



DISTRIBUTED GENERATION GUIDELINES MANUAL

MAY - 2023

Approval and Version History

Navarro County Electric Cooperative, Inc. (NCEC) developed and implemented the policies, procedures, and requirements contained in the NCEC Distributed Generation Guidelines Manual (DG Guidelines Manual) in order for NCEC Members to install, interconnect, and operate in parallel, approved Distributed Generation systems (DG Systems).

Below are the approvals and version history of the NCEC DG Guidelines Manual:

Version	Effective Date	Approval By	Approval Signature
2023.1	5/18/23	Ron Buckley President NCEC Board of Directors	



DISTRIBUTED GENERATION GUIDELINES MANUAL

INTRODUCTION

Introduction

Distributed Generation (DG) technologies continue to develop and have reached a level of cost-effectiveness that has led an increasing number of energy consumers to consider the installation of DG systems, especially renewable DG systems. Navarro County Electric Cooperative, Inc. (NCEC) has developed the policies, procedures and requirements contained in this Guidelines Manual to ensure DG installations in the NCEC service area **meet procedural, technical, and operational requirements for the safe interconnection and parallel operation of these systems on the NCEC electric distribution system.**

This Distributed Generation Guidelines Manual (DG Guidelines Manual) is intended to provide NCEC's members with accurate procedural, technical and policy information that will assist and guide members through the interconnection process and support informed decisions at every stage or phase of this process.

The DG Guidelines Manual is organized in the following manner:

Section	Purpose
1. Overview - Q&A	Answer questions that members will likely ask / need to know prior to starting on a DG project.
2. Definitions	Define the main terms associated with DG to ensure members understand the terms that are associated with NCEC's DG policies, procedures, and requirements.
3. Technical Requirements	Provide the engineering-based technical requirements and specifications that all DG systems must meet prior to installation / interconnection of the DG system.
4. Procedural and Policy Requirements	Identify the process and policy requirements that must be satisfied to interconnect a DG system.
5. Application Form	The DG application must be completed and submitted prior to a member beginning the process to install and interconnect a DG system.
6. DG Agreement	The DG agreement between NCEC and a member that desires to install, interconnect, and operate a DG system in parallel with the NCEC distribution system.
7. DG Interconnection Diagrams	Diagrams that illustrates key installation and interconnection requirements for standard configurations of DG systems.
8. Large DG Systems (<50 kW)	Policy and procedural information for DG systems larger than 50 kW (AC). Also includes an initial information form for Battery Energy Storage Systems (BESS).



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OVERVIEW - Q&A

What is the purpose of the NCEC Distributed Generation (DG) Interconnection Guidelines?

The Navarro County Electric Cooperative, Inc. (NCEC) Distribution Generation Interconnection Guidelines Manual was developed to establish the requirements and procedures for the safe installation, interconnection, and parallel operation of distributed generation facilities within the Co-op's electric service area.

NCEC's DG Interconnection Guidelines are aligned with the Texas Public Utility Commission's (PUC) DG rules and regulations (P.U.C. SUBST. R. 25.211, 25.212 and 25.217) as well as other statutory guidelines, including the Texas Public Utilities Regulatory Act (PURA), which provides for the interconnection and parallel operation of Distributed Renewable Generation with electric utilities in Texas.

The information contained in this Manual has been developed for NCEC's members that are interested and/or considering the installation of interconnected distributed generation. NCEC wants to ensure that NCEC's members have all the technical and procedural information needed to have a full understanding of the requirements involved with this process in advance of any decision to install a DG system.

This Manual also provides information regarding the rate that NCEC has put in place regarding the purchase of any energy that is generated by a DG system and delivered to the NCEC distribution system.

The bottom line: NCEC is committed to the safe interconnection and operation of all DG installations on the NCEC distribution system.

I am a NCEC member and considering installing a DG system. Where should I start?

NCEC members should contact the Co-op very early in the "DG decision-making" process. NCEC representatives will take time to answer questions and provide both technical and procedural information regarding your potential DG installation. **The NCEC DG Policy is clear: DG systems will not be allowed to interconnect and/or operate until the following steps have occurred:**

1. NCEC members must submit information and application to NCEC for the proposed DG system(s). The NCEC DG Application Form is included in the NCEC DG Interconnection Guidelines Manual and is also available on the Co-op's website (www.navarroec.com) and at the Co-op office.
2. The DG Application must be reviewed and approved by NCEC, prior to installation of the DG system. NCEC must confirm that the proposed system meets the technical requirements and specifications and determine if the proposed DG installation requires an engineering study. In some cases, engineering studies are essential to ensure the safe and proper operation of the DG system. Engineering studies may also result in the denial of a DG application.
3. Once the DG system is installed NCEC will confirm the installation is consistent with the DG Application and meets all NCEC requirements. This inspection / system verification must take place prior to interconnecting the DG system with the NCEC distribution system.
4. The member must execute a DG Agreement with NCEC. A DG Agreement is required prior to interconnecting the DG system with the NCEC distribution system. The agreement confirms that the system meets all technical requirements and sets forth the rate at which NCEC will purchase any energy that is delivered to NCEC (energy in excess of the DG output that is used by the member).

What are the technical specifications and requirements for the interconnection of a DG system?

The term “technical requirements” can be a little confusing in terms of the DG application, installation, and agreement process. Here are some key things to know and consider regarding technical requirements:

- ✓ NCEC has adopted the technical requirements and specifications that are aligned and consistent with the Texas Public Utility Commission (PUC) DG Rule. These specifications set forth the requirements for the safe interconnection and operation of DG systems. These requirements also establish the criteria used to determine if an engineering study is needed.
- ✓ Many technical requirements are addressed / covered by having “pre-certified” equipment with appropriate IEEE, UL and other “stamps of approval” from the DG system manufacturer. For most systems, these certifications signal to NCEC that the system being installed meets and/or exceeds technical engineering requirements for the major components of the system (e.g., the solar panels and inverter(s)).
- ✓ One important technical requirement is the NEC Article 690.12 Rapid Shutdown of PV Systems on Building. NCEC will check to ensure that all relevant NEC requirements are met, including PV system circuits installed on or in buildings shall include a rapid shutdown function to reduce shock hazard for firefighters in accordance with 690.12(A) through 690.12(D).
- ✓ There are also technical requirements related to the installation. NCEC has provided the requirements (technical and procedural) in this Manual. Several of these requirements are included in the DG Application Form and the DG Agreement. These documents are included in this Manual.

Are there any DG system size restrictions or size thresholds to consider?

- ✓ Yes. The Public Utility Commission of Texas (PUCT) defines DG as “10 MW or less”. While this definition is utilized by NCEC, the Co-op has developed a policy that sets a threshold of 20 kW AC and 50 kW AC for certain policies that are provided in this DG Guidelines Manual.
- ✓ The Co-op will perform an engineering review for DG systems larger than 20 kW AC, and for DG systems larger than 50 kW AC, the Co-op will require (in most cases) an engineering study to determine if the proposed DG system will be allowed to interconnect to the Co-op’s distribution system. DG systems larger than 50 kW AC will also require a custom DG Agreement. Additional requirements for large DG systems is included in the NCEC DG Guidelines Manual.
- ✓ The Co-op encourages members considering the installation and interconnection of a DG system to “right-size” these systems. A good rule to consider is to size DG systems at not larger than 30% of the premise (residence or business) peak demand. For most residences, this means a “right-sized DG system would be in the 2-5 kW AC range.

Does NCEC sell and/or install DG systems? Does NCEC have listed DG vendors or contractors?

NCEC does not sell and/or install DG systems. NCEC is committed to the safe and reliable operation and maintenance of the NCEC distribution system.

NCEC understands that members look to the Co-op for sound and unbiased information related to electric energy topics and issues. And with that in mind, NCEC can provide general industry information to our members regarding distributed generation. However, ***NCEC will not endorse or recommend systems, vendors, or contractors for DG system installations.***

How will NCEC account for (and reimburse) energy that a DG system sends to the electric grid?

NCEC will reimburse members for energy “delivered to” the NCEC distribution system at the “avoided cost of generation” rate (ACGR). The ACGR is determined by the current fixed shape contract price for energy purchased by NCEC from its wholesale electric energy provider(s). NCEC reserves the right to amend the ACGR at any time. Reimbursements will likely take the form of a credit on the member’s monthly bill; however, NCEC may make other arrangements for reimbursement based on the amount of energy that is delivered to the Co-op from the DG system. This “avoided cost” approach to reimbursements for energy provided to NCEC is fair to all NCEC members and based on well-established regulatory and industry policies.

What fees are associated with a DG interconnection?

NCEC requires a DG application fee of \$100 for all DG systems that intend to interconnect and operate in parallel with the NCEC distribution system. This fee is non-refundable, regardless of whether the DG system is approved for installation and/or is ultimately installed by the NCEC member. For information regarding a DG Application -- please contact:

Co-op Office:

- **Email:** distribgen@navarroec.com
- **Phone:** Office: 903-874-7411 or 1-800-771-9095
- **Address:**
Navarro County Electric Cooperative, Inc.
3800 W. Highway 22
P. O. Box 616
Corsicana, TX 75151-0616



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DEFINITIONS

DG Definitions

- **Automatic Disconnect Device:** A switch that is capable of opening and closing automatically at the Point of Interconnection that provides clear indication of the switch position, and when in the open position isolates the distributed generation Battery Storage System.
- **Co-op Secretary:** The Co-op Secretary and/or his/her duly authorized representative.
- **Co-op DG Contact Person:** The person or persons designated by the Co-op Manager to serve as the Co-op's contact for all matters related to distributed generation interconnection.
- **Battery Storage System:** Technology developed for storing electric charge by using specially developed batteries so the stored energy can be utilized at a later time. The system typically utilizes an electro-chemical solution and includes batteries, inverters, and disconnect switches. The system may be connected to and serve critical loads when utility power is unavailable.
- **Commission:** The Public Utility Commission of Texas or its successor organization having jurisdiction over the matters herein contained.
- **Member:** A person or entity interconnected or seeking interconnection to the NCEC electric system for the purpose of receiving or exporting electric power from or to the NCEC electric system.
- **DG Agreement:** An agreement between a member and the Co-op that sets forth the contractual conditions under which a company and a member agree that one or more facilities may be interconnected with the Co-op's electric system.
- **DG Application:** The form of application of a member seeking interconnection and parallel operation of distributed generation with the Co-op's electric system.
- **Distributed Generation (DG):** An electrical generating facility located at a member's point of delivery (point of common coupling) of ten (10) megawatts (MW) or less and connected at a voltage less than sixty (60) kilovolts (kV) which may be connected in parallel operation to the NCEC's electric system.
- **Distributed Renewable Generation:** Electric generation with a capacity of not more than 2,000 kilowatts provided by renewable energy technology, that is installed on a retail electric member's side of the meter.
- **Distributed Generation Owner:** An owner of distributed generation, the member on whose side of the meter distributed generation is installed and operated, regardless of whether the member takes ownership of the distributed generation, or a person who by contract is assigned ownership rights to energy produced from distributed generation located at the premises of the member on the member's side of the meter.
- **Energy Delivered:** Electric energy, measured in kWh, sent / delivered to the Member (premise) by NCEC.
- **Energy Received:** Electric energy, measured in kWh, sent / delivered to the NCEC distribution system by the DG member.
- **ERCOT:** The Electric Reliability Council of Texas, Inc., or successor independent organization under Public Utility Regulatory Act ("PURA") §39.151 for the power region to which the Navarro County Electric Cooperative, Inc. electric system is connected.
- **Interconnection:** The physical connection of distributed generation to the utility system in accordance with the requirements of this ordinance so that parallel operation can occur.

- **Interconnection study:** A study or studies that may be undertaken by the Co-op in response to its receipt of a completed DG Application. Pre-interconnection studies may include, but are not limited to, service studies, coordination studies and utility system impact studies.
- **Manual Disconnect Device:** A manual switch at the Point of Interconnection that provides clear indication of the switch position, and when in the open position isolates the distributed generation from load unrelated to generation of electricity or operation of the facility.
- **Networked Services / Networked Secondary:** Two or more utility primary distribution feeder sources electrically tied together on the secondary (low voltage) side to form one power source for one or more members. The service is designed to maintain service to the members even after the loss of one of these primary distribution feeder sources.
- **Parallel Operation:** The operation of distributed generation by a member while the member is connected to the NCEC electric system.
- **Point of Interconnection (Point of Service, Point of Common Coupling):** The point where the electrical conductors of the NCEC utility system are connected to the member's conductors and where any transfer of electric power between the member and the NCEC utility system takes place, such as switchgear near the meter.
- **Pre-certified Equipment:** A specific generating and protective equipment system or systems that have been certified as meeting the applicable parts of this ordinance relating to safety and reliability by an entity approved by the Commission.
- **Stabilized:** The NCEC electric system shall be considered stabilized when, following a disturbance, the system returns to the normal range of voltage and frequency for a duration of two minutes.



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TECHNICAL REQUIREMENTS

Technical Requirements for the Installation and Parallel Operation of a DG System

1. General Requirements

- 1.1. All interconnections shall comply with P.U.C. SUBST. R. 25.212 and successors. In addition, all interconnections shall comply with applicable state and federal laws and regulations.
- 1.2. All interconnections shall comply with local building and electric codes. Installation of all interconnections shall be inspected by local and County code entities. Compliance with all applicable electric codes is a prerequisite and a continuing condition of interconnection and parallel operation of distributed generation.
- 1.3. Variations from the Technical Requirements herein must be reviewed and approved by NCEC prior to implementation. Variations in the point of interconnection must be approved by the NCEC Co-op Manager (or designee) and included in the executed DG Agreement.

2. Protection of line workers and Co-op's system

- 2.1. The distributed generation facility must have an interrupting device capable of interrupting the maximum available fault current, an interconnection disconnect device, a generator disconnect device, an over-voltage trip, an under-voltage trip, an over/under frequency trip, and a manual or automatic synchronizing check (for facilities with stand-alone capability).

3. Manual Disconnect

- 3.1. The member shall provide and install a manual load break switch that provides clear indication of the switch position to provide separation between the NCEC electrical system and the member's electrical generation system. The location of the disconnect switch must be approved by NCEC. The disconnect switch shall be easily visible, mounted separately from metering equipment, readily accessible to NCEC personnel at all times, and capable of being locked in the open position with an NCEC padlock. NCEC reserves the right to open the disconnect switch isolating the member's electrical generating system (which may or may not include the member's load) from the NCEC electrical system for any of the following reasons:
 - 3.1.1. To facilitate maintenance or repair of the NCEC electrical system, or
 - 3.1.2. When emergency conditions exist on the NCEC electrical system, or
 - 3.1.3. When the member's electrical generating system is determined to be operating in a hazardous or unsafe manner or is or potentially can unduly affect the NCEC electrical system waveform, or
 - 3.1.4. When the member's electrical generating system is determined to be adversely affecting other electric consumers on the NCEC electrical system, or
 - 3.1.5. Failure of the member to comply with applicable codes, regulations, and standards in effect at the time, or
 - 3.1.6. Failure of the member to abide by any contractual arrangement or operating agreement with NCEC.

4. Rapid Shutdown of PV Systems

- 4.1. Per NEC Article 690.12 Rapid Shutdown of PV Systems on Building: PV system circuits installed on or in buildings shall include a rapid shutdown function to reduce shock hazard for firefighters in accordance with 690.12(A) through 690.12(D).

5. Power Quality

- 5.1. Voltage: NCEC shall endeavor to maintain the distribution voltages on the electrical system but shall not be responsible for factors or circumstances beyond its control. The member shall provide an automatic method of disconnecting generation equipment from the NCEC electrical system within 10 cycles should a voltage deviation greater than +5% or -10% from normal be sustained for more than 30 seconds (1800 cycles) or a voltage deviation greater than +10% or -30% from normal be sustained for more than 10 cycles. If high or low voltage complaints or flicker complaints result from the operation of the member's electrical generation, the member's generating system shall be disconnected until the problem is resolved.
- 5.2. Frequency: NCEC shall endeavor to maintain a 60-hertz nominal frequency on the electrical system. The member shall provide an automatic method of disconnecting generation equipment from the NCEC electrical system within 15 cycles should a deviation in frequency of +0.5Hz or -0.7Hz from normal occur.
- 5.3. Harmonics: In accordance with IEEE 519, the total harmonic distortion (THD) of voltage shall not exceed 5% of a pure sine wave of 60-hertz frequency or 3% of the 60-hertz frequency for any individual harmonic when measured at the point of interconnection with the NCEC electrical system. Also, the total current distortion shall not exceed 5% of the fundamental frequency sine wave. If harmonics beyond the allowable range result from the operation of the member's electrical generation, the member's generating system shall be disconnected until the problem is resolved.
- 5.4. Flicker: The distributed generation facility shall not cause excessive voltage flicker on the NCEC electrical system. This flicker shall not exceed 3% voltage dip, in accordance with IEEE 519 (Section 10.5), as measured at the point of interconnection.
- 5.5. Power factor: The member's electrical generation system shall be designed, operated and controlled at all times to provide reactive power requirements at the point of interconnection from 0.97 lagging to 0.97 leading power factor. Induction generators shall have static capacitors that provide at least 97% of the magnetizing current requirements of the induction generator field. NCEC may, in the interest of safety, authorize the omission of capacitors. However, where capacitors are used for power factor correction, additional protective devices may be required to guard against self-excitation of the member's generator field.

6. Loss of Source

- 6.1. The member shall provide approved protective equipment necessary to immediately, completely, and automatically disconnect the member's electrical generation equipment from the NCEC electrical system in the event of a fault on the member's system, a fault on the NCEC system or loss of source on the NCEC system. Such protective equipment shall conform to the criteria specified in UL 1741 and IEEE 1547.
- 6.2. The member's generating system shall automatically disconnect from the grid within 10 cycles if the voltage on one or more phases falls and stays below 70% of nominal voltage for at least 10 cycles.

The automatic disconnecting device may be of the manual or automatic reclose type and shall not be capable of reclosing until after the NCEC service voltage and frequency are restored to within the normal operating range and the system is stabilized.

- 6.3. DG systems equipped with battery storage systems may be equipped with an automatic disconnect switch to isolate from the utility system. Subpanels isolated by the automatic disconnect switch may be energized from the battery storage system. Returning to utility power will be according to section 12.1.

7. Coordination and Synchronization

- 7.1. The member shall be solely responsible for coordination and synchronization of the member's electrical generating system with all aspects of the NCEC electrical system, and the member assumes all responsibility for damage or loss that may occur from improper coordination and synchronization of its generating system with the NCEC electrical system.

8. Metering

- 8.1. At the point of member / premise interconnection, the Co-op will provide a standard data recorder (meter) that can measure the “kWh Delivered” and the “kWh Received” in intervals established by the Co-op. If special (non-standard) metering is required, the Co-op will identify this requirement and any cost to the member prior to approval of the DG Application.

9. Interconnection Study

- 9.1. NCEC will determine whether an interconnection study is necessary, based on relevant engineering factors including the output of the system, the location of the system and other distribution system factors. Interconnection studies, include service study, coordination study, and utility system impact study, as needed, and determined in the sole discretion of the Co-op. If the interconnection study is deemed necessary, NCEC shall perform the study under reasonable terms and conditions agreed upon by both the member and NCEC and at the member's sole expense.
- 9.2. Any modifications or additions to the NCEC electric system identified through the interconnection study as required for the safe and reliable interconnection of Member's facility shall be solely at the Member's expense. Member shall not acquire any ownership in such modifications or additions to NCEC's distribution system.
- 9.3. The interconnection study may conclude the proposed system may not be approved / authorized by NCEC. In such cases, NCEC will make the study available to the member and may also offer recommendations for modifications that could result in authorization to proceed with a revised system.
- 9.4. No study fee will be charged if the proposed generation site is not on a networked secondary and if all of the following apply:
 - 9.4.1. The proposed generation equipment is pre-certified. Generation equipment that are less than 20 kW AC shall be considered pre-certified if a UL 1741 listed inverter that also meets IEEE 1547 specifications is used. For solar PV installations, to be pre-certified system must have UL 1703 listed PV modules, and
 - 9.4.2. The proposed generation system does not expect to export more than 15% of total load on the feeder, and

9.4.3. The proposed generation system does not contribute more than 25% of the maximum possible short circuit current of the feeder.

10. Protection. The distributed generation facility must have interrupting devices capable of interrupting the maximum available fault current, an interconnection disconnect device, a generator disconnect device, an over-voltage trip, an under-voltage trip, an over/under frequency trip and a manual or automatic synchronizing check (for facilities with standalone capability). Facilities rated over 10kW, three-phase, must also have reverse power sensing and either a ground over-voltage or a ground over-current trip depending on the grounding system. Grounding shall be done in accordance with UL 1741, IEEE 1547, and NEC Article 250.

11. Three-Phase Generators.

11.1. Synchronous machines:

11.1.1. The distributed generation facility's circuit breakers shall be three-phase devices with electronic or electromechanical control.

11.1.2. The Member is solely responsible for proper synchronization of its generator with the NCEC system.

11.1.2.1. The excitation system response ratio shall not be less than 0.5.

11.1.2.2. The generator's excitation system shall conform to the field voltage versus time criteria specified in ANSI Standard C50. 13-1989.

11.2. Induction machines: The induction machines used for generation may be brought up to synchronous speed if it can be demonstrated that the initial voltage drop at the point of interconnection is within the flicker limits specified in this document.

12. Inverters:

12.1. Line-commutated inverters do not require synchronizing equipment.

12.2. Self-commutated inverters require synchronizing equipment.

13. Standards. The distributed generation equipment shall be designed, installed, operated, and maintained in accordance with, but not limited to, ANSI standards, UL standards, IEEE standards, the National Electrical Code, ERCOT Operating Guides and any other applicable local, state, or federal codes and statutes. In the case of a conflict between the requirements in this document and any of those standards or codes, this document shall prevail.

14. ERCOT Registration: Distributed Generation systems with installed capacity greater than or equal to 1MW AC, which may export energy into the Co-op's Distribution System, are required to register with ERCOT. Systems less than 1MW AC that plan to participate in the ERCOT wholesale market must also register with ERCOT.



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PROCEDURAL / POLICY REQUIREMENTS

Process Overview

- **Members must submit information and application to NCEC** for the proposed DG system(s). The NCEC DG Application Form is included in the NCEC DG Interconnection Guidelines Manual – and is also available on the Co-op’s website (www.navarroec.com) and at the Co-op offices.
- The **DG application must be reviewed and approved by NCEC, prior to installation** of the DG system. NCEC must confirm that the proposed system meets the technical requirements and specifications and determine if the proposed DG installation requires an engineering study. In some cases, engineering studies are essential to ensure the safe and proper operation of the DG system. Engineering studies may also result in the denial of a DG application.
- Once the DG system is installed NCEC will confirm the installation is consistent with the DG Application and meets all NCEC requirements. This **inspection must take place prior to interconnecting the DG system** with the NCEC distribution system.
- The **member must execute a DG Agreement with NCEC**. This agreement is required prior to interconnecting the DG system with the NCEC distribution system. The DG Agreement confirms that the system meets all technical requirements and sets forth the rate at which NCEC will purchase any energy that is delivered to NCEC (in excess of the DG output that is used by the member).

Member Provided Information

- The information regarding the characteristics of the DG System are as specified in the Application for Interconnection and Parallel Operation of Distributed Generation with the NCEC electric system filed by the Member with NCEC;
- The DG System and associated other electrical components and devices meet National Electrical Code standards;
- All permits, inspections, approvals, and/or licenses necessary for the installation or operation of the DG System have been obtained. The DG System has been successfully tested to UL 1741 and IEEE 1547 standards or has been satisfactorily tested by an independent laboratory with published results.
- Member shall provide manufacturer’s data or other written proof acceptable to NCEC to verify the accuracy of the foregoing warranties and representations. If any of foregoing warranties and representations are inaccurate, NCEC may, without waiver of or prejudice to any other remedy, immediately disconnect the DG system from the NCEC electric system and terminate this agreement.

Energy Purchases

- NCEC will purchase from Member and Member will sell exclusively to NCEC the electrical output from the DG system that is “received” by the NCEC Distribution System. During the term of this Agreement, Member shall exclusively purchase from NCEC its requirements of electric energy above the amounts generated by the DG system.
- NCEC shall pay Member for the “kWh Received” (energy received by the NCEC’s Distribution System) at the “Avoided Cost of Generation Rate” (ACGR). The ACGR is determined by the current fixed shape contract price for energy purchased by NCEC from its wholesale electric energy provider(s). NCEC reserves the right to amend the ACGR at any time.

Metering

At the point of member / premise interconnection, NCEC will provide a standard data recorder (meter) that can measure the “kWh Delivered” and the “kWh Received” in intervals established by the NCEC. If special (non-standard) metering is required, NCEC will identify this requirement and any cost to the member prior to approval of the DG Application.

Interconnection Study

NCEC will determine whether an interconnection study is necessary, based on relevant engineering factors including the output of the system, the location of the system and other NCEC distribution system factors. Interconnection studies, include service study, coordination study, and utility system impact study, as needed, and determined in the sole discretion of NCEC. If the interconnection study is deemed necessary, NCEC shall perform the study under reasonable terms and conditions agreed upon by both the member and NCEC and at the member's sole expense.

Any modifications or additions to the NCEC's Electric system identified through the interconnection study as required for the safe and reliable interconnection of Member's facility shall be solely at the Member's expense. Member shall not acquire any ownership in such modifications or additions to NCEC's distribution system.

The interconnection study may conclude the proposed system may not be approved / authorized by NCEC. In such cases, NCEC will make the study available to the member and may also offer recommendations for modifications that could result in authorization to proceed with a revised system.

No study fee will be charged if the proposed generation site is not on a networked secondary and if all of the following apply:

- 1) The proposed generation equipment is pre-certified. Generation equipment that are less than 20 kW AC shall be considered pre-certified if a UL 1741 listed inverter that also meets IEEE 1547 specifications is used. For solar PV installations, to be pre-certified system must have UL 1703 listed PV modules, and
- 2) The proposed generation system does not expect to export more than 15% of total load on the feeder, and
- 3) The proposed generation system does not contribute more than 25% of the maximum possible short circuit current of the feeder.

DG System - Member Responsibilities

Member shall be solely responsible for the design, installation, operation, maintenance, and repair of the DG System and Member's interconnection facilities. The interconnection of the DG System to the NCEC electrical system shall comply with the Public Utility Commission of Texas Substantive Rules §25.212 relating to Technical Requirements for Interconnection and Parallel Operation of On-Site Distributed Generation, (16 Texas administrative Code §25.212) or any successor rule addressing distributed generation. NCEC shall inspect the DG System and the interconnection equipment. All costs to interconnect with the NCEC electric system shall be the responsibility of Member. NCEC shall not be required to take or pay for any energy generated by the DG System until the DG System successfully passes NCEC's Field Inspection and Member shall have reimbursed NCEC for all its interconnection costs. Maintenance of the DG System shall be performed in accordance with the applicable manufacturer's recommended maintenance schedule.

Right to Temporarily Curtail and/or Interrupt

NCEC shall not be obligated to accept and shall have the right to require Member to temporarily curtail, interrupt, or reduce, deliveries of energy in order to construct, install, maintain, repair, replace, remove, investigate, inspect, or test any part of the interconnection facilities, equipment, or any part of the NCEC electric system. NCEC may disconnect, without notice, the DG System from the electric distribution system, if, in NCEC's opinion, a hazardous condition exists, and such immediate action is necessary to protect persons, or NCEC's facilities or other members' facilities from damage or interference caused by Member's DG System or lack of properly operating protective devices.

Co-op Access

Member hereby grants NCEC access on and across its property at any reasonable time to inspect the DG System and the interconnection equipment, to read or test meters and metering equipment, and to operate, maintain and repair NCEC's facilities. No inspection by NCEC of the DG System or the interconnection facilities shall impose on NCEC any liability or responsibility for the operation, safety or maintenance of the DG system or Member's interconnection facilities.

Liability Insurance Requirements

For Facilities 50 kW and Smaller: The Member is not required to provide a certificate of insurance coverage to NCEC. It is recommended, however, that the Member carry liability insurance coverage which insures the Member against all claims for property damage and for personal injury or death arising out of, resulting from or in any manner connected with the installation, operation, and maintenance of the Member's generating equipment.

For Facilities Larger than 50 kW: The insurance requirements will be determined based on the size of the system and the engineering analysis. It is recommended that the Member carry liability insurance coverage which insures the Member against all claims for property damage and for personal injury or death arising out of, resulting from or in any manner connected with the installation, operation, and maintenance of the Member's generating equipment.



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APPLICATION FORM

APPLICATION AND MEMBER INFORMATION

This application is for the coordination of interconnection of a distributed generation (DG system) between “Member”, the Navarro County Electric Cooperative, Inc. (NCEC) and the electrician / contractor doing the proposed work. The following needs to be filled out completely and clearly.

Date	
First Name (Member)	
Last Name (Member)	
Account Number	
Premise Type	<input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Other
Phone	
Email	
Installation Address (Physical address)	

DG SYSTEM INFORMATION

Total Nameplate Rating (kW)		Over 50 kW?	Yes	No
(If Solar DG) Panel Manufacturer				
Inverter Manufacturer				
Do you plan to export power?	Yes	No		
Does system have a battery backup?				
IEEE and/or UL Certification(s) (List all or attach documentation)				
Rapid Shutdown of PV Systems on Building (provide documentation)				
Please provide the system engineering and/or manufacturers drawings and specifications	<input type="checkbox"/> System one-line diagram <input type="checkbox"/> Additional system documentation			

INFORMATION PREPARED AND SUBMITTED BY	
License Number (Master Electrician, Electrical Engineer, or Homestead Owner)	
Company Name	
Phone	
Email	
Project Contact Person	
Signature	
Date	

NOTES TO APPLICANT
<ol style="list-style-type: none"> 1. An application fee of \$100 is required and is non-refundable, regardless of whether the DG system is approved for installation and/or is ultimately installed by the NCEC member. 2. Any required costs / charges will be available after the application has been reviewed. Charges are required to be paid and application for service be made prior to issuance of permit. 3. If work has not been completed within a 180-day period – the application will be voided. 4. If additional work is required by the Navarro County Electric Cooperative, Inc. – there will be additional charges that will need to be paid. 5. ALLOW A MINIMUM OF TEN WORKING DAYS FOR PROCESSING 6. Return to Navarro County Electric Cooperative, Inc.: 3800 W. Highway 22, P. O. Box 616, Corsicana, TX 75151-0616; or submit via email at distribgen@navarroec.com

NCEC APPROVAL	
By:	
Title:	
Date:	
Notes:	



DISTRIBUTED GENERATION GUIDELINES MANUAL

DISTRIBUTED GENERATION AGREEMENT (DG SYSTEMS \leq 50kW AC)

**FOR THE INTERCONNECTION AND PARALLEL OPERATION OF
DISTRIBUTED GENERATION IN NCEC SERVICE AREA**

THIS AGREEMENT is entered into by and between the Navarro County Electric Cooperative, Inc. (Co-op) and _____ Member (Member).

Navarro County Electric Cooperative, Inc. (NCEC) is a non-profit electric utility company serving portions of Ellis, Navarro, Freestone Hill and Limestone Counties in Texas; and NCEC Member intends to construct, own, operate, maintain, and connect to the NCEC electric distribution system, a Distributed Generation system (DG System) with a nameplate rating less than or equal to 50kW AC at address:

_____; and the parties hereto wish to contract for the purchase and sale of the electrical output from the DG System, and the terms of its interconnection with the NCEC electric distribution system. THEREFORE, in consideration of the mutual covenants and agreements herein contained, the parties hereby contract and agree with each other as follows:

Article 1.0 | This Agreement shall be effective as of the date of execution by the latter of the two parties (the Effective Date) and, subject to the other terms of this Agreement, shall continue in effect for a period of one year, and month to month thereafter.

Article 2.0 | The DG System will be installed at Member's premises at the address specified above. Member shall install, operate, and maintain the DG System in full and faithful compliance with all applicable federal, state, and local laws, ordinances, rules and regulations, and generally accepted industry codes and standards, including, but not limited to the National Electrical Safety Code and the National Electrical Code. Member shall promptly notify Co-op upon receipt of any citation or other official notice of alleged violation of laws, ordinances, rules, and regulations concerning the DG System.

Article 3.0 | Member warrants and represents that:

3.01 | The information regarding the characteristics of the DG System are as specified in the Application for Interconnection and Parallel Operation of Distributed Generation with the Co-op Electric system filed by the Member with Co-op;

3.02 | The DG System and associated other electrical components and devices meet National Electrical Code standards;

3.03 | All permits, inspections, approvals, and/or licenses necessary for the installation or operation of the DG System have been obtained. The DG System has been successfully tested to UL 1741 and IEEE 1547 standards or has been satisfactorily tested by an independent laboratory with published results.

3.04 | Member shall provide manufacturer's data or other written proof acceptable to Co-op to verify the accuracy of the foregoing warranties and representations. If any of foregoing warranties and representations are inaccurate, Co-op may, without waiver of or prejudice to any other remedy, immediately disconnect the DG system from the Co-op electric system and terminate this agreement.

Article 4.0 | Co-op will purchase from Member and Member will sell exclusively to Co-op the electrical output from the DG system that is "received" by the Co-op's Distribution System. During the term of this Agreement, Member shall exclusively purchase from Co-op its requirements of electric energy above the amounts generated by the DG system.

Article 5.0 | The Co-op shall pay Member for the "kWh Received" (energy received by the Co-op's Distribution System) at the "Avoided Cost of Generation Rate" (ACGR). The ACGR is determined by the current fixed shape

contract price for energy purchased by NCEC from its wholesale electric energy provider(s). Co-op reserves the right to amend the ACGR at any time.

Article 6.0 | At the point of member / premise interconnection, the Co-op will provide a standard data recorder (meter) that can measure the “kWh Delivered” and the “kWh Received” in intervals established by the Co-op. If special (non-standard) metering is required, the Co-op will identify this requirement and any cost to the member prior to approval of the DG Application.

Article 7.0 | The Co-op will determine whether an interconnection study is necessary, based on relevant engineering factors including the output of the system, the location of the system and other Co-op distribution system factors. Interconnection studies, include service study, coordination study, and utility system impact study, as needed, and determined in the sole discretion of Co-op. If the interconnection study is deemed necessary, the Co-op shall perform the study under reasonable terms and conditions agreed upon by both the member and Co-op and at the member's sole expense.

Any modifications or additions to the Co-op’s Electric system identified through the interconnection study as required for the safe and reliable interconnection of Member’s facility shall be solely at the Member’s expense. Member shall not acquire any ownership in such modifications or additions to Co-op’s distribution system.

The interconnection study may conclude the proposed system may not be approved / authorized by the Co-op. In such cases, the Co-op will make the study available to the member and may also offer recommendations for modifications that could result in authorization to proceed with a revised system.

No study fee will be charged if the proposed generation site is not on a networked secondary and if all of the following apply:

- 1) The proposed generation equipment is pre-certified. Generation equipment that are less than 20 kW AC shall be considered pre-certified if a UL 1741 listed inverter that also meets IEEE 1547 specifications is used. For solar PV installations, to be pre-certified system must have UL 1703 listed PV modules, and
- 2) The proposed generation system does not expect to export more than 15% of total load on the feeder, and
- 3) The proposed generation system does not contribute more than 25% of the maximum possible short circuit current of the feeder.

Article 8.0 | Member shall be solely responsible for the design, installation, operation, maintenance, and repair of the DG System and Member's interconnection facilities. The interconnection of the DG System to the Co-op electrical system shall comply with the Public Utility Commission of Texas Substantive Rules §25.212 relating to Technical Requirements for Interconnection and Parallel Operation of On-Site Distributed Generation, (16 Texas administrative Code §25.212) or any successor rule addressing distributed generation. Co-op shall inspect the DG System and the interconnection equipment. All costs to interconnect with the Co-op electric system shall be the responsibility of Member. Co-op shall not be required to take or pay for any energy generated by the DG System until the DG System successfully passes Co-op’s Field Inspection and Member shall have reimbursed Co-op for all its interconnection costs. Maintenance of the DG System shall be performed in accordance with the applicable manufacturer's recommended maintenance schedule.

Article 9.0 | Co-op shall not be obligated to accept and shall have the right to require Member to temporarily curtail, interrupt, or reduce, deliveries of energy in order to construct, install, maintain, repair, replace, remove, investigate, inspect, or test any part of the interconnection facilities, equipment, or any part of the Co-op electric system. Co-op may disconnect, without notice, the DG System from the electric distribution system, if, in Co-op's opinion, a hazardous condition exists, and such immediate action is necessary to protect persons, or Co-op's facilities or other members' facilities from damage or interference caused by Member's DG System or lack of properly operating protective devices.

Article 10.0 | Member hereby grants Co-op access on and across its property at any reasonable time to inspect the DG System and the interconnection equipment, to read or test meters and metering equipment, and to operate, maintain and repair Co-op's facilities. No inspection by Co-op of the DG System or the interconnection facilities shall impose on Co-op any liability or responsibility for the operation, safety or maintenance of the DG system or Member's interconnection facilities.

Article 11.0 | **MEMBER SHALL INDEMNIFY, DEFEND AND HOLD HARMLESS NAVARRO COUNTY ELECTRIC COOPERATIVE, INC., ITS ELECTED AND NON-ELECTED OFFICIALS, OFFICERS, AGENTS AND EMPLOYEES FROM AND AGAINST ANY AND ALL LIABILITIES, LOSSES, CLAIMS, DAMAGES, ACTIONS, SUITS OR DEMANDS FOR DAMAGES (INCLUDING COSTS AND ATTORNEY'S FEES, BOTH AT TRIAL AND ON APPEAL) ARISING OUT OF, RESULTING FROM, OR IN ANY MANNER CONNECTED WITH THE BREACH OF ANY WARRANTY OR REPRESENTATION MADE BY MEMBER IN THIS AGREEMENT, OR IN ANY MANNER CONNECTED WITH THE DESIGN, CONSTRUCTION, OPERATION, MAINTENANCE OR REPAIR OF ANY PART OF MEMBER'S DG SYSTEM OR INTERCONNECTION FACILITIES, INCLUDING, WITHOUT LIMITATION LIABILITIES, LOSSES, CLAIMS, DAMAGES, ACTIONS, SUITS OR DEMANDS FOR DAMAGES FOR OR ON ACCOUNT OF PERSONAL INJURY TO, OR DEATH OF, ANY PERSON, OR DAMAGE TO, OR DESTRUCTION OR LOSS OF, PROPERTY BELONGING TO MEMBER, NAVARRO COUNTY ELECTRIC COOPERATIVE, INC. OR ANY THIRD PERSON.**

Article 12.0 | For Facilities 50 kW and Smaller: The Member is not required to provide a certificate of insurance coverage to Navarro County Electric Cooperative, Inc.. It is recommended, however, that the Member carry liability insurance coverage which insures the Member against all claims for property damage and for personal injury or death arising out of, resulting from or in any manner connected with the installation, operation and maintenance of the Member's generating equipment.

For Facilities Larger than 50 kW: The insurance requirements will be determined based on the size of the system and the engineering analysis. It is recommended that the Member carry liability insurance coverage which insures the Member against all claims for property damage and for personal injury or death arising out of, resulting from or in any manner connected with the installation, operation, and maintenance of the Member's generating equipment.

Article 13.0 | After the initial term of 12 months, this agreement shall continue in force thereafter unless terminated by either party giving at least thirty (30) days written notice to the other.

Article 14.0 | Notices given under this Agreement are deemed to have been duly delivered if hand delivered or sent by United States certified mail, return receipt requested, postage prepaid, to:

If to Co-op:

Navarro County Electric Cooperative, Inc.
3800 W. Highway 22
P. O. Box 616
Corsicana, TX 75151-0616

If to Member:

The above-listed names, titles, and addresses of either party may be changed by written notification to the other.

Article 15.0 | A material failure of either party to fully, faithfully, and timely perform its obligations under this Agreement shall be a breach of this Agreement. In the event of a breach which is not cured within thirty (30) days after receipt of written notice to the party in default, the party not in default may terminate this Agreement. **If** Member is in breach of this Agreement, and such breach continues for thirty (30) days after written notice from Co-op, Co-op may disconnect the DG System or otherwise suspend taking energy from Member. All rights granted under this section are in addition to all other rights or remedies available at law or under this Agreement or the applicable Co-op Utilities Rules and Regulations.

Article 16.0 | This Agreement shall inure to the benefit of and be binding upon the heirs, successors, or assigns of each of the parties hereto. Member may not assign this Agreement without the prior written consent of Co-op. Any assignment without such consent shall be null and void.

Article 17.0 | This Agreement constitutes the entire agreement and understanding between the parties hereto and can be amended only by agreement between the parties in writing. In the event any provision of this Agreement, or any part or portion thereof, shall be held to be invalid, void or otherwise unenforceable, the obligations of the parties shall be deemed to be reduced only as much as may be required to remove the impediment.

Article 18.0 | The failure of either party to insist in any one or more instances upon strict performance of any provisions of this Agreement, or to take advantage of any of its rights hereunder, shall not be construed as a waiver of any such provision or the relinquishment of any such right or any other right hereunder.

Article 19.0 | This Agreement and all disputes arising hereunder shall be governed by the laws of the State of Texas. The venue for all such disputes shall be proper and lie exclusively in Navarro County, Texas.

IN WITNESS WHEREOF, the parties hereto have caused their names to appear below, signed by authorized representatives.

Navarro County Electric Cooperative, Inc.

By (Signature): _____

Name (Print): _____

Title: _____

Date: _____

Member

By (Signature): _____

Name (Print): _____

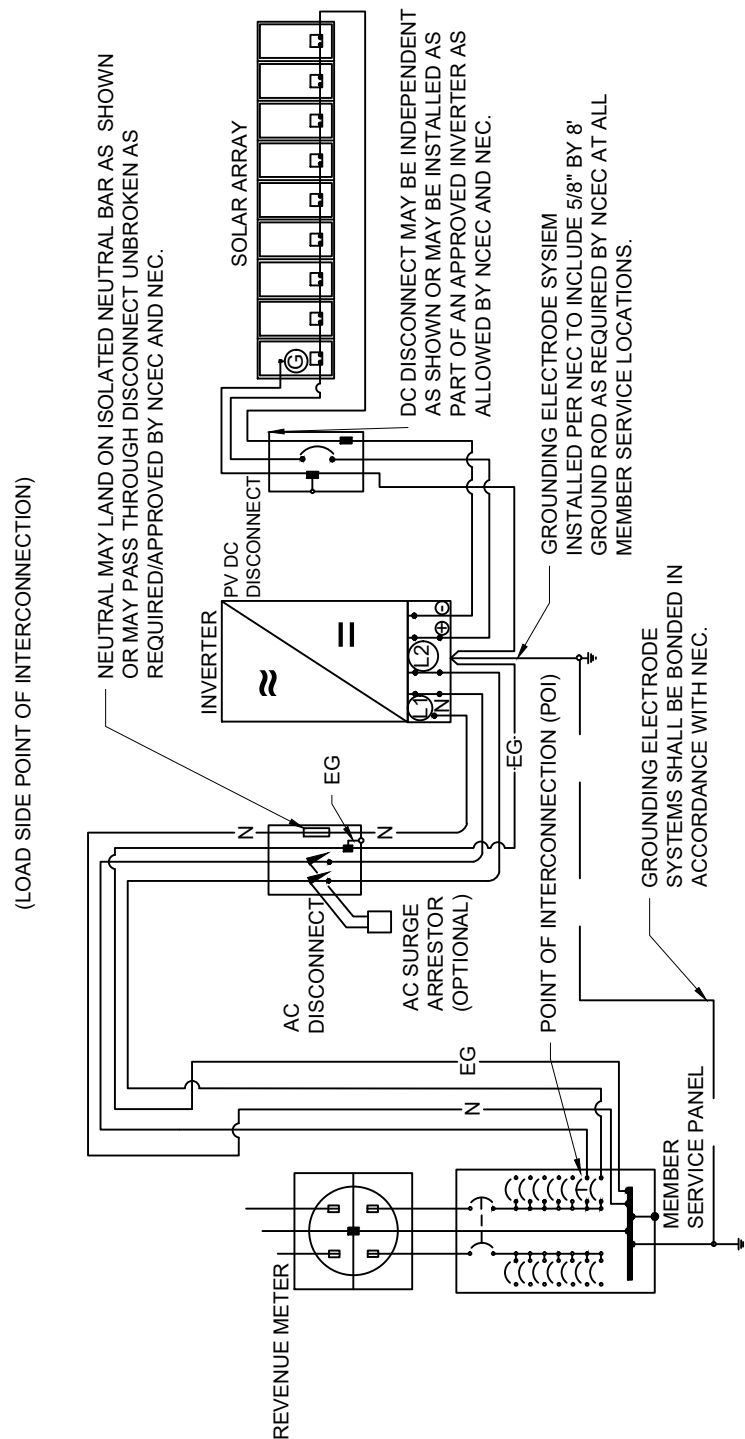
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DISTRIBUTED GENERATION GUIDELINES MANUAL

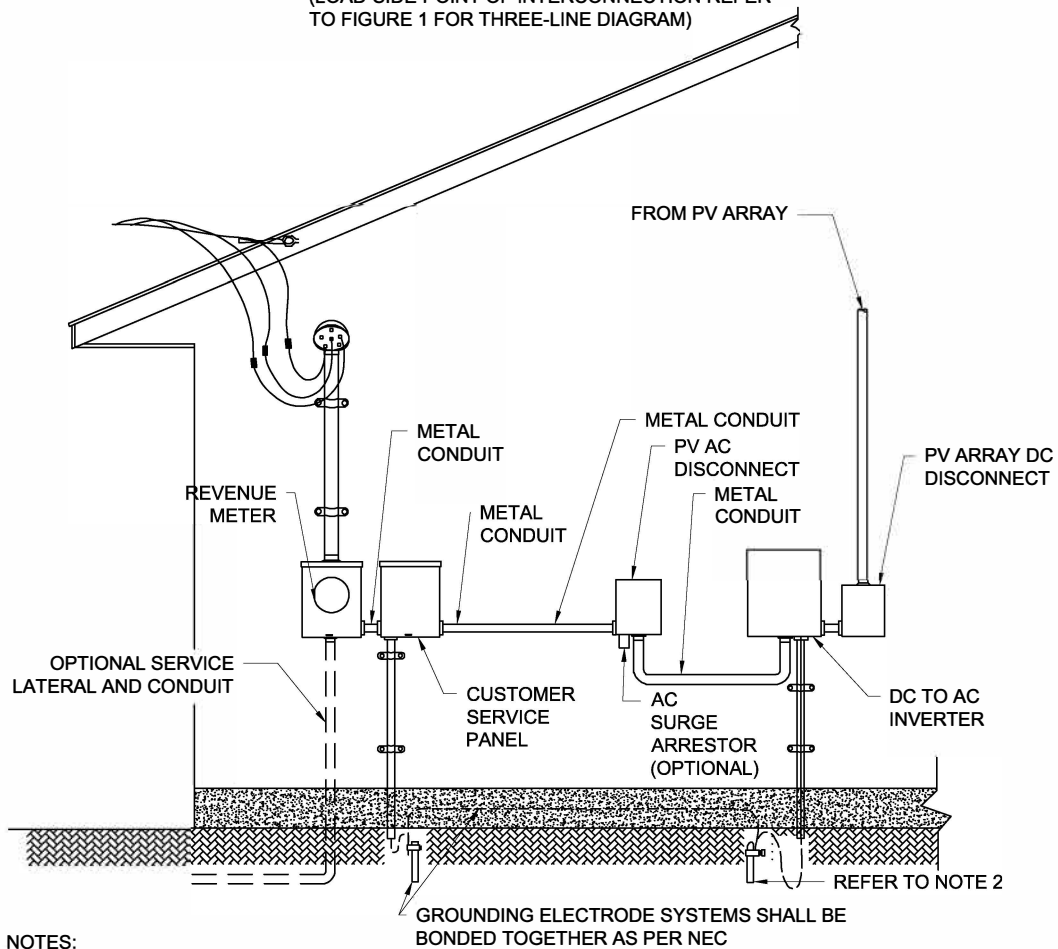
INTERCONNECTION DIAGRAMS

FIGURE 1
TYPICAL PHOTOVOLTAIC (PV) SYSTEM
120/240-VOLT SINGLE-PHASE THREE-WIRE DIAGRAM



- NOTES:
1. TYPICAL INTERACTIVE PV SYSTEM WIRING DIAGRAM, FOR ILLUSTRATION PURPOSES ONLY. REFER TO EQUIPMENT MANUFACTURER LITERATURE FOR ACTUAL EQUIPMENT WIRING RECOMMENDATIONS. INSTALLATION SHALL COMPLY WITH NCEC ELECTRIC SERVICE STANDARDS AND NATIONAL (NEC, UL AND IEEE) CODES.
 2. INVERTER OUTPUT CIRCUIT CONDUCTORS SHALL BE INSTALLED IN METAL RACEWAYS.
 3. THE PV DC GROUNDING SYSTEM SHALL NOT BE BONDED TO THE AC GROUNDING SYSTEM BY USING A COMBINED DC GROUNDING ELECTRODE CONDUCTOR AND AC EQUIPMENT GROUNDING CONDUCTOR. CONTRACTOR MAY CHOOSE TO USE THE OPTION SHOWN ABOVE OR MAY INSTALL A GROUNDING ELECTRODE CONDUCTOR FROM THE INVERTER DIRECTLY TO THE SERVICE GROUNDING ELECTRODE SYSTEM.
 4. WHERE THE POINT OF INTERCONNECTION IS TO BE MADE AHEAD OF THE SERVICE EQUIPMENT, IT SHALL BE MADE AFTER THE NCEC REVENUE METER. SUCH INSTALLATION MUST BE PRE-APPROVED BY NCEC. (REFER TO FIGURE 3 AND 4).

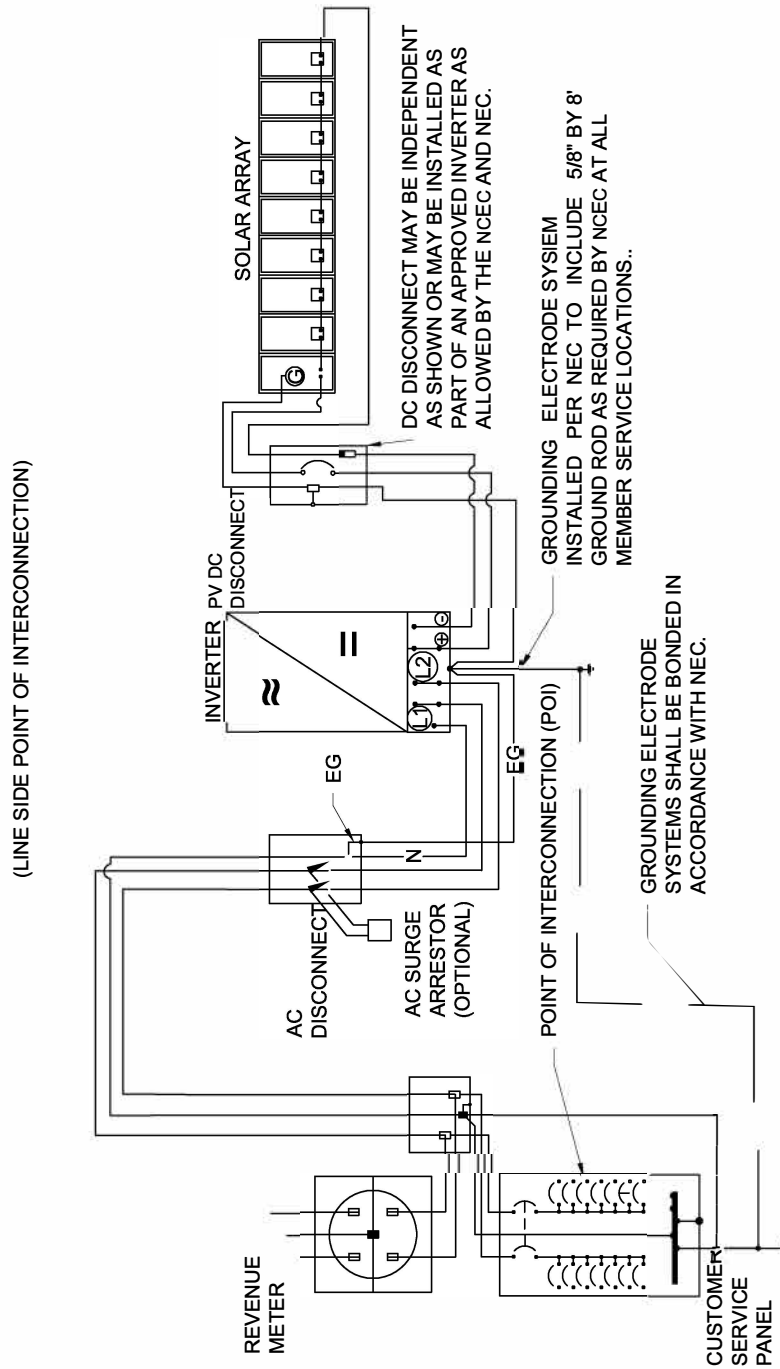
FIGURE 2
TYPICAL 120/240-VOLT, SINGLE-PHASE PHOTOVOLTAIC (PV) SYSTEM
(LOAD-SIDE POINT OF INTERCONNECTION REFER
TO FIGURE 1 FOR THREE-LINE DIAGRAM)



NOTES:

1. INVERTER OUTPUT CIRCUIT CONDUCTOR SHALL BE INSTALLED IN METAL RACEWAYS FROM INVERTER TO POINT OF INTERCONNECTION.
2. GROUNDING ELECTRODE SYSTEM INSTALLED AS PER NEC TO INCLUDE 5/8 -INCH X 8-FOOT GROUND ROD AS REQUIRED BY NCEC AT ALL MEMBER SERVICE LOCATIONS.
3. THE PV DC GROUNDING SYSTEM SHALL NOT BE BONDED TO THE AC GROUNDING SYSTEM BY USING A COMBINED DC GROUNDING ELECTRODE CONDUCTOR AND AC EQUIPMENT GROUNDING CONDUCTOR. CONTRACTOR MAY CHOOSE TO USE THE OPTION SHOWN ABOVE OR MAY INSTALL A GROUNDING ELECTRODE CONDUCTOR DIRECTLY FROM THE INVERTER GROUNDING ELECTRODE TERMINAL TO THE MAIN SERVICE GROUNDING ELECTRODE SYSTEM.
4. THE PV AC DISCONNECT SHALL BE LOCATED IMMEDIATELY ADJACENT TO THE REVENUE METER.
5. LABELING AND IDENTIFICATION OF ALL PV RELATED EQUIPMENT SHALL BE DONE IN ACCORDANCE WITH THE NEC.
6. WHERE THE POINT OF INTERCONNECTION IS TO BE MADE AHEAD OF THE SERVICE EQUIPMENT, IT SHALL BE MADE AFTER THE NCEC REVENUE METER. SUCH INSTALLATIONS MUST BE PRE-APPROVED.

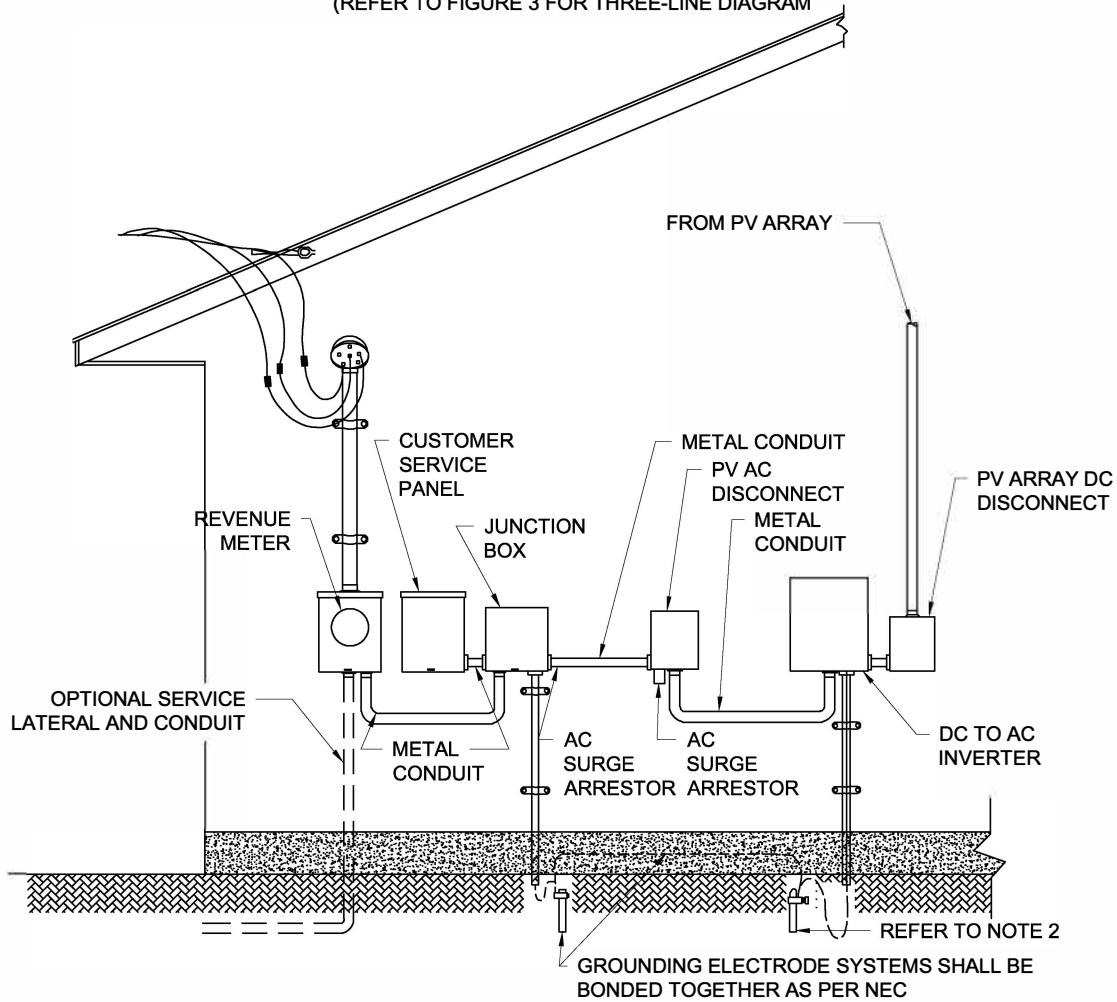
FIGURE 3
TYPICAL PHOTOVOLTAIC (PV) SYSTEM
120/240-VOLT SINGLE-PHASE THREE-WIRE DIAGRAM



NOTES:

1. TYPICAL INTERACTIVE PV SYSTEM WIRING DIAGRAM, FOR ILLUSTRATION PURPOSES ONLY. REFER TO EQUIPMENT MANUFACTURER LITERATURE FOR ACTUAL EQUIPMENT WIRING RECOMMENDATIONS. INSTALLATION SHALL COMPLY WITH NEC SERVICE STANDARDS AND NATIONAL (NEC, UL AND IEEE) CODES.
2. INVERTER OUTPUT CIRCUIT CONDUCTORS SHALL BE INSTALLED IN CONTINUOUS METAL RACEWAYS.
3. THE PV DC GROUNDING SYSTEM SHALL NOT BE BONDED TO THE AC GROUNDING SYSTEM BY USING A COMBINED DC GROUNDING ELECTRODE CONDUCTOR AND AC EQUIPMENT GROUNDING CONDUCTOR. CONTRACTOR MAY CHOOSE TO USE THE OPTION SHOWN ABOVE OR MAY INSTALL A GROUNDING ELECTRODE CONDUCTOR FROM THE INVERTER DIRECTLY TO THE SERVICE GROUNDING ELECTRODE(S).
4. THE POINT OF INTERCONNECTION SHALL BE MADE AFTER THE NEC REVENUE METER IN A JUNCTION BOX SUITABLE FOR THE CONDITIONS AND PROVIDED WITH LOCKING PROVISIONS. SUCH INSTALLATION MUST BE PRE-APPROVED BY NCEC
5. IF A CUSTOMER DESIRES TO TAP THE EXISTING CONDUCTOR BETWEEN THE METER AND THE MAIN BREAKER OR DISCONNECT, A FUSED DISCONNECT OR BREAKER MUST BE INSTALLED WITHIN 18 INCHES OF THE TAP CONNECTIONS.

FIGURE 4
TYPICAL 120/240-VOLT, SINGLE-PHASE PHOTOVOLTAIC (PV) SYSTEM
(LINE-SIDE POINT OF INTERCONNECTION)
(REFER TO FIGURE 3 FOR THREE-LINE DIAGRAM)



NOTES:

1. INVERTER OUTPUT CIRCUIT CONDUCTORS SHALL BE INSTALLED IN METAL RACEWAYS FROM INVERTER TO POINT OF INTERCONNECTION.
2. GROUNDING ELECTRODE SYSTEM INSTALLED AS PER NEC TO INCLUDE 5/8-INCH X 8-FOOT GROUND ROD AS REQUIRED BY NCEC AT ALL MEMBER SERVICE LOCATIONS.
3. THE PV DC GROUNDING SYSTEM SHALL NOT BE BONDED TO THE AC GROUNDING SYSTEM BY USING A COMBINED DC GROUNDING ELECTRODE CONDUCTOR AND AN AC EQUIPMENT GROUNDING CONDUCTOR. CONTRACTOR MAY CHOOSE TO USE THE OPTION SHOWN ABOVE OR MAY INSTALL A GROUNDING ELECTRODE CONDUCTOR DIRECTLY FROM THE INVERTER GROUNDING ELECTRODE TERMINAL TO THE MAIN SERVICE GROUNDING ELECTRODE SYSTEM.
4. THE PV AC SERVICE DISCONNECT SHALL BE LOCATED IMMEDIATELY ADJACENT TO THE REVENUE METER.
4. LABELING AND IDENTIFICATION OF ALL PV RELATED EQUIPMENT SHALL BE DONE IN ACCORDANCE WITH THE NEC.
5. THE POINT OF INTERCONNECTION SHALL BE MADE AFTER THE REVENUE METER IN A JUNCTION BOX SUITABLE FOR THE CONDITIONS AND PROVIDED WITH LOCKING PROVISIONS. SUCH INSTALLATIONS MUST BE PRE-APPROVED.
6. IF A CUSTOMER DESIRES TO TAP THE EXISTING CONDUCTOR BETWEEN THE METER AND THE MAIN BREAKER OR DISCONNECT, A FUSED DISCONNECT OR BREAKER MUST BE INSTALLED WITHIN 18 INCHES OF THE TAP CONNECTIONS.



DISTRIBUTED GENERATION GUIDELINES MANUAL

LARGE DG SYSTEMS

DG Systems Larger than 50 kW (AC)

Navarro County Electric Cooperative, Inc. (NCEC) has established a “DG size/output capacity threshold” at a level larger than 50 kW (AC). NCEC refers to systems in this size category as “large DG” systems. This threshold is not arbitrary, but is linked to certain industry standards and regulatory reporting obligations for the Co-op.

To provide NCEC members considering the installation of large DG systems with accurate and important information, the Co-op has developed a list of policy and procedural information points for DG systems larger than 50kW (AC):

1. The technical, policy, and procedural requirements contained in this Guidelines Manual apply to large DG systems.
2. NCEC may utilize the DG Agreement (DGA) contained in the Guidelines Manual in full or in part as the basis for a DGA with members installing and interconnecting approved large DG systems. NCEC reserves the right to modify the terms and conditions contained in the DGA.
3. NCEC will require certain levels of liability insurance for large DG systems. Prior to interconnection, the DG Member must provide a certificate of insurance showing satisfactory liability insurance including contractual liability insurance covering indemnity obligations with insures the DG Member against all claims for property damage and for personal injury or death arising out of, resulting from or in any manner connected with the installation, operation, and maintenance of the DG Member’s DG facility.

(a) The amount of such insurance coverage per occurrence shall be not less than defined in the table below and name NCEC as an additional insured. This amount may be increased at the sole discretion of NCEC if the nature of the project so requires.

DG System Size	Insurance Requirement
≤ 50kW	N/A
> 50 kW ≤ 100kW	\$500K
> 100 kW ≤ 500kW	\$1M
> 500 kW	\$2M

(b) The certificate of insurance shall provide that the insurance policy will not be changed or cancelled during its term without thirty days written notice to NCEC. The term of the insurance shall be coincident with the term of the interconnection agreement or shall be specified to renew throughout the length of the interconnection agreement.

4. NCEC has a responsibility to communicate, and report distributed generation information to ERCOT.
5. Distributed Generation systems with installed capacity greater than or equal to 1MW AC, which may export energy into the Co-op’s Distribution System, are required to register with ERCOT. Systems less than 1MW AC that plan to participate in the ERCOT wholesale market must also register with ERCOT.
6. NCEC has developed an initial information form for Battery Energy Storage Systems (BESS) which is attached on the following page(s). This form must be completed by companies exploring the installation of BESS systems connected to the NCEC distribution system.

7. NCEC must comply with SB398, which is a law that applies to DG systems with a capacity of 250 kW – ≤2MW for certain DG facilities. SB398 establishes certain requirements for NCEC including the following:
- Must purchase generation at wholesale or agreed upon price;
 - Must provide wholesale transmission service (including distribution voltage);
 - Must provide a standard interconnect application;
 - Must utilize reasonable costs, including good faith interconnect cost estimate 30 days from submission of interconnect agreement;
 - Must completed interconnect 240 days from payment received (for distribution system / facility upgrades);
 - Under SB398 NCEC may limit the total amount of large DG to “no more than 5% of NCEC ERCOT “4-CP”, which is calculated annually by ERCOT.

Battery Energy Storage System (BESS) Information Form

Date:

Customer Information

Facility Name:

Customer Name:

Contact Person:

Contact Email:

Contact Phone Number:

Requested Energization Date: Expected Operation Date:

System Information

Is the BESS registered with ERCOT?

Will BESS participate in Ancillary Services?

Max Export Requested at PCC (kW/PF):

Max Rated Export at PCC (kW/PF):

Maximum Charging Demand (kW/PF):

Battery Discharge Duration (1hr, 2 hr.):

Total Connected Battery Storage (kWh):

Auxiliary Load (kVA):

Anticipated Cycles per Year:

Inverter Manufacturer & Model Number: Quantity of Inverters:

Fault Current Contribution (multiple of load current)

Ramp Rate:

Do you have land control?

GPS point of requested PCC:

Provide the following documents:

- ☐ Manufacturer Spec sheet for Inverter Manufacturer
- ☐ Spec sheet for Battery
- ☐ One Line Diagram
- ☐ Site Layout (include location of disconnect, meter, and PCC)
- ☐ Inverter Short Circuit / Source Impedance Data
- ☐ BESS transformer spec sheet (if available)
- ☐ Inverter Standards Compliance sheets (UL1741, IEEE 1547)
- ☐ Harmonics Spec Sheet / test results

Provide additional system information: (optional)

Distribution System BESS Interconnection Process Steps

- *Notes:*
 - *The following are general steps for consideration of a BESS installation connected to Distribution.*
 - *Previous steps and requirements must be complete and satisfactory to move to the next step.*
 - *There are additional requirements and study requirements with NCEC's power supplier.*

Process / Steps

1. Installer contact NCEC and requests pre-screen information
2. Installer pays pre-screen fee
3. Pre-screen information and tariff are provided
4. Installer fills out BESS Information Sheet and provides
5. Installer pays interconnection application and impact study fee
6. Interconnection Application process begins when all data is provided and payment is received
7. Distribution Impact Study is completed (Approx. 6 weeks)
8. Study results including costs and limitations are provided to BESS installer
9. Brazos Electric Cooperative completed facilities study and provides results, costs, and limitations
10. Interconnection agreement is signed



**DISTRIBUTED GENERATION
TARIFF AND RATE RIDER**

MAY - 2023

Applicability

The Distributed Generation Tariff and Rate Rider applies to the interconnection and parallel operation of distributed generation systems (DG Systems) connected to the Cooperative's electric distribution system.

The Cooperative shall allow interconnection of a distributed generation system on a nondiscriminatory basis, based on the following;

- Compliance with and adherence to the Cooperative's service rules and regulations; and
- Compliance with and adherence to the application and interconnection policies and procedures contained in the Cooperative's Distributed Generation Guidelines Manual.

The DG Tariff and Rate Rider is not applicable to temporary, shared, or resale service. This Tariff and Rate are applicable to service supplied at one point of delivery and measured through one Cooperative meter.

Definition of Distributed Generation

The Cooperative adopts and the Public Utility Commission of Texas definition of Distributed Generation:

An electrical generating facility located at a customer's point of delivery (point of common coupling) of ten (10) megawatts (MW) or less and connected at a voltage less than sixty (60) kilovolts (kV) which may be connected in parallel operation to the Cooperative's electric system.

Sales to Customer

Energy sales to a Distributed Generation Member shall be consistent with the applicable retail rate schedule established by the Cooperative and in use by the Member as if there were no Distributed Generation installation.

Monthly Rate

Each billing period the Customer shall be obligated to pay any charges in addition to all charges indicated on his/her base rate, as determined at the sole discretion of the Cooperative on a non-discriminatory case-by-case basis, unless prohibited by the Substantive Rules of the Public Utility Commission of Texas, to recover any additional operation and maintenance expense caused by the Customer's facility. Standard monthly charges are listed below:

Distributed Generation - Additional Monthly Charges		
DG Customer Charge	50 kW and smaller	\$0 per meter/month
	Over 50 kW	Based on DG Agreement between Cooperative and Member
Meter Reading Charge	Where remote access to meter reading is not feasible	\$50.00 per meter/month

Energy Delivered to Cooperative – Member Reimbursement

Cooperative shall pay Member for the "kWh Received" from the Member's DG System (energy received by the Co-op's Distribution System) at the "Avoided Cost of Generation Rate" (ACGR). The ACGR is determined by the current fixed shape contract price for energy purchased by the Cooperative from its wholesale electric energy provider(s). Cooperative reserves the right to amend the ACGR at any time.

Obtaining Interconnection

A Cooperative Member planning to install and operate a DG System and desiring to interconnect and operate in parallel with the Cooperative's electric distribution system shall:

1. Comply with Tariff and Rate Rider: Apply for interconnection, provide an easement satisfactory to the Cooperative, and otherwise comply with the Cooperative's Distributed Generation Tariff and Rate Rider;
2. Provide Information: In advance of interconnection, Member shall make application (DG Application) and provide technical information for the DG System and its interconnection with the Cooperative's system. Members shall also provide such additional information as may be required by the Cooperative.

In the event Producer's installation involves the use of non-standard equipment or design techniques, the Cooperative may require such installation be approved by a registered professional engineer.

Any review or acceptance of such technical information by the Cooperative shall not impose any liability on the Cooperative and does not guarantee the adequacy of Member's DG equipment to perform its intended function. The Cooperative 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 generating installations.

The Cooperative may perform studies, as needed, and as determined in the sole discretion of the Cooperative. The Cooperative may charge Producer fees that recover the costs of performing such studies. A study generally will not be required for an installation that: (1) has inverter(s) with a UL 1741 certification and meet IEEE 1547 specifications; (2) does not export more than 15% of total load on the feeder; (3) does not contribute more than 25% of the maximum possible short circuit current of the feeder; and (4) has AC nameplate capacity of 20 kW or less.

Application Review

Based on the application review process, the Cooperative may not allow the interconnection of a distributed generation facility if an engineering evaluation identifies issues related to the Cooperative's system reliability, power quality, or safety.

Required Improvements to the Distribution System - Cost Recovery

The Cooperative may recover from the owner or operator of the distributed generation facility all reasonable costs necessary for and directly attributable to the interconnection of the facility, including the reasonable costs of necessary system upgrades and improvements directly attributable to the distributed generation facility.