

City of Camden, South Carolina

Standard for Interconnecting Small Generation with Electric Power (Interconnection Standard)

1. **Overview:**

This Standard contains the requirements, in addition to applicable rates and service regulations, for parallel interconnection of non-utility owned single phase small generation systems which are rated at 20 kW or less for residential customers and 1000 kW or less for nonresidential customers.

1.1 **Scope:**

The Standard applies only to "Small" generators installed at existing radial fed Electric Power System ("EPS") distribution customer sites, with a determination of minimal impact.

1.2 **Purpose:**

This document was developed to provide a uniform simplified standard for interconnecting certain small generators in the City of Camden.

1.3 **Limitations:**

The interconnection of generators is subject to applicable City approved rates, operating policy, and service regulations in addition to compliance with this Standard.

1.4 **Conflicts:**

In case of conflict between any provision of a rate and of this Standard, the provisions of the rate shall prevail.

2. **References:**

IEEE 929 – (Recommended Practice for Utility Interface of Photovoltaic (PV) Systems, latest published edition)

IEEE 1547 – (Standard for Interconnecting Distributed Resources with Electric Power Systems, latest published edition)

IEEE P1547.1 – (Draft: Standard Conformance Test Procedures for Interconnecting Distributed Energy Resources with Electric Power Systems)

IEEE P1547.2 – (Draft: Application Guide for IEEE Standard 1547, Interconnecting Distributed Resources with Electric Power Systems)

IEEE P1547.3 – (Draft: Guide for Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems)

UL 1741 – (Inverters, Converters and Controllers for use in Independent Power Systems, latest published edition)

NFPA 70 – (National Electric Code, latest published edition)

City of Camden – approved rates including, but not limited to, rate schedules, riders, service regulations and operating policy.

3. **Definitions:**

- 3.1 **Department:** The City of Camden is the electric utility owning and operating the EPS.
- 3.2 **EPS:** Electric Power System: The electric facilities of the City.
- 3.3 **Closed Transition of Loads:** A make-before-break load transfer scheme, in which the Generator is operated in parallel with the EPS for a brief period of time, to ensure that the load is maintained while in transition from the City to the Generator or vice versa. This transition scheme includes fast transfer systems, generally less than 100 msec, and soft load systems where the parallel condition is maintained for a number of seconds.
- 3.4 **Customer:** The electric Customer of record for the location where the generation will be interconnected.
- 3.5 **Generator:** The distributed "generation system" and equipment to be interconnected to the EPS.
- 3.6 **Isolation Device:** A manual load-break disconnect switch or safety switch with a clear visible indication of switch position between the EPS and the Generator. The switch must have pad lock provisions for locking in the open position. The switch must be visible to, and accessible to City personnel. The switch must be in close proximity, and visible from, the Customer's point of electrical interconnection with the City's EPS. The switch must be labeled "Generator Disconnect Switch". The switch may isolate the Generator system and its associated load from the EPS or disconnect only the Generator from the EPS. The City shall have access to the Isolation Device at all times.
- 3.7 **Momentary Parallel Systems:** A Generator utilizing only a Closed Transition mode of operation.
- 3.8 **Point of Common Coupling:** "Point of common coupling" means the point in the interconnection of a customer-generator facility with an electric delivery system and shall have the same meaning as in IEEE Standard 1547.

3.9 **Impact Screen:** An internal process used by the City to determine the effects the generator will have on the City's EPS.

4. **General Requirements:**

4.1 **Service Regulations and Tariff/Rate Schedule:** This Standard for Interconnecting Small Generation with EPS is governed by the City's General operating policy and Electric Rate Schedules.

4.2 **Acceptance for Interconnection:** Each application and Generator is evaluated individually and accepted or denied for interconnection with the City's EPS. The Customer is solely responsible for ensuring the safe installation and operation of the Generator. Generators shall not be interconnected until the requirements and process described in this Standard have been satisfied.

The acceptance for interconnection is for the original applicant only. Subsequent owners or occupants of a site with an interconnected generator must submit a new Application to the City. The existing customer assumes the responsibility of ensuring a new customer is aware the new customer must re-apply and obtain the City's written acceptance or the equipment must be removed or disabled to prevent future interconnection and/or operation.

4.3 **Waiving Requirements:** All requirements of this Standard must be met although the City may, in its sole discretion, waive all or some of the requirements of this Standard. Waivers must be issued in writing.

4.4 **Interconnect Cost:** The Customer will bear all the cost of interconnection on the Customer's side of the point of interconnection as well as necessary changes or upgrades to the EPS to meet all technical and protection requirements to address any power quality, reliability or safety issues caused by the Generator operation or connection to the EPS.

4.5 **Isolating or Disconnecting the Generator:** The City may isolate the Customer's premises and/or Generator from the City's EPS when necessary in order to construct, install, repair, replace, remove, investigate, or inspect any of the City's equipment or part of the City's system; or if the City determines that isolation of the Customer's premises and/or Generator from the City's EPS is necessary because of emergencies, forced outages, force majeure or compliance with prudent electrical practices. Whenever feasible, the City shall give the Customer reasonable notice of the isolation of the Customer's premises and/or generator from the City's EPS. Notwithstanding any other provision of this Standard, if at any time the City determines that either the Generator may endanger the City's personnel or other persons or property, or the continued operation of the Customer's Generator may endanger the integrity or safety of the City's electric system, the City shall have the right to isolate the Customer's premises and/or Generator from the City's EPS without notice.

The City may disconnect the EPS electric service to any Generator determined to be malfunctioning, or not in compliance with this Standard. The Customer must provide proof of compliance with this Standard before the electrical service will be reconnected.

- 4.6 **Limitation of Liability:** Each party's liability to the other party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission hereunder, shall be limited to the amount of direct damage actually incurred. In no event shall either party be liable to the other party for any indirect, special, incidental, consequential, or punitive damages of any kind.
- 4.7 **Indemnification:** The Customer shall at all times indemnify, defend and save the City its officers and employees harmless from any and all liability, damages, losses, claims, including claims and actions relating to injury or death of any person or damage to property, including property of the City, demand suits, recoveries, costs and expenses, court costs, attorney's fees, and all other obligations by or to third parties, arising out of or resulting from the Customer's action or inaction or the Customer's obligations hereunder, in any manner directly or indirectly connected with, growing out of the operation of the Customer's Generator, except in cases of gross negligence or intentional wrongdoing by City.
- 4.8 **Access to and Operation of the Generator:** The Customer shall limit access to and operation of the Generator to qualified persons and assumes the responsibility of maintaining control of the operation of the Generator.
- 4.9 **Insurance:** The Customer shall obtain and retain, for as long as its Generator is interconnected with the City's system, liability insurance which protects the Customer from claims for bodily injury and/or property damage. For a non-residential Customer the minimum coverage shall be comprehensive general liability insurance with coverage at least \$500,000 per occurrence and for a residential Customer the minimum coverage shall be at a standard homeowner's insurance policy with liability coverage in the amount of at least \$300,000 per occurrence. The insurance shall be primary for all purposes. The Customer shall provide certificates evidencing this coverage as required by the City. Automatic notification to City must be established for both annual renewals and if appropriate any termination of such insurance. The City reserves the right to refuse to establish, or continue the interconnection of the Customer's Generator with the City's system, if such insurance is not in effect. The City shall have the right to immediately terminate this Agreement, immediately terminate the interconnection and require the Customer to permanently disconnect the Customer's Generator from the EPS.
- 4.10 **Generator Alterations:** Changes to the Generator output capacity and/or modification to the protection system required to meet this Standard are prohibited without submitting a new "Application to Interconnect Small Generator" and obtaining a new acceptance from the City.

4.11 **Discontinuing Operation:** The Customer shall notify the City prior to permanently discontinuing operation of the Generator interconnected with the City.

4.12 **Interconnection Application Fee:** The nonrefundable interconnection application fee covers only the application process for interconnection of Generators and shall be:

4.12.1 For residential service customers: \$100.00

4.12.2 For nonresidential service customers: \$200.00

4.13 **Termination Fee:** A nonrefundable termination fee will be applied in the event that the Customer terminates this agreement as follows in addition to any costs incurred by the City:

4.13.1 For residential service customers: \$100.00

4.13.2 For nonresidential service customers: \$200.00

5. **Generator, Inverter and Protective Equipment Technical Requirements:**

5.1 **General:** The City may elect to visit the site and verify compliance with any requirement of these Standards. The Generator must be single phase only for both residential customers and non-residential customers. Three phase Generators are not covered by this Standard.

5.2 **Required Standards:** The Customer must certify the following requirements:

5.2.1 The installation of the Generator and all equipment in the system must comply with the latest published edition of IEEE 929 and IEEE 1547 as applicable.

5.2.2 Future IEEE Standards and/or Recommended Practices: IEEE P1547.1, P1547.2 and P1547.3 are still proposed draft documents and still in working groups at the time of writing this Standard. After these standards are published interconnected generators may be required to comply with these IEEE standards.

5.2.3 The Customer's inverter or interconnection protection system must be tested and listed for compliance with the latest published edition of Underwriters Laboratories, Inc. (UL) 1741.

5.2.4 The Generator must pass the anti-islanding test UL 1741.

5.2.5 The Customer's inverter or interconnection protection system must be manufactured after November 7, 2000.

5.2.6 Any protection settings affecting anti-islanding performance must not be adjusted after passing anti-islanding tests.

5.3 **Additional PV (Photovoltaic) System Requirements:** The Customer must certify that the Generator meets the following requirements:

5.3.1 The installation of the Generator and all equipment in the system comply with the latest published edition of IEEE 929.

5.3.2 The Generator is a non-islanding type as defined in IEEE 929.

5.4 **Electrical Contractors and NEC Code Inspection:** All installed wiring, protection devices, cabinets and connectors, etc. must comply with the latest published edition of the National Electric Code ("NEC") as used by the local jurisdiction and all applicable local codes. An approved electrical inspection by the authority having jurisdiction is required.

5.5 **Isolation Device:** An isolation device as defined in Section 3.6 is required. The City in its sole discretion determines if the device is suitable.

6. **Screens and Requirements for Determination of Minimal Impact:**

6.1 **Limitations of EPS Facilities:**

6.1.1 General: The Generator shall meet each of the following requirements to qualify for interconnection and must continue to meet each requirement after commissioning.

6.1.2 EPS Capacity Limitation: The maximum rated output of the Generator or total aggregate of multiple Generators shall not exceed the capacity or ratings of the EPS facilities as determined by the City.

6.1.3 Secondary, Service and Service Entrance Limitation: The Generator capacity shall be less than the capacity of the EPS secondary, service and service entrance cable connected to the Point of Common Coupling. The City will make this determination after reviewing the EPS installed facilities.

6.1.4 Transformer Loading Limitation: The Generator shall not have the ability to overload the EPS transformer or any EPS transformer winding beyond manufacturer or nameplate ratings.

6.1.5 Integration with EPS Grounding: The ground scheme of the Generator shall comply with IEEE 1547.

6.1.6 Balance Limitation: The generator shall not create a voltage imbalance of more than 3% if the EPS transformer, when the secondary connected to the Point of Common Coupling is a three-phase transformer.

6.1.7 Any changes or upgrades to EPS to accommodate the Generator will be pursuant to Section 4.4 above.

7. **Commissioning, Maintenance and Inspections:**

7.1 **General:** The Customer or Customer's authorized representative shall perform commissioning, and maintenance as outlined in this section for all Generator equipment. All testing shall be documented and the City shall be granted the right to audit the documentation. The City reserves the right to require and witness testing of the Customer's Generator.

The Customer's Generator is subject to inspection by a City representative at a mutually agreeable time, as the City deems necessary. The City's inspection and/or witnessing the testing of the Customer's equipment shall not be construed as the City warranting or implying that the Customer's equipment is safe or reliable. The City shall not be liable to the Customer or others as a result of inspection and witnessing of tests of the Customer's Generator or equipment.

7.2 **Commissioning:** The manufacturer's recommended and required commissioning, installation and functional tests shall be completed, with successful results, in accordance with the manufacturer's published recommendations. Commissioning tests in IEEE 1547 shall also be completed with successful results unless these IEEE 1547 tests are duplications of the manufacturer tests. After obtaining the final electrical inspection, the Customer shall invite the City to the commissioning test and perform the test at a mutually agreed date.

7.3 **Maintenance and Testing:** Maintenance shall be performed in accordance with the manufacturer's published maintenance procedures. Periodic testing shall be completed with successful results in accordance with the manufacturer's published recommendations for periodic testing at, or before, the recommended testing intervals. If the manufacturer does not publish recommendations for periodic testing, suitable testing shall be performed that assures proper protection for the EPS, at an interval not to exceed two years. All test results shall be documented and available to the City for review up request.

7.4 **Failure of Test:** If a Generator fails any test, it shall be disabled and the Isolation Device must be opened and locked until the equipment is repaired.

8. **Procedures:**

8.1 **Interconnection Request:** The Customer submits to the City an "Application to Interconnect Small Generation" accompanied with the appropriate Interconnection Application Fee to a designated City contact or department.

- 8.2 **Impact Screens:** The City accepts or rejects the application for interconnection after reviewing the application and performing the screens outlined in this Standard. If the application is rejected, the Customer may request the City to reconsider interconnection outside the scope of this Standard. If the application is accepted the process will continue.
- 8.3 **Agreement for Interconnection:** After the previous items in the process are complete, the City will provide an agreement to the Customer. Once the Customer returns the executed Agreement to the City, the City will execute the Agreement and return a copy to the Customer. Customer shall not interconnect the generator to the City's EPS Facilities unless an Agreement between Customer and the City has been executed by both parties.
- 8.4 **Installation and Inspections:** The Customer installs the Generator and the Customer is responsible for obtaining an approved electrical inspection from the local authority having jurisdiction for the Generator installation. The Customer shall request the inspector to forward a copy of the approved inspection to the City contact processing the Generator interconnect request.
- 8.5 **EPS Facilities:** At the Customer's expense the City will install or alter the EPS facilities as necessary to accommodate the interconnection.
- 8.6 **Commissioning Test:** The Customer performs the required commissioning test and forwards a confirmation letter to the City. The Customer shall invite the City to the commissioning test and perform the test at a mutually agreed date and time if the City elects to attend.
- 8.7 **Completion of Application/Expiration Process:** The application for interconnection shall be valid for one year once the Impact Screen process is completed.

Application to Interconnect Small Generation

Customer hereby gives notice of intent to operate an interconnected generating facility pursuant to the "Standard for Interconnecting Small Generation with Electric Power Systems (Interconnection Standard)", Permission to interconnect is not granted until an Interconnection Agreement has been completed between the City and the Customer and that all requirements and obligations of the Interconnection Agreement have been met. This Application shall be valid for one (1) year from date of signing by the Customer.

Section 1 – Contact Information

Customer (Name): _____

Contact Name: _____

US Mail Address: _____ City: _____

State: _____ Zip Code: _____ E-Mail Address: _____

Daytime Phone Number: _____ Alternate Phone/Cell Number: _____

Installer (Name): _____

Contact Name: _____ Date: _____

US Mail Address: _____ City: _____

State: _____ Zip Code: _____ Phone Number: _____

Department: _____

Electrical/Contractor License Number(s): _____

Electrical Inspector (Name): _____

County: _____ Phone Number: _____

Section 2 – Generator and Facility Information:

Facility Location: _____

Account Number: _____

Customer Type: Residential Commercial Other: _____

Is there an existing interconnect generator at this facility? Yes No

Total proposed aggregate generation output rating at this site (kW): _____

Generator and Inverter Information

Energy Source/Type _____

Manufacturer Name _____

Model Name & # (Specific) _____

Nameplate Rating (kW AC) _____

Nominal Voltage (Volts AC) _____

If a customer owned transformer will be used, specify Mfg, type and ratings:

(Attach Transformer Manufacturer Specifications)

Section 3. Installation Information

Proposed Installation Date: _____ Proposed Interconnection Date: _____

Section 4. Certification

The interconnection protection system is tested and listed for compliance with the latest published edition of Underwriters Laboratories (UL) 1741 including the anti-islanding test. The system (is/will) be installed in compliance with IEEE 929 and or IEEE 1547 as applicable, all manufacturer specifications, the National Electric Code and all local codes. No protection settings affecting anti-islanding have been or will be adjusted or modified.

I hereby certify that, to the best of my knowledge, all of the information provided in this Application is true and correct and the generator will comply with the Interconnection Standard stated above.

Signature of Customer: _____ Date: _____

Note: Attach application fee and 1-line (electrical drawing of installation) with application.

Submit Application to: (Utility Representative): _____

City (Electric Utility Use Only): Note: Only signifies receipt of this form.

This application received by: The City of Camden, South Carolina

Signed (Utility Representative): _____ Date: _____