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DISTRIBUTED GENERATION Manual

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GENERAL

In order to receive service from Tri-County Electric Cooperative, Inc (TCEC), a customer must join or become a Member of the cooperative. Throughout this manual, customers are referred to as “Members.” For more information about the cooperative membership application process, including any applicable membership fees or deposits, contact the Cooperative to request new member information.

It is the intent of TCEC to allow Members to install Distributed Generation (DG), provided the Member’s DG facility does not adversely affect TCEC. The Member is solely responsible for analyzing and determining the economic benefit of implementing a DG operation.

A DG facility that is not connected to TCEC’s distribution system in any way is known as a “stand-alone” or “isolated” DG facility. The Member may operate a DG facility in stand-alone or isolated fashion as long as such DG facility does not adversely affect TCEC’s system. A DG facility connected in any way to TCEC’s system shall be considered to be operating in “parallel.” For purposes of this Manual, a DG facility is considered operating in “parallel” anytime it is connected to TCEC’s system in any way, even if the Member does not intend to export power. All provisions of this Manual shall apply to parallel operations of DG facilities as so defined.

This Manual is not a complete description or listing of all laws, ordinances, rules and regulations, nor is this Manual intended to be an installation or safety manual. The Member requesting to interconnect a DG facility to TCEC’s system is responsible for and must follow, in addition to all provisions of this Manual, TCEC’s *Rules and Regulations and Tariffs for Electric Service*, TCEC’s *Line Extension Policy*, the *Policies and Procedures* of TCEC’s power supplier where applicable, the *Policies and Procedures* of TCEC’s transmission service provider where applicable, the current *IEEE 1547 Standard Guide for Distributed Generation Interconnection*, other applicable IEEE standards, applicable ANSI standards, including ANSI C84.1 Range A and any other applicable governmental and regulatory laws, rules, ordinances or requirements. These aforementioned tariffs, policies, and standards supersede any actual or perceived conflict with this manual. This manual replaces and supersedes any previous version of TCEC’s Distributed Generation Manual. All legal, technical, financial, etc. requirements in the following sections of this Manual must be met prior to interconnection of the DG facility to TCEC’s system.

A Member may serve all load behind the meter at the location serving the DG facility but cannot serve multiple meters, multiple consuming facilities or multiple Members with a single DG facility or under a single DG application without prior approval by TCEC.

I. DETERMINE THE CATEGORY OF DISTRIBUTED GENERATION FACILITY

1) Connection Level Category

- a) Connected to TCEC's system
The Member requests and/or the Member's DG facility requires connection to TCEC's system. All provisions of this Manual cover this category.

2) Power Export Category

- a) **Parallel – no power export**
The Member operates a DG facility connected **in any way** to TCEC's system but with no intention to export power.
- b) **Parallel – power generated to be both consumed and exported**
The Member operates a DG facility connected **in any way** to TCEC's system and that is designed primarily to serve the Member's own load but with the intention to export excess power.
- c) **Parallel – power generated to be exported only**
The Member operates a DG facility connected **in any way** to TCEC's system that is designed primarily with the intention to export power. Presently, TCEC is not accepting applications of this type.

3) Size Category

- a) All Facilities From 1 kilowatt (1 kW) to 50 kW alternating current (AC) of connected generation will be placed in this size category and be on an avoided-cost, buy-back rate per billing cycle.
- b) Calculation of Total DG output in kW AC

The kW AC, for the purposes of the application, is calculated using the maximum continuous rating for the inverter at 240 volts alternating current (240VAC). In addition, all inverters associated with storage are required to be added to the total to be considered correct.

II. MEMBER'S INITIAL REQUIREMENTS

1) Notification

- a) The Member must meet all TCEC's membership and service requirements in addition to the requirements in this Manual.

- b) Anyone owning or operating a DG facility in parallel with TCEC’s system is required to notify TCEC of the existence, location and category of the DG facility.

2) Service Request

- a) In advance of submitting a request for an interconnection, the Member must contact TCEC and complete the “Cooperative Agreement for Interconnection and Parallel Operation of Distributed Generation.”
- b) All DG facilities, regardless of kW AC must be pre-certified distributed generation (as defined under Chapter 25 of the Substantive rules or as determined by TCEC).
- c) A separate form must be completed and submitted for each facility.

3) Submit a DG Plan

- a) As part of the application, the Member shall submit a plan detailing the electrical design, interconnection requirements, size, and operational plans for the DG facility (the “DG plan”). Either at the time of submission or during the review process, TCEC may require additional information.
- b) At a minimum, the DG plan must contain an electrical one-line drawing and a facility drawing that shows the building, meter, disconnect and the nearest road as they physically relate to each other.
- c) In the case of DG facilities (i) to be operated in parallel with TCEC’s system, (ii) with no intention to export power to TCEC and (iii) that are of standard design and intended entirely as emergency or as a back-up power supply, TCEC may, at its sole discretion, waive the application fee.
- d) Prior to review of the application and DG plan by TCEC, the Member shall pay an application fee as indicated below. A separate fee must be submitted for each DG facility interconnected.

DG Size in kW AC (Connected Load)	Application Fee	Additional Engineering Fee
1-50	\$500	As Required

III. COOPERATIVE AND POWER SUPPLIER REVIEW PROCESS

1) Plan Review Process

- TCEC and its Power Supplier, if requested by TCEC, will review the application and accompanying documents, plans, specifications, and other information provided and will return an interconnection analysis to the Member within 60 days of receipt of final plans and specifications.
- Technical review will be consistent with guidelines established by the most recent *IEEE Standard 1547 Guide for Distributed Generation Interconnection*. The Member may be required by TCEC to provide proof that their DG facilities once constructed have been tested and certified by applicable IEEE guidelines.
- If the Member makes corrections or changes to the DG plan, specifications and other information, the 60-day period may be restarted to when such changes or corrections were provided to TCEC. Additionally, any changes to the site or project requiring new analysis by TCEC may require a new DG plan and incur additional cost.
- The Member acknowledges and agrees that any review or acceptance of such plans, specifications and other information by TCEC and/or its Power Supplier shall not impose any liability on TCEC and/or its Power Supplier and does not guarantee the adequacy of the Member's equipment or DG facility to perform its intended function. TCEC and its Power Supplier disclaim any expertise or special knowledge relating to the design or performance of distributed generating installations and does not warrant the efficiency, cost-effectiveness, safety, durability, or reliability of such DG installations.
- The Member will be responsible for paying TCEC and/or its Power Supplier in advance for all costs associated with any required modifications for the interconnection of the Member's DG facilities, should it become necessary either at the time of the initial interconnection or at some time in the future, for TCEC and/or its Power Supplier to:
 - Modify electric delivery systems to serve the Member's DG facilities;
 - purchase or continue to purchase the output of the Member's DG facilities; or
 - if the quality of the power provided by the Member's DG adversely affects the Cooperative's and/or its Power Supplier's delivery system.

IV. SALES TO AND PURCHASES FROM A DG FACILITY

1) For All Installations From 1 kW AC to 50 kW AC

- a)** Energy sales to Members with distributed generation shall be billed under one of TCEC's existing rate tariffs applicable to the Member as if there were no distributed generation installation.
- b)** TCEC will compensate Members for exported power based on its prescribed tariff, which may be updated from time to time. (See the tariff filing posted in the Member Information Center at tcectx.social/tariff.)
- c)** All exchanges of electric power and energy by TCEC to a Member shall be consistent with the applicable wholesale avoided cost rate schedule established by TCEC as if there were no DG installation at the Member's premises, including any charges in TCEC's DG tariff rider.
- d)** The Member shall not make any purchases that will cause it to be out of compliance with any applicable contracts or all-power contract requirements with its power supplier(s).
- e)** In addition to all other charges, TCEC may bill the Member for any additional facilities charges as determined by TCEC and appended to the Interconnection Agreement and as prescribed in TCEC's tariff.
- f)** The Member shall sign an approved contract for interconnection service with TCEC.

V. MEMBER'S RESPONSIBILITY PRIOR TO OPERATION

1) Line Extension and Modifications to Cooperative Facilities

- a) As a part of the interconnection analysis performed by TCEC, the Member will be provided with an estimate of any line extension or other cost to be incurred in providing electric delivery service to the Member's DG facility.
- b) Notwithstanding TCEC's line extension policy, the Member shall pay in advance the full cost of the construction of any transmission, substation, distribution, transformation, metering, protective, or other facilities or equipment which, at the sole discretion of TCEC and/or its Power Supplier, is required to serve the Member's DG facility.
- c) The Member will reimburse TCEC and/or its Power Supplier for all costs of modifications required for the interconnection of the Member's DG facilities if, at the time of initial interconnection or at any time in the future, it becomes necessary for the Cooperative and/or its Power Supplier to modify electric delivery systems in order to:
 - 1) Serve the Member's DG facilities,
 - 2) Purchase or continue purchasing the Member's output, and/or
 - 3) If the quality of power from the Member's DG adversely affects the Cooperative's and/or its Power Supplier's delivery system.
- d) The Member will bear the full cost of any changes to metering equipment, transformers, or other Member-owned equipment required to continue receiving service at the new primary voltage level if, at any time in the future, TCEC changes the primary voltage of the facilities serving the DG facility. In all cases, the Member shall pay the full cost of the installation of a visible load break disconnect switch by and to the sole specification of TCEC. The switch is required to be readily accessible to TCEC personnel and of a type that can be secured in an open position by a TCEC lock.

2) Applicable Regulations

The DG facility shall be installed and operated subject to and in accordance with the terms and conditions set forth in TCEC's rules, regulations, bylaws, rates and tariffs, as amended from time to time, and, if applicable, approved by the Cooperative's Board of Directors, which are incorporated herein by reference, and in compliance with all applicable federal, state and local laws, regulations, zoning codes, building codes, safety rules, environmental restrictions, ordinances and regulations, including without limitation, the most recent IEEE Standard 1547 Guide for Distributed Generation Interconnection, applicable ANSI standards, including ANSI C84.1 Range A, Electric Reliability Council of Texas (ERCOT) Independent System Operator (ISO) directives and ERCOT guidelines, and in accordance with industry standard prudent

engineering practices.

4) **Contracts**

a) Interconnection Contract

The Member will sign and deliver an Agreement for Interconnection to TCEC substantially in the form as shown in TCEC AGREEMENT FOR INTERCONNECTION AND PARALLEL OPERATION OF DISTRIBUTED GENERATION included in this Manual.

b) Power Credit Contract

1) All Buy-Back Systems from 1 kW AC to 50 kW AC: As outlined in TCEC's tariffs.

5) **Initial Interconnection**

a) The interconnection will be completed after the review process is completed and necessary agreements/contracts are executed. After completion of interconnection requirements and before the facility begins generating, the Member must provide pictures of the installation for scheduling a final inspection of the facilities. If the inspection fails the first time, there will be an inspection fee of \$100 for each inspection thereafter. Upon satisfactory final inspection, TCEC will provide Permission to Operate notice to the Member or their agent.

b) TCEC's review process and final inspection is intended to safeguard TCEC's facilities and personnel. The Member acknowledges and agrees that any review or acceptance of such plans, specifications and other information by TCEC and/or its Power Supplier shall not impose any liability on TCEC and/or its Power Supplier and does not guarantee the adequacy of the Member's equipment or DG facility to perform its intended function. TCEC and its Power Supplier disclaims any expertise or special knowledge relating to the design or performance of generating installations and does not warrant the efficiency, cost-effectiveness, safety, durability, or reliability of such DG installations.

VI. REFUSAL TO INTERCONNECT SERVICE OR DISCONNECTION OF INTERCONNECTION SERVICE

TCEC may, at its sole discretion, prevent the interconnection or disconnect the interconnection of DG facilities due to reasons such as safety concerns, reliability issues, power quality issues, breach of interconnection contract or any other reasonable issue. Any disconnection may be without prior notice.

VII. OPERATION OF PARALLEL FACILITY

The purpose of this section is to outline TCEC's operational requirements for DG facilities operated in parallel with TCEC's system and is not intended to be a complete listing of all operational, regulatory, safety and other requirements.

1) Ownership of Facilities

- a) The Member shall own and be solely responsible for all expenses, installation, maintenance and operation of all facilities, including all power generating facilities, at and beyond the point of delivery as defined in TCEC's tariffs.
- b) At its sole discretion, TCEC may locate cooperative-owned metering equipment and transformers past the point of delivery.

2) Self-Protection of DG Facilities

- a) The Member will furnish, install, operate and maintain in good order and repair all equipment necessary for the safe operation of DG facilities operated in parallel with TCEC system.
- b) The Member's equipment will have capability to both establish and maintain synchronism with TCEC's system and to automatically disconnect and isolate the DG facility from TCEC's system.
- c) The Member's DG facility will be designed, installed and maintained to be self-protected from normal and abnormal conditions on TCEC's system including, but not limited to, over-voltage, under-voltage, overcurrent, frequency deviation, and faults. Self-protection will be compatible with all applicable Cooperative protection arrangements and operating policies.
- d) Additional protective devices and/or functions may be required by TCEC when, in the sole judgment of TCEC, the particular DG facility installation and/or TCEC's system characteristics so warrant. At a Minimum, all DG installations intending to export must have a lockable disconnect located within six (6) feet of the Tri-County Electric Cooperative revenue meter.

3) Quality of Service

- a) The Member's DG facility will generate power at the nominal voltage of TCEC's system at the Member's delivery point as defined by ANSI C84.1 Range A.

- b) Member's DG installation will generate power at a frequency within the tolerances as defined by IEEE 1547.
- c) Member's DG facility shall produce power at a minimum power factor of at least 97% or shall use power factor correction capacitors to ensure at least a 97% power factor.
- d) Member's DG facility shall be in accordance with the power quality limits specified in IEEE 519.
- e) The overall quality of the power provided by the Member's DG facility including, but not limited to, the effects of harmonic distortion, voltage regulation, voltage flicker, switching surges and power factor, will be such that TCEC's system is not adversely affected in any manner.
- f) In the event that the adverse effects are caused in whole or in part by the Member's DG facility, the Member will correct the cause of such effects within 30 days and reimburse TCEC for any required correction or risk being disconnected from TCEC's system.

4) **Safety Disconnect**

- a) The Member shall install a visible load break disconnect switch at the Member's expense and to TCEC's specifications.
- b) The switch will be located so as to be readily accessible to TCEC personnel in a location no more than six (6) feet from the revenue meter.
- c) The switch shall be a type that can be secured in an open position by a lock owned by TCEC. If TCEC has locked the disconnect switch open, the Member shall not operate or close the disconnect switch.
- d) TCEC shall have the right to lock the switch open when, in the judgment of TCEC:
 - (1) It is necessary to maintain safe electrical operating and/or maintenance conditions,
 - (2) The Member's DG adversely affects TCEC's system, or
 - (3) There is a system emergency or other abnormal operating condition warranting disconnection.
- e) TCEC reserves the right to operate the disconnect switch for the protection of its system even if it affects the Member's DG facility. In the event TCEC opens and/or closes the disconnect switch:

(1) TCEC shall not be responsible for energization or restoration of parallel operation of the DG facility.

(2) TCEC will make reasonable efforts to notify the Member.

- f) The Member will not bypass the disconnect switch at any time for any reason.
- g) Signage shall be placed by the Member at the Member's expense and located at the disconnect indicating the purpose of the switch.
- h) Members with DG facilities as defined in this Manual which are solely for the purpose of emergency backup or peak shaving without intent to export power shall not operate their DG facilities at any time unless visibly disconnected from the TCEC system. At its sole discretion, TCEC may require Member to install at his/her own expense an interlocking switch for the purpose of ensuring the Member's facilities do not operate in parallel with its facilities.
- i) Should TCEC lose power serving the Member's DG facilities for any reason, Members with DG facilities shall not operate their DG facilities unless visibly disconnected from TCEC's system.
- j) Any system with storage or designed to operate as stand-by power must have an automatic disconnect.

5) Property Access

- a) Persons authorized by TCEC will have the right to enter the Member's property for purposes of testing, operating the disconnect switch, reading or testing the metering equipment, maintaining right-of-way or other DG facility equipment and/or Cooperative service requirement. Such entry onto the Member's property may be without notice.
- b) If the Member erects or maintains locked gates or other barriers, the Member will furnish TCEC with convenient means to circumvent the barrier for full access for the above-mentioned reasons.

6) Liability for Injury and Damages

- a) The Member assumes full responsibility for electric energy furnished at and past the point of interconnection and shall indemnify TCEC and/or its Power Supplier against and hold TCEC and/or its Power Supplier harmless from all claims for both injuries to persons, including death resulting there from, and damages to property occurring upon the premises owned or operated by Member arising from electric power and energy delivered by TCEC or in any way arising directly or indirectly from the Member's DG facility.

TCEC and/or its Power Supplier shall not be liable for either direct or consequential damages resulting from failures, interruptions, or voltage and waveform fluctuations occasioned by causes reasonably beyond the control of the TCEC and/or its Power Supplier including, but not limited to, acts of God or public enemy, sabotage and/or vandalism, accidents, fire, explosion, labor troubles, strikes, order of any court or judge granted in any bona fide adverse legal proceeding or action, or any order of any commission, tribunal or governmental authority having jurisdiction. ALL PROVISIONS NOTWITHSTANDING, IN NO EVENT SHALL THE COOPERATIVE BE LIABLE TO THE MEMBER FOR ANY INTEREST, LOSS OF ANTICIPATED REVENUE, EARNINGS, PROFITS, OR INCREASED EXPENSE OF OPERATIONS, LOSS BY REASON OF SHUTDOWN OR NON-OPERATION OF MEMBER'S PREMISES OR FACILITIES FOR ANY INDIRECT, INCIDENTAL, OR CONSEQUENTIAL, PUNITIVE OR EXEMPLARY DAMAGES ARISING OUT OF OR RELATED, IN WHOLE OR PART, TO THIS AGREEMENT. TCEC shall not be liable in any event for consequential damages.

- b) The Member is solely responsible for ensuring his/her facility complies with all applicable regulations including, but not limited to, laws, regulations, ordinances, TCEC and its Power Supplier tariffs, policies and directives, and ERCOT rules, policies and directives.

7) **Metering/Monitoring**

- a) TCEC shall specify, install and own all metering equipment.
- b) All Facilities from 1 kW AC to 50 kW AC
The facility will be administered using the following method as prescribed by TCEC.
 - (1) Installing a single meter which measures energy flow in both directions to determine the energy purchased and exported per billing cycle.
- c) The meter shall be read at times determined by TCEC's sole discretion for acquiring metering data. If requested by TCEC, the Member shall provide TCEC an approved communications link at the Member's cost. The type of communications link and metering equipment measuring purchase of power by TCEC shall be installed and specified at the sole discretion of TCEC.
- d) TCEC may, at its sole discretion, require the Member to pay TCEC in advance for metering and monitoring equipment and installation expense.
- e) Meter testing shall follow TCEC's standard policy on metering testing and accuracy.

- f) At its sole discretion, TCEC may meter the facility at the primary or secondary level.

8) Notice of Change in Installation

- a) The Member is required to notify TCEC in writing thirty (30) days in advance of making any change affecting the characteristics, performance, or protection of the DG facility.
- b) If any modification undertaken by the Member will create or has created conditions which may be unsafe or adversely affect TCEC's system, the Member shall immediately correct such conditions or be subject to immediate disconnection from the system.
- c) Any change in the operating characteristics of the DG facility including, but not limited to, size of generator, total facility capacity, nature of facility, fuel source, site change, hours of operation, or type used, may require a new application process, including, but not limited to, application form, application fee, DG plan and DG plan review by TCEC.

9) Testing and Record Keeping

- a) The Member shall test all aspects of the protection systems up to and including tripping of the generator and interconnection point at start-up and thereafter as required. Testing will verify all protective set points and relay/breaker trip timing and shall include procedures to functionally test all protective elements of the system. The Cooperative may witness the testing.
- b) The Member shall maintain records of all maintenance activities, which the TCEC may review at reasonable times.

10) Disconnection of Service

TCEC may, at its sole discretion, discontinue the interconnection of DG installations due to reasons such as safety concerns, reliability issues, power quality issues, breach of interconnection contract or any other reasonable issue.

11) Compliance with Laws, Rules and Tariffs

The DG installation owned and installed by the Member shall be installed and operated subject to and in accordance with the terms and conditions set forth in the Cooperative's rules, regulations, bylaws, rates and tariffs, as amended from time to time, and, if applicable, approved by TCEC's Board of Directors, which are incorporated herein by reference, and in compliance with all applicable federal, state and local laws, regulations, zoning codes, building codes, safety rules, environmental

restrictions, ordinances and regulations, including without limitation, Electric Reliability Council of Texas (ERCOT) Independent System Operator (ISO) directives and ERCOT guidelines, and in accordance with industry standard prudent engineering practices.

12) Payment of Fees

Solar contractors may make payments by check payable to Tri-County Electric Cooperative and delivered or mailed to the return address on the invoice. Payments may be made by electronic check or credit card using the online payment portal at <https://tcectexas.smarthub.coop/ui/#/paynow>. The assigned account number and contractor name on the invoice must be entered for online payments.

Members performing their own solar installation may make payments by check payable to Tri-County Electric Cooperative and delivered or mailed to the return address on the invoice. Payments may be made by electronic check or credit card using the online payment portal at <https://tcectexas.smarthub.coop/ui/#/paynow>. The assigned account number and member's last name on the invoice must be entered for online payments. Please note, the invoice account number is not the same as the member's electric account number.

13) Submission

All applications for distributed generation are to be submitted through the TCEC web portal found at the following address:

<https://submit.tcectexas.com/Forms/DistGenApp>

Any other submission method used may result in a longer approval time without warranty on the time required to process the application.

There will be a \$100 charge added to the application fee after two failed submittal attempts (per address). It is recommended to review the Manual and use the checklist provided at the end of this Manual to submit a complete application.

14) Rejection of Applications

Applications may be rejected for the following reasons:

- a) A notice from the installer.
- b) Failure to remit payment within 30 days of notice.
- c) Failure to respond to TCEC requests for information within 30 days of the request.