

WAC 480-108-020 Eligibility and technical requirements for Tier 1, Tier 2, and Tier 3 interconnection. (1) Applicability.

(a) **Tier 1.** Interconnection of a generating facility will use Tier 1 processes and technical requirements if the proposed generating facility meets all of the following criteria:

- (i) Uses inverter-based interconnection equipment;
- (ii) Is single phase;
- (iii) Has a nameplate capacity of 25 kW or less;
- (iv) Is proposed for interconnection at secondary voltages (600 V class);
- (v) Requires no construction or upgrades to electrical company facilities, other than meter changes;
- (vi) The aggregated generating capacity on the service wire does not exceed the service wire capability;
- (vii) The aggregated generating capacity on the transformer secondary does not exceed the nameplate of the transformer;
- (viii) If proposed to be interconnected on a center tap neutral of a 240 volt service, its addition shall not create an imbalance between the two sides of the 240 volt service of more than 5 kVA; and
- (ix) The aggregated nameplate capacity of all generating facilities on any line section does not exceed fifteen percent of the line section annual peak load as most recently measured or calculated for that line section, or fifteen percent of the circuit annual peak load as most recently measured or calculated for the circuit. For the purposes of this subsection:

(A) "All generating facilities" means all interconnected generating facilities, the proposed generating facility, and all other proposed generating facilities already in the queue defined in WAC 480-108-030(7); and

(B) "Line section" means that portion of an electric system connected to the generating facility and bounded by sectionalizing devices or the end of the distribution line.

(b) **Tier 2.** Interconnection of a generating facility will use Tier 2 processes and technical requirements if the proposed generating facility meets all of the following criteria:

- (i) It does not qualify for Tier 1 interconnection applicability requirements;
- (ii) Has a nameplate capacity of 500 kW or less;
- (iii) Is proposed for interconnection to an electric system distribution facility operated at or below 38 kV class;
- (iv) Is not a synchronous generator;
- (v) If it is proposed to be interconnected on a shared secondary, the aggregate generating capacity on the shared secondary, including the proposed generating facility, must not exceed the lesser of the service wire capability or the nameplate of the transformer;
- (vi) The aggregated nameplate capacity of all generating facilities on any line section does not exceed fifteen percent of the line section annual peak load as most recently measured or calculated for that line section, or fifteen percent of the circuit annual peak load as most recently measured or calculated for the circuit. For the purposes of this subsection:

(A) "All generating facilities" means all interconnected generating facilities, the proposed generating facility, and other proposed generating facilities already in the queue defined in WAC 480-108-030(7); and

(B) "Line section" means that portion of an electric system connected to the generating facility and bounded by sectionalizing devices or the end of the distribution line;

(vii) Any upgrades required to the electric system must fall within the requirements in subsection (2)(b)(ii) of this section;

(viii) For interconnection of a proposed generating facility to the load side of spot network protectors, the proposed generating facility must utilize an inverter. The aggregate nameplate capacity of all inverter-based systems must not exceed the smaller of five percent of a spot network's maximum load or 50 kW;

(ix) The aggregated nameplate capacity of existing and proposed generating facilities must not contribute more than ten percent to the distribution circuit's maximum fault current at the point on the primary voltage distribution line nearest the point of interconnection; and

(x) The generating facility's point of interconnection must not be on a circuit where the available short circuit current, with or without the proposed generating facility, exceeds 87.5 percent of the interrupting capability of the electrical company's protective devices and equipment (including substation breakers, fuse cutouts, and line reclosers).

(c) **Tier 3.** Interconnection of a generating facility will use Tier 3 processes and technical requirements if the proposed generating facility does not qualify for Tier 1 or Tier 2.

(2) **Technical requirements.**

(a) **Tier 1.**

(i) The purpose of the protection required for Tier 1 generating facilities is to prevent islanding and to ensure that inverter output is disconnected when the electric system is deenergized.

(ii) An interrupting device must be provided which is capable of safely interrupting the maximum available fault current (typically the maximum fault current is that supplied by the electrical company).

(iii) The generating facility must operate within the voltage and power factor ranges specified by the electrical company and as allowed by Underwriters Laboratories standard (UL) 1741.

(iv) **Disconnect switch.** Unless the Washington state department of labor and industries requires a visible, lockable AC disconnect switch, an electrical company shall not require a visible, lockable AC disconnect switch for interconnection customers installing and operating an inverter-based UL 1741 certified system interconnected through a self-contained socket-based meter of 320 amps or less.

(b) **Tier 2.**

(i) In all cases, the interconnection facilities must isolate the generating facility from the electric system as specified by IEEE 1547, and the interconnection agreement. The interconnection customer shall prevent its generating facility equipment from automatically re-energizing the electric system as specified by IEEE 1547, and the interconnection agreement. For inverter-based systems, the interconnecting facility must comply with IEEE 1547, UL 1741 and the interconnection agreement set forth by the electric utility. For noninverter based systems a separate protection package will be required to meet IEEE 1547 and the interconnection agreement set forth by the electric utility.

(ii) If the generating facility fails to meet the characteristics for Tier 2 applicability, but the electrical company determines that the generating facility could be interconnected safely if minor modifications to the transmission or distribution system were made (for

example, changing meters, fuses, or relay settings), then the electrical company may offer the interconnection customer a good-faith, non-binding estimate of the costs of such proposed minor modifications. If the interconnection customer authorizes the electrical company to proceed with the minor modifications and agrees to pay the entire cost of the modifications, then the electrical company may approve the application using Tier 2 processes and technical requirements.

(iii) For proposed generating facilities 50 kW and greater, three-phase connection may be required by the electric company.

(iv) For three-phase induction generator interconnections, the electrical company may, in its sole discretion, specify that ground fault protection must be provided. Use of ground overvoltage or ground overcurrent elements may be specified, depending on whether the electrical company uses three-wire or effectively grounded four-wire systems.

(v) If the generating facility is single-phase and interconnected on a center tap neutral of a 240 volt service, it must not create an imbalance between the two sides of the 240 volt service of more than 5 kW.

(vi) If the generating facility is proposed for interconnection at primary (greater than 600 V class) distribution voltages, the connection of the transformer(s) used to connect the generating facility to the electric system must be the electrical company's standard connection. This is intended to limit the potential for creating overvoltages on the electric system for a loss of ground during the operating time of functions designed to prevent islanding.

(vii) For primary-voltage connections to three-phase, three-wire systems, the transformer primary windings must be connected phase to phase.

(viii) For primary-voltage connections to three-phase, four-wire systems, the transformer primary windings may be connected phase to neutral.

(ix) **Disconnect switch.**

(A) Except as provided in (b) (i) (B), (C), and (D) of this subsection, the generating facility must include a visible, lockable AC disconnect switch. The electrical company shall have the right to disconnect the generating facility at a UL listed disconnect switch to meet electrical company operating safety requirements.

(B) An electrical company may waive the visible, lockable disconnect switch requirement for an inverter-based system.

(C) To maintain electrical company operating and personnel safety in the absence of an external disconnect switch, the interconnection customer shall agree that the electrical company has the right to disconnect electric service through other means if the generating facility must be physically disconnected for any reason, without liability to the electrical company. These actions to disconnect the generating facility (due to an emergency or maintenance or other condition on the electric system) will result in loss of electrical service to the customer's facility or residence for the duration of time that work is actively in progress. The duration of outage may be longer than it would otherwise have been with an AC disconnect switch.

(D) In the absence of an external disconnect switch, the interconnection customer is required to operate and maintain the inverter in accordance with the manufacturer's guidelines, and retain documentation of commissioning. In the absence of such documentation the electric company may, with five days' notice and at the interconnection customer's expense, test or cause to be tested the inverter to

ensure its continued operation and protection capability. The person that tests the inverter shall provide documentation of the results to both the electrical company and the interconnection customer. Should the inverter fail the test, the electric company may disconnect the generating facility, and require the interconnection customer to repair or replace the inverter. The cost of any such repair or replacement required by the electric company shall be the sole responsibility of the interconnection customer.

(c) **Tier 3.**

(i) In all cases, the interconnection facilities must isolate the generating facility from the electric system as specified by IEEE 1547, and the interconnection agreement. The interconnection customer shall prevent its generating facility equipment from automatically re-energizing the electric system as specified by IEEE 1547, and the interconnection agreement. For inverter-based systems, the interconnecting facility must comply with IEEE 1547, UL 1741 and the interconnection agreement set forth by the electric utility. For noninverter based systems a separate protection package will be required to meet IEEE 1547 and the interconnection agreement set forth by the electric utility.

(ii) The system must be designed to prevent a single point of failure from causing a loss of protective functions. This can be achieved by installing multiple discrete-function relays providing the required functions as a set, or by installing redundant multifunction devices, each of which provides all of the required functions.

(iii) Ground fault protection must be provided, unless waived by the utility in writing. Use of ground overvoltage or ground overcurrent elements may be specified, depending on whether the utility uses three-wire or effectively grounded four-wire systems.

(iv) Breaker failure detection must be provided, and secondary action initiated in the event that the interconnection breaker fails to clear for the trip condition, consistent with utility practice. This may require installation of dual generator breakers tripped by similar interconnection relays, or a main and backup relay with the same functions and zones of protection, one of which trips the generator breaker and one which trips the main incoming breaker.

(v) **System impact studies.** The electrical company may require a feasibility, system impact, facilities, or other study as described in WAC 480-108-030 (10)(c). These studies are intended to quantify the impacts of the generating facility on the electric system, and may include an analysis of power flow, stability, metering, relay/protection, and communications/telemetry. Acceptance of the results of these studies by the interconnection customer is a condition of approval of the application because the studies provide the basis for the detailed technical requirements for interconnection.

[Statutory Authority: RCW 80.01.040 and 80.04.160. WSR 13-15-089 (Docket UE-112133, General Order R-571), § 480-108-020, filed 7/18/13, effective 8/18/13; WSR 07-20-059 (Docket UE-060649, General Order 545), § 480-108-020, filed 9/27/07, effective 10/28/07; WSR 06-07-017 (Docket No. UE-051106, General Order No. R-528), § 480-108-020, filed 3/6/06, effective 4/6/06.]