

## **Procedures for Interconnecting a Certified Inverter-Based Small Generating Facility No Larger than 10 kW ("10 kW Inverter Process")**

Butler Rural Electric Cooperative, Inc has adopted a uniform procedure to process requests for interconnecting small, inverter-based generating facilities no larger than 10 kW. The procedure was developed by the Federal Energy Regulatory Commission (FERC) as a way of streamlining the process of Member interconnections and includes these documents:

- This description of the procedures involved in the interconnection process;
- The Application for interconnecting the generator;
- The Terms and Conditions of the interconnection;
- The Certificate of Completion

The process contains the following steps:

- 1.0 The Interconnection Member ("Member") completes the Interconnection Request ("Application") and submits it to Butler Rural Electric Cooperative, Inc. ("Cooperative").
- 2.0 The Cooperative acknowledges to the Member receipt of the Application within three Business Days of receipt.
- 3.0 The Cooperative evaluates the Application for completeness and notifies the Member within ten Business Days of receipt that the Application is or is not complete and, if not, advises what material is missing.
- 4.0 The Cooperative verifies that the Small Generating Facility can be interconnected safely and reliably using the screens contained in the Fast Track Process in the Small Generator Interconnection Procedures (SGIP), reprinted below. The Cooperative has 15 Business Days to complete this process. Unless the Cooperative determines and demonstrates that the Small Generating Facility cannot be interconnected safely and reliably, the Cooperative approves the Application and returns it to the Member. Note to Member: Please check with the Cooperative before submitting the Application if disconnection equipment is required.
  - 4.0.1 Screens
    - 4.0.1.1 The proposed Small Generating Facility's Point of Interconnection must be on a portion of the Cooperative's Distribution System that is subject to the Tariff.
    - 4.0.1.2 For interconnection of a proposed Small Generating Facility to a radial distribution circuit, the aggregated generation, including the proposed Small Generating Facility, on the circuit shall not exceed 15 % of the line section annual peak load as most recently measured at the substation. A line section is that portion of a Cooperative's electric system connected to a Member bounded by automatic sectionalizing devices or the end of the distribution line.

- 4.0.1.3 For interconnection of a proposed Small Generating Facility to the load side of spot network protectors, the proposed Small Generating Facility must utilize an inverter-based equipment package and, together with the aggregated other inverter-based generation, shall not exceed the smaller of 5 % of a spot network's maximum load or 50 kW<sup>1</sup>.
- 4.0.1.4 The proposed Small Generating Facility, in aggregation with other generation on the distribution circuit, shall not contribute more than 10 % to the distribution circuit's maximum fault current at the point on the high voltage (primary) level nearest the proposed point of change of ownership.
- 4.0.1.5 The proposed Small Generating Facility, in aggregate with other generation on the distribution circuit, shall not cause any distribution protective devices and equipment (including, but not limited to, substation breakers, fuse cutouts, and line reclosers), or Interconnection Member equipment on the system to exceed 87.5 % of the short circuit interrupting capability; nor shall the interconnection be proposed for a circuit that already exceeds 87.5 % of the short circuit interrupting capability.
- 4.0.1.6 Using the table below, determine the type of interconnection to a primary distribution line. This screen includes a review of the type of electrical service provided to the Interconnecting Member, including line configuration and the transformer connection to limit the potential for creating over-voltages on the Cooperative's electric power system due to a loss of ground during the operating time of any anti-islanding function.

<b>Primary Distribution Line Type</b>	<b>Type of Interconnection to Primary Distribution Line</b>	<b>Result/Criteria</b>
Three-phase, three wire	3-phase or single phase, phase-to-phase	Pass screen
Three-phase, four wire	Effectively-grounded 3 phase or Single-phase, line-to-neutral	Pass screen

- 4.0.1.7 If the proposed Small Generating Facility is to be interconnected on single-phase shared secondary, the aggregate generation capacity on the shared secondary, including the proposed Small Generating Facility, shall not exceed 20 kW.

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<sup>1</sup> A spot Network is a type of distribution system found within modern commercial buildings to provide high reliability of service to a single Member. (Standard Handbook for Electrical Engineers, 11<sup>th</sup> edition, Donald Fink, McGraw Hill Book Cooperative)

- 4.0.1.8 If the proposed Small Generating Facility is single-phase and is 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 20 % of the nameplate rating of the service transformer.
  - 4.0.1.9 The Small Generating Facility, in aggregate with other generation interconnected to the transmission side of a substation transformer feeding the circuit where the Small Generating Facility proposes to interconnect shall not exceed 10 MW in an area where there are known, or posted, transient stability limitations to generating units located in the general electrical vicinity (e.g., three or four transmission busses from the point of interconnection).
  - 4.0.1.10 No construction of facilities by the Cooperative on its own system shall be required to accommodate the Small Generating Facility.
- 5.0 After installation, the Member returns the Certificate of Completion to the Cooperative. Prior to parallel operation, the Cooperative may inspect the Small Generating Facility for compliance with standards which may include a witness test, and may schedule appropriate metering replacement, if necessary.
- 6.0 The Cooperative notifies the Member in writing that interconnection of the Small Generating Facility is authorized. If the witness test is not satisfactory, the Cooperative has the right to disconnect the Small Generating Facility. The Member has no right to operate in parallel until a witness test has been performed, or previously waived on the Application. The Cooperative is obligated to complete this witness test within ten Business Days of the receipt of the Certificate of Completion. If the Cooperative does not inspect within ten Business Days or by mutual agreement of the Parties, the witness test is deemed waived.
- 7.0 Contact Information – The Member must provide the contact information for the legal applicant (i.e., the Interconnection Member). If another entity is responsible for interfacing with the Cooperative, that contact information must be provided on the Application.
- 8.0 Ownership Information – Enter the legal names of the owner(s) of the Small Generating Facility. Include the percentage ownership (if any) by any utility or public utility holding Cooperative, or by any entity owned by either.
- 9.0 UL1741 Listed – This standard ("Inverters, Converters, and Controllers for Use in Independent Power Systems") addresses the electrical interconnection design of various forms of generating equipment. Many manufacturers submit their equipment to a Nationally Recognized Testing Laboratory (NRTL) that verifies compliance with UL1741. This "listing" is then marked on the equipment and supporting documentation.

# Application for Interconnecting a Certified Inverter-Based Small Generating Facility No Larger than 10kW

This Application is considered complete when it provides all applicable and correct information required below. Additional information to evaluate the Application may be required.

## Processing Fee

A non-refundable processing fee of \$300 must accompany this Application.

## Interconnection Member

Name: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

## Contact (if different from Interconnection Member)

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

Owner of the facility (include % ownership by any electric utility): \_\_\_\_\_

## Small Generating Facility Information

Location (if different from above): \_\_\_\_\_

Electric Service Cooperative: \_\_\_\_\_

Account Number: \_\_\_\_\_

Inverter Manufacturer: \_\_\_\_\_ Model: \_\_\_\_\_

Nameplate Rating: \_\_\_\_\_ (kW) \_\_\_\_\_ (kVA) \_\_\_\_\_ (AC Volts)  Single Phase  Three Phase

System Design Capacity: \_\_\_\_\_ (kW) \_\_\_\_\_ (kVA)

Prime Mover:  Photovoltaic  Reciprocating Engine  Fuel Cell  Turbine  Other \_\_\_\_\_

Energy Source:  Solar  Wind  Hydro  Diesel  Natural Gas  Fuel Oil

Other (describe) \_\_\_\_\_

Is the equipment UL1741 Listed?  Yes  No

If Yes, attach manufacturer's cut-sheet showing UL1741 listing

Estimated Installation Date: \_\_\_\_\_ Estimated In-Service Date: \_\_\_\_\_

The 10 kW Inverter Process is available only for inverter-based Small Generating Facilities no larger than 10 kW that meet the codes, standards, and certification requirements of Attachments 3 and 4 of the FERC Small Generator Interconnection Procedures (SGIP), or the Cooperative has reviewed the design or tested the proposed Small Generating Facility and is satisfied that it is safe to operate.

List components of the Small Generating Facility equipment package that are currently certified:

Equipment Type	Certifying Entity
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

**Interconnection Member Signature**

I hereby certify that, to the best of my knowledge, the information provided in this Application is true. I agree to abide by the Terms and Conditions for Interconnecting an Inverter-Based Small Generating Facility No Larger than 10kW and return the Certificate of Completion when the Small Generating Facility has been installed.

Signed: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

(For Cooperative use only)

**Contingent Approval to Interconnect the Small Generating Facility**

Interconnection of the Small Generating Facility is approved contingent upon the Terms and Conditions for Interconnecting an Inverter-Based Small Generating Facility No Larger than 10kW and return of the Certificate of Completion.

Cooperative Signature: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

Application ID number: \_\_\_\_\_

Cooperative waives inspection/witness test?  Yes  No

## **Terms and Conditions for Interconnecting an Inverter-Based Small Generating Facility No Larger than 10kW**

### **1.0 Construction of the Facility**

The Interconnection Member (the "Member") may proceed to construct (including operational testing not to exceed two hours) the Small Generating Facility when Butler Rural Electric Cooperative, Inc. (the "Cooperative") approves the Interconnection Request (the "Application") and returns it to the Member.

### **2.0 Interconnection and Operation**

The Member may operate Small Generating Facility and interconnect with the Cooperative's electric system once all of the following have occurred:

2.1 Upon completing construction, the Member will cause the Small Generating Facility to be inspected or otherwise certified by the appropriate local electrical wiring inspector with jurisdiction, and

2.2 The Member returns the Certificate of Completion to the Cooperative, and

2.3 The Cooperative has either:

2.3.1 Completed its inspection of the Small Generating Facility to ensure that all equipment has been appropriately installed and that all electrical connections have been made in accordance with applicable codes. All inspections must be conducted by the Cooperative, at its own expense, within ten Business Days after receipt of the Certificate of Completion and shall take place at a time agreeable to the Parties. The Cooperative shall provide a written statement that the Small Generating Facility has passed inspection or shall notify the Member of what steps it must take to pass inspection as soon as practicable after the inspection takes place; or

2.3.2 If the Cooperative does not schedule an inspection of the Small Generating Facility within ten business days after receiving the Certificate of Completion, the witness test is deemed waived (unless the Parties agree otherwise); or

2.3.3 The Cooperative waives the right to inspect the Small Generating Facility.

2.4 The Cooperative has the right to disconnect the Small Generating Facility in the event of improper installation or failure to return the Certificate of Completion.

2.5 Revenue quality metering equipment must be installed and tested in accordance with applicable ANSI standards.

### **3.0 Safe Operations and Maintenance**

The Member shall be fully responsible to operate, maintain, and repair the Small Generating Facility as required to ensure that it complies at all times with the interconnection standards to which it has been certified.

### **4.0 Access**

The Cooperative shall have access to the disconnect switch (if the disconnect switch is required) and metering equipment of the Small Generating Facility at all times. The Cooperative shall provide reasonable notice to the Member when possible prior to using its right of access.

## 5.0 **Disconnection**

The Cooperative may temporarily disconnect the Small Generating Facility upon the following conditions:

- 5.1 For scheduled outages upon reasonable notice.
- 5.2 For unscheduled outages or emergency conditions.
- 5.3 If the Small Generating Facility does not operate in the manner consistent with these Terms and Conditions.
- 5.4 The Cooperative shall inform the Member in advance of any scheduled disconnection, or as is reasonable after an unscheduled disconnection.

## 6.0 **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 to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the other Party's action or inactions of its obligations under this agreement on behalf of the indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the indemnified Party.

## 7.0 **Insurance**

The Parties agree to follow all applicable insurance requirements imposed by the state in which the Point of Interconnection is located. All insurance policies must be maintained with insurers authorized to do business in that state.

## 8.0 **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 in its performance of this Agreement, 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, incidental, special, consequential, or punitive damages of any kind whatsoever, except as allowed under paragraph 6.0.

## 9.0 **Termination**

The agreement to operate in parallel may be terminated under the following conditions:

### 9.1 **By the Member**

By providing written notice to the Cooperative.

### 9.2 **By the Cooperative**

If the Small Generating Facility fails to operate for any consecutive 12 month period or the Member fails to remedy a violation of these Terms and Conditions.

### 9.3 **Permanent Disconnection**

In the event this Agreement is terminated, the Cooperative shall have the right to disconnect its facilities or direct the Member to disconnect its Small Generating Facility.

### 9.4 **Survival Rights**

This Agreement shall continue in effect after termination to the extent necessary to allow or require either Party to fulfill rights or obligations that arose under the Agreement.

## 10.0 **Assignment/Transfer of Ownership of the Facility**

This Agreement shall survive the transfer of ownership of the Small Generating Facility to a new owner when the new owner agrees in writing to comply with the terms of this Agreement and so notifies the Cooperative.

## Small Generating Facility Certificate of Completion

Is the Small Generating Facility owner-installed?  Yes  No

Interconnection Member: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Address: \_\_\_\_\_

Location of the Small Generating Facility (if different from above):

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone: (Day) \_\_\_\_\_ (Evening) \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

### **Electrician:**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Telephone (Day): \_\_\_\_\_ (Evening): \_\_\_\_\_

Fax: \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

License number: \_\_\_\_\_

Date Approval to Install Facility granted by the Cooperative: \_\_\_\_\_

Application ID number: \_\_\_\_\_

### **Inspection:**

The Small Generating Facility has been installed and inspected in compliance with the local building/electrical code of \_\_\_\_\_

\_\_\_\_\_  
Signed (Local electrical wiring inspector,  
or attach signed electrical inspection)

\_\_\_\_\_  
Print Name

Date: \_\_\_\_\_

As a condition of interconnection, you are required to send/fax a copy of this form along with a copy of the signed electrical permit to (insert Cooperative information below):

Name: \_\_\_\_\_

Cooperative: \_\_\_\_\_

Address: \_\_\_\_\_

Fax: \_\_\_\_\_

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### **Approval to Energize the Small Generating Facility (For Cooperative use only)**

Energizing the Small Generating Facility is approved contingent upon the Terms and Conditions for Interconnecting an Inverter-Based Small Generating Facility No Larger than 10kW

Cooperative Signature: \_\_\_\_\_

Title: \_\_\_\_\_ Date: \_\_\_\_\_

**Additional Operating Requirements for the Transmission Provider's  
Transmission System and Affected Systems Needed to Support  
the Interconnection Customer's Needs**

**Voltage Regulation** – The Customer’s interconnected generation shall be designed to operate at the nominal voltage and frequency of the Cooperative’s electric system at the Point of Common Coupling (PCC). The Customer’s interconnected generation shall not attempt to regulate the voltage on the Cooperative’s electric system. The Customer’s generation shall control only power and power factor when interconnected. The Customer’s interconnected generation shall not cause the voltage on the Cooperative’s electric system to go outside the requirements of ANSI C84.1-1995 Range A.

**Grounding** – The Customer’s grounding method shall meet all applicable NEC (or NESC) requirements and shall be coordinated with the Cooperative’s grounding system so that the interconnection will not cause overvoltage that exceeds the rating of the Cooperative’s equipment and will not disrupt the coordination of the ground fault protection on the Cooperative’s electric system.

**Synchronization** – The Customer’s interconnected generation shall parallel with the Cooperative’s electric system without causing a voltage fluctuation of greater than +/- 5% of the prevailing voltage level at the point of common coupling and shall not cause objectionable flicker for other customers served by the Cooperative’s electric system.

**Inadvertent Energization** – The Customer’s interconnected generation shall not energize the Cooperative’s electrical system when the Cooperative’s electrical system is de-energized.

**Isolation Device** – To facilitate the establishment of safe work area clearances when required for maintenance or other service activities on the Cooperative side of the (PCC) the Cooperative shall provide at the Customer’s expense a lockable disconnect switch to provide visual isolation of the Customer’s interconnected generation from the Cooperative’s system. This disconnect switch should be located within 20 feet of the PCC. Where that is not practical the disconnect switch shall be located between the Customer’s interconnected generation and the PCC and a weather-proof map showing the location of the disconnect switch shall be permanently mounted adjacent to the PCC. The disconnect switch shall be accessible to Cooperative personnel at all times.

**System Protection** – The Customer’s interconnection facilities shall include relays to protect the Cooperative’s electric system from the Customer’s interconnected generation. At a minimum this protection shall include an Under/Over Voltage relay element (27/59) and an Under/Over Frequency relay element (81U/O). These relay elements shall trip either the generator breaker or the main service

breaker. Additional protective elements may be required for generation rated at greater than 100 kW or generation directly connected to the Cooperative's electrical system. All protective relays used for system protective functions shall be "utility grade" and must be manufactured in accordance with the applicable industry standards (i.e. ANSI, IEEE, etc.). The Customer is responsible for providing any additional relays necessary for the protection of the Customer's interconnected generation.

**Metering** – The Cooperative shall purchase, own, install and maintain metering to measure any excess energy produced by the interconnected generation. This may require the installation of an additional meter or the replacement/upgrade of an existing meter. The metering is to be located as near as practical to the PCC. The metering shall be revenue quality and shall be consistent with the Cooperative's metering standards for equivalent electrical services. For facilities rated at greater than 200 kW, telemetry may be required by the Cooperative to monitor in real time the output of the interconnected generation and other related parameters.

**Power Quality** – The Customer's interconnected generation shall operate at a power factor as near to unity (100%) as is practical and shall be within the range of 95% lagging to 95% leading as measured at the PCC under all interconnected conditions. The overall quality of the power provided by the Customer's interconnected generation including, but not limited to, the affects of harmonic distortion, voltage regulation, switching surges, voltage flicker and power factor shall meet the applicable requirements of industry standards (i.e. IEEE 519, IEEE 141, IEEE 1547, etc.) and be such that the Cooperative's electric system and other customers served by the Cooperative's electric system are not adversely affected by the Customer's interconnected generation.