

Berkeley Electric Cooperative, Inc.
Standard for Interconnecting Distributed Resources Up To 500 KVA
with the Cooperative's Electric Systems (CES)

1. Overview:

This Standard sets forth the requirements, in addition to applicable tariffs and service regulations, for parallel interconnection of Member owned small generation systems and energy storage technologies (collectively sometimes hereinafter referred to as “Distributed Resources”) which are rated up to 500 KVA.

Distributed Resources meeting the criteria and conditions included and/or referenced herein will normally be approved for interconnection except in extenuating site specific circumstances.

1.1 Scope:

This Standard applies to Distributed Resources to be interconnected with existing radial fed CES distribution with a determination of minimal impact.

1.2 Purpose:

This document is developed to provide a simplified Standard for interconnecting Distributed Resources of up to 500 KVA capacity.

1.3 Limitations:

This Standard does not cover momentary parallel systems used for the exclusive purpose of closed transition of loads. The Standard does not cover small Distributed Resources connecting to area network systems. The Standard does not cover Members served directly from area transmission facilities.

Although outside the scope of this document, Distributed Resources failing to meet the requirements of this Standard may still be considered for interconnection after more detailed review specific to the proposed application and Distributed Resource.

1.4 Conflicts:

In case of conflict between any provision of the Cooperative's service regulations and of this Standard, the provisions of the service regulations 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, June 12, 2003 or latest published edition).

IEEE P1547.1 – (Standard Conformance Test Procedures for Interconnecting Distributed Energy Resources with Electric Power Systems June 9, 2005 or latest approved edition)

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 Electrical Code, latest published edition).

3. **Definitions:**

- 3.1 **CES:** Cooperative's Electric System: The electric distribution facilities of the Cooperative.
- 3.2 **Cooperative:** The electric utility providing electric service in the area and owning and operating the CES.
- 3.3 **Closed Transition of Loads:** A make-before-break load transfer scheme, in which the Distributed Resource is operated in parallel with the CES for a brief period of time, to ensure that the load is maintained while in transition from the Cooperative to the Distributed Resource 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 **Member:** The person(s) or business that is the Cooperative's Member of record for the location where the generation will be interconnected. (This term includes non-members receiving electric service from the Cooperative that submit an Application under this Standard.)
- 3.5 **Distributed Resource:** The "generation system" or "energy storage system" and associated equipment to be interconnected to the CES.
- 3.6 **Isolation Device:** A manual load-break disconnect switch or safety switch with a clear visible indication of switch position between the CES and the Distributed Resource. The switch must have pad lock provisions for locking in the open position. The switch must be visible to, and accessible to Cooperative personnel. The switch must be in close proximity, and visible from, the Member's point of common coupling with the CES. The switch must be labeled "Generator Disconnect Switch" or "Energy Storage Disconnect Switch". The switch may isolate the

Distributed Resource system and its associated load from the CES or disconnect only the Distributed Resource from the CES.

The Cooperative shall have access to the Isolation Device at all times.

- 3.7 **Momentary Parallel Systems:** A Distributed Resource 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 Distributed Resource with an electric delivery system and shall have the same meaning as in IEEE Standard 1547.

4. General Requirements:

- 4.1 **Service Regulations and Tariff/Rate Schedule:** This Standard is governed by the Cooperative's Service Regulations and Tariff/Rate Schedules.
- 4.2 **Acceptance for Interconnection:** Each application and Distributed Resource is evaluated individually and accepted or denied for interconnection with the CES. Any Cooperative evaluation is from the perspective of the impact of the interconnection on the Cooperative and its system. The Member is solely responsible for ensuring the safe installation and operation of the Distributed Resource. Distributed Resource 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 Distributed Resource must submit a new Application to the Cooperative. The existing Member assumes the responsibility of ensuring a new Member is aware the new Member must re-apply and obtain the Cooperative's written acceptance or the equipment must be removed or disabled to prevent future interconnection and/or operation. The application fee for the re-applying new Member is waived and the technical requirements may be grandfathered for subsequent owners as long as the Distributed Resource's maximum output capacity has not been changed and/or the interconnection protection system has not been modified.

- 4.3 **Waiving Requirements:** All requirements of this Standard must be met although the Cooperative 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 Member will bear all the cost of interconnection on the Member's side of the point of interconnection as well as necessary changes or upgrades to the CES to meet all technical and protection requirements to address any power quality, reliability or safety issues caused by the Distributed Resource operation or connection to the CES.
- 4.5 **Isolating or Disconnecting the Distributed Resource:** The Cooperative may isolate the Member's premises and/or Distributed Resource from CES when

necessary in order to construct, install, repair, replace, remove, investigate, or inspect any of Cooperative's equipment or part of Cooperative's system; or if Cooperative determines that isolation of the Member's premises and/or Distributed Resource from CES is necessary because of emergencies, forced outages, force majeure or compliance with prudent electrical practices. Whenever feasible, the Cooperative shall give the Member reasonable notice of the isolation of the Member's premises and/or Distributed Resource from CES. Notwithstanding any other provision of this Standard, if at any time the Cooperative determines that either the Distributed Resource may endanger the Cooperative's personnel or other persons or property, or the continued operation of the Member's Distributed Resource may endanger the integrity or safety of the Cooperative's electric system, the Cooperative shall have the right to isolate the Member's premises and/or Distributed Resource from the CES.

The Cooperative may disconnect electric service for any Distributed Resource determined to be malfunctioning, or not in compliance with this Standard. The Member 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 parties shall at all times indemnify, defend and save the other party harmless from any and all damages, losses, claims, including claims and actions relating to injury or death of any person or damage to property, 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 other party's action or inaction of its obligations hereunder on behalf of the indemnifying party, except in cases of gross negligence or intentional wrongdoing by the indemnified party.
- 4.8 **Access to and Operation of the Distributed Resource:** The Member shall limit access to and operation of the Distributed Resource to qualified persons and assumes the responsibility of maintaining control of the operation of the Distributed Resource.
- 4.9 **Insurance:** The Member shall obtain and retain, for as long as its Distributed Resource is interconnected with the Cooperative's system, liability insurance which protects the Member from claims for bodily injury and/or property damage. For a non-residential Member the minimum coverage shall be comprehensive general liability insurance with coverage at least \$1,000,000 per occurrence and for a residential Member the minimum coverage shall be at a standard homeowner's insurance policy with liability coverage in the amount of at least \$100,000 per occurrence. This insurance shall be primary for all purposes. The Member shall

provide certificates evidencing this coverage as required by the Cooperative. The Cooperative reserves the right to refuse to establish, or continue the interconnection of the Member's Distributed Resource with the Cooperative's system, if such insurance is not in effect. The member is required to provide proof of insurance to the Cooperative annually or at the time of renewal.

- 4.10 **Distributed Resource Alterations:** Changes to the Distributed Resource output capacity and/or modification to the protection system required to meet this Standard are prohibited without submitting a new Application and obtaining a new acceptance from the Cooperative.
- 4.11 **Discontinuing Operation:** The Member shall notify the Cooperative prior to permanently discontinuing operation of the Distributed Resource interconnected with the Cooperative.
- 4.12 **Interconnection Application Fee:** The nonrefundable interconnection application fee covers only the application process for interconnection of Distributed Resource and shall be one of the following:
 - 4.12.1. For residential service Members: \$150.00
 - 4.12.2. For non-residential service Members: \$250.00
 - 4.12.3. For non-members interconnecting to the CES: \$500.00

5. Distributed Resource, Inverter and Protective Equipment Technical Requirements:

- 5.1 **General:** The Cooperative may elect to visit the site and verify compliance with any requirement of these Standards. The Member shall contact the Cooperative to coordinate installation to CES facilities.
- 5.2 **Required Standards:** The Member must certify that the following requirements have been met:
 - 5.2.1. The installation of the Distributed Resource 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: Distributed Resource interconnected before IEEE standards are published may be required to comply with such standards when adopted.
 - 5.2.3. The Member'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 Distributed Resource must pass the anti-islanding test in UL 1741.

5.2.5. The Member'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) Systems requirements:** The Member must certify that the Distributed Resource meets the following requirements:

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

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

5.4 **Electrical Contractors and NEC Code Inspections:** All installed wiring, protection devices, cabinets and connectors, etc. must comply with the latest published edition of the 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 Cooperative in its sole discretion determines if the device is suitable.

6. Screens and Requirements for determination of minimal impact:

6.1 **CES Circuit Level Saturation:** The cumulative total of the maximum rated output of all interconnected Distributed Resources shall not exceed the limits as may be determined by the Cooperative.

6.2 **Limitations of CES Facilities:**

6.2.1. General: The Distributed Resource shall meet each of the following requirements to qualify for interconnection and each requirement must be maintained after commissioning.

6.2.2. CES Capacity Limitation: The maximum rated output of the Distributed Resource or total aggregate of multiple Distributed Resources shall not exceed the capacity or ratings of the CES facilities as determined by the Cooperative.

6.2.3. Secondary, Service and Service Entrance Limitation: The Distributed Resource capacity shall be less than the capacity of the CES owned secondary, service and service entrance cable connected to the point of common coupling. The Cooperative will make this determination after reviewing the CES installed facilities.

- 6.2.4. Transformer Loading Limitation: The Distributed Resource shall not have the ability to overload the CES transformer or any CES transformer winding beyond manufacturer or nameplate ratings.
- 6.2.5. Integration with CES Grounding: The grounding scheme of the Distributed Resource shall comply with IEEE 1547.
- 6.2.6. Balance Limitation: The Distributed Resource shall not create a voltage imbalance of more than 3% if the CES transformer, with the secondary connected to the point of common coupling, is a three-phase transformer.
- 6.2.7. Any changes or upgrades to CES to accommodate the Distributed Resource will be pursuant to Section 4.4 above.

7. Commissioning, Maintenance and Inspections:

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

The Member's Distributed Resource is subject to inspection by a Cooperative representative at a mutually agreeable time, as the Cooperative deems necessary.

The Cooperative's inspection and/or witnessing the testing of the Member's equipment shall not be construed as the Cooperative warranting or implying that the Member's equipment is safe or reliable. The Cooperative shall not be liable to the Member or others as a result of inspection and witnessing of tests of the Member's Distributed Resource 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 Member shall invite the Cooperative to the commissioning test and perform the test at a mutually agreed date. Once the Cooperative tests the Distributed Resource installation and it is successful, the Distributed Resource will be deemed Cooperative approved and interconnected to CES Facilities. **The Member shall not interconnect the Distributed Resource to CES Facilities permanently until it has been approved by the Cooperative.**
- 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 CES, at an interval not to exceed two years. All test results shall be documented and available to the Cooperative for review upon request.

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

8. Procedures

- 8.1 **Interconnection Request:** The Member submits to the Cooperative an “Application to Interconnect Distributed Resource” accompanied with the appropriate Interconnection Application Fee to a designated Cooperative contact or department.
- 8.2 **Queue Position:** The Cooperative considers the Application based on the date a completed Application is received by the Cooperative in reference to priority when evaluating the CES screen limits.
- 8.3 **Impact Screens:** The Cooperative 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 Member may request the Cooperative to reconsider interconnection outside the scope of this Standard. If the application is accepted the process will continue.

It may be necessary to visit the site to gather information on the CES facilities or the Member’s Distributed Resource equipment.

Upon receipt of a completed “Application to Interconnect Distributed Resource”, the Cooperative will commence the Impact Screen process. The Cooperative may provide the Member with an estimate of the number of weeks needed to complete the Impact Screen process.

- 8.4 **Agreement for Interconnection:** After all previous items in the process are complete, the Cooperative will provide an agreement to the Member. Once the Member returns the executed Agreement to the Cooperative, the Cooperative will execute the Agreement and return a copy to the Member. Member shall not interconnect the Distributed Resource to CES Facilities unless an Agreement between Member and Cooperative has been executed by both parties.
- 8.5 **Installation and Inspections:** The Member installs the Distributed Resource and the Member is responsible for obtaining an approved electrical inspection from the local authority having jurisdiction for the Distributed Resource installation. **The Member shall insure that the inspector forwards a copy of the approved inspection to the Cooperative contact who is processing the Distributed Resource interconnect request.** The Cooperative reserves the right to refuse the interconnection to the CES without the approved inspection report.
- 8.6 **CES Facilities:** At the Member’s expense, the Cooperative will install or alter the CES facilities as necessary to accommodate the interconnection.

- 8.7 **Commissioning Test:** The Member performs the required manufacturer's commissioning test and forwards a confirmation letter to the Cooperative unless the Cooperative witnesses the test and it is successful. The Member shall invite the Cooperative to the commissioning test and perform the test at a mutually agreed date and time if the Cooperative elects to attend. The Cooperative schedules and performs an interconnection commissioning test after the Member receives the approved electrical inspection from the local authority.
- 8.8 **Completion of Application/Expiration Process:** The application shall be valid for no less than one year once the Impact Screen process is completed.