 2078**: Narragansett Electric Company Standards for Connecting Distributed Generation
https://www.nationalgridus.com/non_html/StdsCmctDG2078_11-30-11.pdf
- B. **ESB 750**: Specifications for Electrical Installations
http://www.nationalgridus.com/niagaramohawk/non_html/constr_esb750.pdf
- C. **ESB 756 Appendix D for Rhode Island**: Requirements for Parallel Generation
http://www.nationalgridus.com/non_html/shared_constr_esb756.pdf
- D. National Grid Phone Line Installation Guide
http://www.nationalgridus.com/non_html/Expedited%20Standard%20Interconnection/Phone%20Line%20Installation.pdf
- E. National Grid Witness Test Procedure Guideline
http://www.nationalgridus.com/non_html/Expedited%20Standard%20Interconnection/NGrid%20Witness%20Test%20Guidelines%20Feb%202012.pdf