Sulphur Springs Valley Electric Cooperative, Inc.
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Interconnection Requirements

For

Distributed Generation

For Compliance with R14-2-2628
Approved with ACC Decision # _____

Contents

1.0 SCOPE

This document specifies Sulphur Springs Valley Electric Cooperative, Inc. (SSVEC) requirements for safe and effective interconnection of a Distributed Generator with SSVEC's electric distribution system. Interconnection requirements as outlined here are for those installations that will be connected to SSVEC's electric distribution system at 69kV or less. These requirements apply to installations not subject to the Arizona Electric Power Cooperatives (AEPCO) Open Access Transmission Tariff (OATT).

This document does not provide for, nor include transmission service. The availability of transmission service may not be inferred or implied from this document. Transmission service on the transmission system is available pursuant to the AEPCO OATT.

For the purpose of simplicity, the term "Member" will be used here to refer to a SSVEC Member who installs, owns or operates a distributed generator, co-generator or small power producer.

The required protective relaying and/or safety devices and requirements specified in this document are for protecting utility facilities and other utility Members' equipment from damage or disruptions caused by a fault, malfunction or improper operation of the distributed generating facility. They are also necessary to ensure the safety of utility workers and the public. The requirements specified herein do not include additional relaying, protective or safety devices as may be required by industry and/or government codes and standards, equipment manufacturer requirements and prudent engineering design and practice to fully protect Member’s generating facility or facilities; those are the sole responsibility of the Member. In addition to all applicable regulatory, technical, safety, and electrical requirements and codes, Members will also be subject to contractual and other legal requirements, which will govern over the general provisions in this document.

Members and SSVEC personnel shall use this document when planning the installation of distributed generation to be connected to or expecting back-up electrical service from SSVEC. Note that these requirements may not cover all details in specific cases. SSVEC encourages the Member to discuss project plans with SSVEC before designing their facility or purchasing and installing equipment. This document must be applied in conjunction with applicable rate tariffs and electrical service schedules and requirements that pertain to the operation of distributed generation with the SSVEC electrical distribution system and is subject to regulatory change.

2.0 DEFINITIONS

2.1 **AC**: Alternating Current.

2.2 **ACC**: Arizona Corporation Commission.

2.3 **AEPCO**: Arizona Electric Power Cooperatives, Inc.

2.4 **ANSI**: American National Standards Institute. See www.ansi.org

2.5 **Applicant**: Member or Representative who submits an Interconnection Application as indicated herein.

2.6 **Application**: SSVEC standard form submitted by a Member or Representative to apply for interconnection of a Generating Facility with the SSVEC Distribution System.

2.7 **Back-feed**: To energize a section of the SSVEC Power Supply System with a Generating Facility.

2.8 **Business Day**: Monday through Friday, excluding Federal and/or Arizona State Holidays.

2.9 **Calendar Day**: Any day including Saturday, Sunday, or a Federal or State Holiday.

2.10 **Certified Equipment**: Specific generating and protective system or systems certified as meeting the requirements in R14-2-2611 relating to testing, operation, safety, and reliability by a Nationally Recognized Testing Laboratory, (NRTL).

2.11 **Clearance**: Documentation from SSVEC stating that a line or equipment is disconnected from all known sources of power and tagged; that for safety purposes all proper precautionary measures have been taken; and that workers may proceed to inspect, test, and install grounds on the circuit.

2.12 **Clearance Point**: A clearance point is the physical location on a piece of line or equipment that is to be de-energized from all known sources of power and tagged. Further, that piece of line or equipment shall remain in the condition stated until released by the person having the clearance.

2.13 **CFR**: Code of Federal Regulations.

2.14 **Commission**: Arizona Corporation Commission.

2.15 **Cogeneration Facility**: Any facility that sequentially produces electricity, steam or forms of useful energy (e.g., heat) from the same fuel source and which are used for industrial, commercial, heating, or cooling purposes.

2.16 **DC**: Direct Current.

2.17 **DG Service Disconnect**: Visible gang operated load break disconnect switch(s) or breaker(s), capable of being locked in a visibly "open" position by a standard SSVEC padlock that will completely isolate the Generating Facility from the SSVEC system. Member's disconnect switch(s) or breaker(s) shall be clearly labeled with permanent letters 1" high stating "DG Service Disconnect".

2.18 **Disconnect Switch**: A device that: a) is installed and maintained for a Generating Facility by the Member; b) is a visible-open, manual, gang-operated, load break disconnect device; c) is capable of being locked in a visible-open position by a standard SSVEC padlock that will completely isolate the Generating Facility from the SSVEC Power Supply System; and d) if the voltage of the Generating Facility is over 500 volts, is capable of being grounded on the SSVEC source side.

2.19 **Distributed Generation**: Any type of Member electrical generator, solid-state or static inverter, or Generating Facility interconnected with the SSVEC Power Supply System that either can be operated in electrical parallel with the Power Supply System or can feed a Member load that can also be fed by the Power supply System.

2.20 **Distributed Generator**: Any type of electrical generator or static inverter producing alternating current that (a) has the capability of parallel operation with the utility distribution system, or (b) is designed to operate separately from SSVEC system and can feed a load that can also be fed by SSVEC's electrical system. A distributed generator is sometimes referred to simply as "generator".

2.21 **Distribution System**: The infrastructure constructed, maintained, and operated by SSVEC to deliver electric power service to retail Members. This system consists of all material and equipment energized up to voltages below 69 kV.

2.22 **Electric Cooperative**: A Utility that is: a) not operated for profit; b) owned and controlled by its members; and c) operating as a public service company in the state of Arizona.

2.23 **Electric Supply/Purchase Agreement**: An agreement between SSVEC and the Member that covers the terms and conditions under which electrical power is supplied and/or purchased to/from SSVEC.

2.24 **Exporting System**: Any type of Generating Facility that is designed to regularly backfeed the SSVEC Power Supply System.

2.25 **Fault Current**: Level of current that can flow if a short circuit is applied to a voltage source.

2.26 **Fast Transition**: A switch that parallels the generator with the Power Supply System for less than 500 milliseconds, while transferring the load to, or from the utility source.

2.27 **Facilities Study**: A comprehensive analysis of the actual construction needed to take place based on the outcome of a System Impact Study.

2.28 **Feasibility Study**: A preliminary review of the potential impacts on the Distribution System that may result from a proposed interconnection.

2.29 **Generating Facility (GF)**: All or part of the Member's distributed electrical generator(s), energy storage system, or any combination of electrical generator(s) and storage system(s), together with all inverter(s) and protective, safety, and associated equipment necessary to produce electric power at the Member's facility. This includes solid-state or static inverters, induction machines, and synchronous machines. A GF also includes any Qualifying Facility (QF).

2.30 **Good Utility Practice**: Any of the practices, methods, and acts engaged in or approved by a significant portion of the electric power industry during the relevant time period, or any of the practices, methods, and acts that, in the exercise of reasonable judgment in light of facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with reliability, safety, and expedition. Good Utility Practice is not intended to be limited to the optimal practice, method, or act to the exclusion of all others, but rather to include practices, methods, or acts generally accepted in the region at the relevant time.

2.31 **Hot Line Order**: The method used as an aid in protection of personnel working on or near energized equipment, whereby automatic or remote re-closing of a line is disabled. When a hold tag is in effect, if the circuit trips open, it will not be re-closed until the system operator receives a release from the person to whom the hold was issued. As it relates to distributed generation, circuits having hold tags shall have all potential sources of back-feed removed by opening, locking and tagging the appropriate disconnect switch(s).

2.32 **Hold Tag**: See Hot Line Order.

2.33 **IEEE**: Institute of Electrical and Electronics Engineers, Inc.

2.34 **Inadvertent Export**: The unplanned, uncompensated transfer of electrical energy from a Generating Facility to the Power Supply System across the Point of Interconnection.

2.35 **Integrated Distributed Resources (IDR)**: Generating Facilities with protective functions built into the unit's control system for operating interconnected with SSVEC's Power Supply System.

2.36 **Interconnection**: The physical connection of the Member's Generating Facility to SSVEC's Power Supply System.

2.37 **Interconnection Agreement**: An agreement, together with appendices, signed between SSVEC and the Member (Generating Facility) covering the terms and conditions governing the interconnection and operation of the Generating Facility with SSVEC.

2.38 **Interconnection Facilities**: The electrical wires, switches, and related equipment that are required, in addition to the facilities required to provide electric distribution service to a Member, to allow interconnection. Interconnection Facilities may be located on either side of the Point of Interconnection as appropriate to their purpose and design.

2.39 **Interconnection Manual**: This document developed and maintained by SSVEC as required per R14-2-2628.

2.40 **Interconnection Study**: A study that may be undertaken by SSVEC or a SSVEC-designated third party (consultant) in response to receipt of a completed application. An Interconnection study may include; a) Feasibility Study; b) System Impact Study; c) Facilities Study, and d) Any additional analysis required by SSVEC.

2.41 **Island**: See Islanding.

2.42 **Islandable System**: A Generating Facility interconnected to a bus common with SSVEC's Power Supply System, where the GF is designed to serve part of the power grid that has become or is purposefully separated from the rest of the grid.

2.43 **Islanding**: A condition occurring when a generator and a portion of SSVEC's Power Supply System separates from the remainder of the system and continues to operate in an energized state. Islanding can be either intentional (planned), or unintentional (unplanned). When the condition is unintentional, Islanding may pose a safety threat or cause equipment problems.

2.44 **Jurisdictional Electric Inspection Agency**: Governmental authority having jurisdiction to inspect and approve the installation of a Generating Facility.

2.45 **kW**: Kilowatt.

2.46 **Maximum Capacity**: a) Nameplate AC capacity of a GF; or b) if Operating Characteristics of the GF limit the power transferred across the Point of Interconnection to the Power Supply System, than Maximum Capacity is only the power transferred across the Point of Interconnection and does not include Inadvertent Export.

2.47 **Member**: Any SSVEC Member who installs, owns or operates a GF.

2.48 **Metering**: The function related to measuring the transfer of electric power and energy.

2.49 **Metering Service**: All functions related to measuring electricity consumption.

2.50 **Minimum Protective Devices, Relays, and Interconnection Requirements**: The minimum required protective relaying and/or safety devices or requirements specified in this manual are for the purpose of protecting only SSVEC electrical distribution facilities and its other Member facilities from damage or disruptions caused by a fault, malfunction, or improper operation of the Member's Generating facility. Minimum Protective Relaying and Interconnection Requirements do not include relaying, or other protective, and / or safety devices as may be required by industry and/or government codes and standards, equipment manufacturing and prudent engineering design and practice to fully protect the Member's Generating Facility; those are the sole responsibility of the Member. These requirements may be revised from time to time.

2.51 **MW**: Megawatt.

2.52 **NEMA**: National Electrical Manufacturers Association. See www.nema.org.

2.53 **NERC**: North American Electrical Reliability Corporation.

2.54 **Network System**: An electrical system that can be fed simultaneously from multiple sources.

2.55 **NFPA**: National Fire Protection Association. See www.nfpa.org.

2.56 **Non-Parallel Connection Agreement:** The agreement for the non-parallel connection of the Member's GF with SSVEC's Power Supply System.

2.57 **Non-Exporting System**: A system in which there is no designed, regular export of power from the GF to SSVEC's Power Supply System.

2.58 **NRTL**: Nationally Recognized Testing Laboratory.

2.59 **Operating Characteristics**: Mode of operation of a GF (Exporting System, Non-Exporting System, or Inadvertent Exporting System) that controls the amount of power delivered across the Point of Interconnection to Power Supply System.

2.60 **OSHA**: Occupational safety and Health Administration. See www.osha.gov.

2.61 **Parallel Operation**: The operation of a GF that is electrically interconnected to a bus common with the utility electrical system, either on a momentary or continuous basis.

2.62 **Point of Common Coupling (PCC)**: see Point of Interconnection.

2.63 **Points of Interconnection**: The physical location where the utility's service conductors are connected to the Member's service conductors to allow Parallel Operation of the GF with the Power Supply System. This is the point at which the power transfer occurs between the Member's electrical system and the utility distribution system, also commonly referred to as the Point of Common Coupling.

2.64 **Power Supply System**: SSVEC's electrical power grid comprised of both transmission and distribution systems and all associated equipment.

2.65 **Qualifying Facility (QF)**: Any Cogeneration or Small Power Production Facility that meets the criteria for size, fuel use, efficiency, and ownership as promulgated in 18 CFR, Chapter I, Part 292, of the Federal Energy Regulatory Commission's Regulations.

2.66 **Radial Line**: An electrical distribution line that originates from a substation and is normally not connected to another substation or another circuit sharing the common supply of electric power.

2.67 **Reclosing**: The act of automatically re-energizing a line to attempt to restore power.

2.68 **Relay**: An electric device that is designed to interpret input conditions in a prescribed manner and after specified conditions are met to respond to cause contact operation or similar abrupt change in associated electric control circuits.

2.69 **Representative**: An agent of the Member who is designated by the Member and is acting on the Member's behalf.

2.70 **RUS**: U.S. Department of Agriculture Rural Utilities Service.

2.71 **Scoping Meeting**: An initial review meeting between SSVEC and a Member or Representative during which a general overview of the proposed GF design is discussed, and general information is provided on system conditions at the proposed Point of Interconnection.

2.72 **Secondary Spot Network System**: An AC power Distribution System meeting the criteria of R14-2-2622.

2.73 **Separate System**: An operating GF that has no possibility of operating in parallel with SSVEC's Power Supply System.

2.74 **Small Power Production Facility**: A Generating Facility that uses primarily biomass, waste or renewable resources, including wind, solar, and water to produce electric power.

2.75 **Static Inverter**: A DC to AC device that converts energy to AC energy for utility interconnection. The inverter contains many control functions, such as voltage and frequency monitoring and protection against islanding. Inverter(s) must be listed and in compliance with Underwriters Laboratories (UL) Subject 1741, Standard for Static Inverters and Charge Controllers for Use in Photovoltaic Systems. Utility-interactive inverters that pass the tests of the new UL 1741 standard will be, by definition, "non-islanding" inverters and will comply with all elements of the new IEEE 929-2000 interconnection standard. The 2017 National Electrical Code requires that all utility-interactive photovoltaic systems use listed inverters that pass UL 1741.

2.76 **System Impact Study**: A full engineering review of the impact on the Power Supply System from a GF, including power flow, system protective device coordination, generator protection schemes (if not certified equipment), stability, voltage fluctuations, frequency impacts, and short circuit study. A System Impact Study may consider total nameplate capacity of the GF.

2.77 **Transfer Switch**: An automatic or manual device for transferring one or more load conductor connections from one power source to another.

2.78 **Transfer Trip Scheme**: A form of remote trip in which a communication channel is used to transmit a trip signal from the relay location to a remote location.

2.79 **Transmission System**: SSVEC system of high-voltage lines (69 kV or higher) and all associated equipment for the movement or transfer of electrical energy between power generating plants and the distribution system.

2.80 **UL**: Underwriters Laboratories, Inc.

2.81 **UL 1741**: Underwriters Laboratory, Inc. Standard for Inverters, Converters, Controllers, and Interconnection System Equipment for Use with Distributed Energy Resources (February 15, 2018), with no future editions or amendments, which is incorporated by reference; on file with the Commission; and published by and available from Underwriters Laboratories, Inc., 151 Eastern Avenue, Bensenville, IL 60106-3072 and available through https://standardscatalog.ul.com.

2.82 **UL 1741SA**: The approved supplemental amendment of UL 1741 that defines the manufacturing (including software) and product testing requirements for advanced inverters.

2.83 **Unsafe Operating Conditions**: Conditions that, if left uncorrected, could result in any of the following: a) harm to personnel; b) damage to equipment; c) adverse effect to the safe operation of the Power Supply System; or d) operation of the GF outside parameters required by the Interconnection Agreement.

2.84 **Utility**: The electric utility entity (SSVEC) that constructs, operates and maintains the electrical power supply system (transmission and distribution) for the receipt and/or delivery of electric power, and ls a public service corporation under Arizona Constitution, Article 15, § 2.

2.85 **Utility Grade Relays**: Relays specifically designed to protect and control electric power apparatus, tested in accordance with the following ANSI/IEEE standards:

(a) ANSI/IEEE C37.90-1989 (R1994), IEEE Standard for Relays and Relay Systems Associated with Electric Power Apparatus.
(b) ANSI/IEEE C37.9.01-1989 (R1994), IEEE Standard Surge Withstand (SWC) Tests for Protective Relays and Relay Systems.
(c) ANSI/IEEE C37.90.2-1995, IEEE Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers.

2.86 **WECC:** Western Electricity Coordinating Council (WECC). In 2002, WSCC became WECC.

2.87 **WSCC:** Western System Coordinating Council.

3.0 OVERVIEW OF DISTRIBUTED GENERATION (ACC - SCREENS)

3.1 For Interconnection of a proposed Generating Facility to a distribution circuit. The aggregated generation on the circuit, including the proposed Generating Facility, shall not exceed 15% of the total circuit annual peak load as most recently measured at the substation or on the line section (if available), or the circuit hosting capacity limit, whichever is greater. Non-Exporting Systems, regardless of system size, and Inadvertent Export systems with a Maximum Capacity of 20 kW and under shall not be subject to this subsection.

3.2 A proposed Generating Facility shall not contribute more than l0% to a distribution circuit's maximum fault current at any point on the Distribution System, including during normal contingency conditions that may occur due to reconfiguration of the feeder or the distribution substation.

3.3 The proposed Maximum Capacity of a Generating Facility, in aggregate with the Maximum Capacity of other generation on a distribution circuit. shall not cause any distribution protective devices and equipment (including but not limited to substation breakers, fuse cutouts, and line reclosers), or consumer equipment on the system, to exceed 90% of the short circuit interrupting capability. Interconnection may not be proposed for a circuit that already exceeds 90% of the short circuit interrupting capability.

3.4 A proposed Generating Facility shall be interconnected to the Distribution System as shown in the table below:

Primary Distribution Line Configuration	**Interconnection to Primary Distribution Line**
Three-phase, three wire	If a three-phase or single-phase Generating Facility, Interconnection shall be phase-to-phase
Three-phase, four wire	If a three-phase (effectively grounded) or single-phase Generating Facility, Interconnection shall be line-to-neutral

3.5 If a proposed Generating Facility is to be interconnected on single-phase shared secondary, the Aggregate generation capacity on the shared secondary. including the proposed Maximum Capacity of the Generating Facility shall not exceed 75% of the service transformer rating. Non-Exporting Systems and Inadvertent Export systems shall not be subject to this subsection.

3.6 If a proposed Generating Facility is single-phase and is to be interconnected on a transformer center tap neutral of a 240-volt service its addition shall not create an imbalance between the two sides of the 240-volt service of more than 20% of the nameplate rating of the service transformer.

3.7 A proposed Generating Facility, in aggregate with other generation interconnected to the distribution low voltage side of a substation transformer feeding the distribution circuit where the Generating Facility would interconnect, shall not exceed 10 MW in an area where there are known or posted transient stability limitations to generating units located in the general electrical vicinity (e.g., three or four transmission voltage level busses from the Point of Interconnection). Non-Exporting Systems regardless of system size and Inadvertent Export systems with a Maximum Capacity of 20 kW and under shall not be subject to this subsection.

3.8 A proposed Generating Facility's Point of Interconnection shall not be on a transmission line.

3.9 A proposed Generating Facility shall not exceed the capacity of the Customer's existing electrical service unless there is a simultaneous request for an upgrade to the Customer's electrical service or the Generating Facility is configured never to inject onto the feeder power that exceeds the capacity of the electrical service.

3.10 If a proposed Generating Facility is non-inverter based, the Generating Facility must comply with the Protective Function requirements and any additional Utility Interconnection requirements. which shall be specified in this Interconnection Manual.

4.0 DISTRIBUTED GENERATION TYPES

Distributed generation is any type of electrical generator or static inverter producing alternating current that (a) has the capability of parallel operation with the utility distribution system, or (b) is designed to operate separately from the utility system and can feed a load that can also be fed by the utility electrical system. A distributed generator is sometimes referred to simply as “generator”.

Distributed generators include induction and synchronous electrical generators as well as any type of electrical inverter capable of producing A/C power. A Separate System, or Emergency or Standby Generation System, is designed to never electrically interconnect or operate in electrical parallel with the utility system. A Parallel System, or Interconnected Generation System, is any generator or generation system that can parallel, or has the potential to be paralleled via design or normal operator control, either momentarily or on a continuous basis, with the utility system.

The Member may elect to run the generator as a separate system with non-parallel load transfer between the two independent power systems or may run it in parallel with the utility system. A description and the basic requirements for these two methods of operation are outlined below.

4.1 Separate System

A separate system is one in which there is no possibility of electrically connecting or operating the Member’s generation in parallel with the utility's system. The Member’s equipment must transfer load between the two power systems in an open transition or non-parallel mode.

Emergency or Standby generators, used to supply part or all of the Member’s load during a utility power outage, are required by the National Electrical Code (NEC) to have transfer equipment designed and installed to prevent the inadvertent interconnection of normal and emergency sources of supply in any operation of the transfer equipment.

These generators must be connected to the Member’s wiring through a double throw, “break- before-make” transfer switch specifically designed and installed for that purpose. The transfer switch must be of a fail-safe mechanical throw-over design, which will under no circumstances allow the generator to electrically interconnect or parallel with the utility system. The transfer switch must always disconnect the Member’s load from the utility power system prior to connecting it to the generator. Conversely, the transfer switch must also disconnect the load from the generator prior to re-connecting it back to the utility system. These requirements apply to both actual emergency operations as well as generator testing. All transfer switches and transfer schemes must be inspected and approved by the jurisdictional electrical inspection agency.

Portable generators are not designed for connection to a building’s permanent wiring system and are not to be connected to any such wiring unless a permanent and approved transfer switch is used. Failure to use a transfer switch can result in back-feed into the utility system – the generator voltage can back-feed through the utility transformer and be stepped up to a very high voltage, which poses a potentially fatal shock hazard to anyone working on the power lines or on utility equipment.

4.2 Parallel System

A parallel, or interconnected, generator is connected to a bus common with SSVEC's system, which may result in a transfer of power between the two systems. In interconnected operations a Member's generator becomes an integral part of the utility system that must be considered in the electrical protection and operation of the utility system.

Parallel generators encompass any type of distributed generator or generating facility that can electrically parallel with, or potentially back-feed SSVEC's system. Additionally, any generator system using a "closed transition" type transfer switch or a multi-breaker transfer scheme, or an electrical inverter that can be configured or programmed to operate in a "utility interactive mode" constitutes a potential back-feed source to the utility system, and is classified as an interconnected generator.

For a Member to interconnect a generator to SSVEC's system, specific interconnection and contractual requirements must be met, and information must be submitted for all interconnected generators as is specified in the various sections of this document. Requirements include a DG Service Disconnect, as well as protective relaying, metering, communication links, and other safety and information requirements. SSVEC personnel will inspect the system, and SSVEC reserves the right to witness testing of these protective schemes. The Member must enter into an Interconnection Agreement and, as applicable, an Electric Supply/Purchase Agreement with the utility. SSVEC approval is not extended to any specific type of generator or generator scheme since each project is site specific and needs to be reviewed on a case-by-case basis.

Per Arizona Administrative Code R14-2-2603, the ACC has designated three system configurations operated in parallel with SSVEC's system.

a. Exporting System
b. Non-Exporting System
c. Inadvertent Export System

In addition to the various other requirements specified in this document, Parallel Systems shall specifically comply with the technical requirements outlined in the Interconnection Technical Requirements section (Section 7) of this document.

5.0 GENERAL INFORMATION & REQUIREMENTS

The Member is financially responsible for all facilities required to be installed solely to interconnect the Member's generation facility to the utility system. This includes connection, conductors, conduits, transformation, switching, protective relaying, metering, grounding and safety equipment, including a visible open DG Service Disconnect switch and any other requirements as outlined in this document or other special items specified by SSVEC. All such Member facilities are to be installed by the Member at the Member's sole expense. In the event that additional SSVEC facilities are required to be installed to accommodate the Member's generation, SSVEC will install such facilities at the Member's expense. SSVEC shall also charge the Member for any administrative costs and/or the costs of studies required to interconnect the Member's generation facilities. Studies may include but are not limited to:

(a) review of grounding adequacy
(b) fault current calculation and protective relay settings
(c) interaction of Member's generating facility with SSVEC 's system

The Member will own and be responsible for designing, installing, operating and maintaining:

(a) The generating facility in accordance with the requirements of all-applicable electric codes, laws and governmental agencies having jurisdiction. This includes, but is not limited to:

- UL 1741 – Inverters
- UL 1703 - PV Panels
- UL 2200 – Microturbines
- IEC 61400 – Wind Turbines
- UL 1008 – Transfer Switches
- IEEE 519 – Harmonics
- IEEE 1547-2018 – Distributed Resources/Utility Interconnection.
- IEEE 1547-1-2020 – IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces.
- IEEE 929-2000 - Recommended Practice for Utility Interface of Photovoltaic Systems
- NEC Article 250 – Grounding
- NEC Article 445 – Generators
- NEC Article 690 - Solar Photovoltaic Systems
- NEC Article 700 – Emergency Systems
- NEC Article 702 – Optional Standby Systems

(b) Any control and protective devices, in addition to protective relays and devices specified in this document, to protect its facilities from abnormal operating conditions, including but not limited to, electric overloading, abnormal voltages, and fault currents.

(c) Interconnection facilities on the Member's premises as may be required to deliver power from the Member's generating facility to the utility system at the Point of Interconnection.

(d) The Member shall install equipment that will:

- not present any hazards to the utility personnel, other Members or the public,
- minimize the possibility of damage to the utility or other Member equipment,
- not adversely affect the quality of service to other Members, and
- not hamper efforts to restore a feeder to service (specifically when a clearance or hold tag is required).

In addition, the Member must:

(a) install its generating facility to meet all the interconnection, safety, and protection requirements outlined in this document,

(b) enter into an Interconnection Agreement with SSVEC and, if applicable, an Electric Supply/Purchase Agreement with SSVEC.

(c) comply with all applicable service schedules and requirements, pricing plans, tariffs, Rules and Regulations, and any other applicable requirements approved by the Arizona Corporation Commission (ACC).

(d) for new installations all service entrance equipment must be submitted in writing to SSVEC for review and approval.

The protective and safety devices (relays, circuit breakers, disconnect switches, communication channels etc.) specified in this document must be installed and placed into service before allowing parallel operation of Member's generation facilities with SSVEC's system. The purpose of these devices is to isolate the Member's generating equipment from the utility system whenever faults or disturbances occur and for maintenance purposes. Modifications to SSVEC's electrical system configuration or protective equipment may also be required, at the expense of the Member, in order to accommodate parallel generation. Additional agreements may be required between the Member and SSVEC before modifications to the distribution system are made.

SSVEC will not assume any responsibility for the protection of the Member's generator(s), or of any other portion of the Member's electrical equipment. The Member is fully and solely responsible for protecting the Member's equipment in a manner to prevent any faults or other disturbances on SSVEC's distribution system from damaging the Member's equipment.

The Member must obtain all required permits.

5.1 Insurance

Per Arizona Administrative Code R14-2-2607, SSVEC shall not require a Customer to maintain general liability insurance coverage as a condition for Interconnection, except as provided in subsection (D) of the referenced article. SSVEC does reserve the right to pursue remedies at law against a Member to recover damages resulting from Members DG interconnection. Should SSVEC, in the future, find it necessary to obtain financing from RUS, a Member may be required to maintain liability insurance to the extent necessary to meet SSVEC's obligations to RUS.

5.2 Interconnect Agreement

All interconnected Members are required to sign, in addition to any other special agreements as may be applicable, an Interconnect Agreement with SSVEC.

5.3 Electric Supply/Purchase Agreement

Members purchasing energy from SSVEC, utilizing an interconnected DG system, may be required to sign a trilateral agreement for backup, supplemental and maintenance power from SSVEC and/or AEPCO.

Members operating a parallel generator may also be required to sign an agreement or take service under a tariff with SSVEC and if applicable with AEPCO that provides for movement of power over SSVEC's distribution and AEPCO's transmission systems.

The Member may sell power to AEPCO, or if applicable, other utilities, electric wholesalers. These entities may or may not be obligated to purchase this power and any such sales would be made under the terms and conditions offered by the purchaser. For a Member who wishes to sell power to others, the Member will be required to:

(a) Choose the applicable SSVEC tariff, and if applicable, AEPCO tariff that allows for the movement of power over SSVEC 's distribution and if applicable, AEPCO transmission systems;

(b) Sign an agreement with the purchaser of the electric power, and/or

(c) Follow all applicable criteria/protocols established by NERC, WSCC, the approved Regional Transmission Organization (RTO), and/or Arizona Independent Scheduling Administrator Association (AZISA) regarding the sale of power to others.

All tariffs under the purchase and supply arrangements are subject to change by SSVEC and / or AEPCO as applicable, and approval of the ACC and other regulatory agencies including the Rural Utilities Service (RUS).

5.4 Interconnections

SSVEC will not install or maintain any lines or equipment on a Member's side of the Point of Interconnection, except that SSVEC may install its meter and/or research equipment. Only SSVEC authorized employees may make and energize the service connection between the utility system and the Member's service entrance conductors.

Normally, the interconnection will be arranged to accept only one type of standard service at one Point of Interconnection. If a Member's generating facility requires a special type of service, or if sales to SSVEC will be at a different voltage level, the services will only be provided according to additional specific terms that are outlined in the Electric Supply/Purchase Agreement, applicable service schedules, or other terms and conditions governing the service.

5.5 Easements and Rights of Way

Where an easement or right of way is required to accommodate the interconnection, the Member shall be required to provide, or obtain from others and provide, suitable easements or rights of way, in SSVEC's name. For specific information concerning easements or Right-of-Way, refer to SSVEC's Line Extension Application and Service Entrance Requirements documentation.

5.6 Member/Utility Rights & Responsibilities

Specific Rights and Responsibilities are enumerated in Arizona Administrative Code Title 14; Chapter 2; Article 26; subsections: R14-2-2604 and R14-2-2605. The reasonable expectations and accommodations for and by both parties entering into an Interconnection Agreement are explicitly explained therein. Article 26 referenced above will be the defining document guiding SSVEC efforts in reviewing and approving Generating Facilities as submitted by members for the purpose of interconnection with the SSVEC Distribution System.

5.7 Meter Installations

SSVEC has specific metering requirements for a GF that is not installed behind a revenue meter. The Member shall contact SSVEC for design requirements and installation details for all Class III systems or systems operating at nonstandard voltages. SSVEC may elect to install, own, and/or operate the metering of the GF at the Member's sole cost.

5.8 Fees

SSVEC will charge various Fees as applicable to the DG Interconnection process. These fees are enumerated below:

- Pre-Application Report Fee (where required) - $125
- Interconnection Application (Class 1) Design Review Fee - $150
- Interconnection Application (Class 2) Design Review Fee - $250
- Interconnection Application (Class 3) Design Review Fee - $500
- Supplemental Review Fee (where required) - $500
- Initial Inspection Fee – No Charge, Re-Inspection Fee (if required) - $75
- Feasibility Study Fee – Deposit of 100% of Good Faith Estimate of cost of materials and labor to complete study. Actual Costs to be paid by Member upon completion of study.
- System Impact Study Fee – Deposit of 100% of Good Faith Estimate of cost of materials and labor to complete study. Actual Costs to be paid by Member upon completion of study.
- Facility Study Fee – Deposit of 100% of Good Faith Estimate of cost of materials and labor to complete study. Actual Costs to be paid by Member upon completion of study.

6.0 DESIGN CONSIDERATIONS AND DEFINITION OF CLASSES

Protection requirements are influenced by the size and characteristics of the parallel generator along with the nature and operational characteristics of the associated utility system. Therefore, similar units connected to different lines could have different protection requirements based on varying load conditions, as well as on the specific utility feeder and transformer characteristics.

6.1 Synchronous Units

Synchronous generators are generally capable of supplying sustained current for faults on SSVEC's system. These units can also supply isolated utility load providing the load is within the units' output capability and must be prevented from energizing a de-energized utility line.

SSVEC will specify the maximum allowable protective relay time settings for a particular proposed distributed generator installation. The Member is responsible for ensuring generator separation prior to utility circuit re-energization to prevent out-of-sync paralleling.

6.2 Induction Units

Induction generators are basically induction motors that are mechanically driven above synchronous speed to produce electric power. These units do not have a separate excitation system and, as such, require that their output terminals be energized with AC voltage and supplied with reactive power to develop the magnetic flux. Induction generators are therefore normally not capable of supplying sustained fault current into faults on the utility system. Such units are generally not capable of supplying isolated load when separated from the utility system; however, it is possible for an induction generator to become self-excited if a sufficient amount of capacitance exists at its output terminals. Under conditions of self-excitation, an induction generator will be capable of supplying isolated load, providing the load is within the units' output capability. In most cases when self-excitation occurs it will be accompanied by a sudden increase in terminal voltage. SSVEC and its other Members must be protected from out-of-sync closing and over-voltages that can occur whenever an induction generator becomes self-excited. Induction units shall therefore be designed to automatically separate from SSVEC's system upon loss of utility voltage and prior to reclosing of SSVEC's feeder.

6.3 Static Inverters

Static inverters convert DC power to AC by means of electronic switching. Switching can be controlled by the AC voltage of the utility's supply system (line-commutated) or by internal electronic circuitry (forced-commutated). Line-commutated inverters are generally not capable of operating independently of the utility's AC supply system and, as such, cannot supply fault current or isolated loads under normal conditions. Forced-commutated, or self-commutated, inverters are capable of supplying fault current and load independently of the AC supply system. Any forced-commutated inverter that is to be interconnected with the utility must be specifically designed for that purpose, i.e. it must be designed to accommodate parallel interfacing and operation. Static inverters must be designed to automatically separate from the utility system upon loss of utility voltage and prior to reclosing of the utility feeder.

6.4 Definition of Generator Size Classes

The following generator size classifications are used in determining specific minimum protective requirements for distributed generation facilities. Specified ratings are for each connection to SSVEC's system. Members must satisfy, in addition to the general requirements specified in this document, the minimum relaying requirements given in this document for each generator class.

(a)	Class I	<20 kW, single or three phase.
(b)	Class II	20 kW to 2MW, three phase.
(c)	Class III	>2MW, three phase.

7.0 INTERCONNECTION TECHNICAL REQUIREMENTS

The requirements and specifications outlined in this section are applicable to distributed generation interconnected for parallel operation with SSVEC's distribution system, unless otherwise specified. The protection and safety devices and other requirements specified in the following sections are intended to provide protection for the utility system, utility workers, other utility Members and the general public. They are not imposed to provide protection for the Member's generation equipment or personnel; this is the sole responsibility of the Member.

With respect to the above protection objectives, it is necessary to disconnect the parallel generator when trouble occurs. This is to:

(a) ensure if a fault on the utility system persists, the fault current supplied by the Member's generator is interrupted;
(b) prevent the possibility of reclosing into an out-of-synch isolated system composed of the utility distribution system, or a section thereof, and the Member's generator; and
(c) prevent reclosing into the Member's generation system that may be out of synchronization or stalled.

The protection requirements are minimal for smaller installations but increase as the size of the Member's generation increases. Small installations usually ensure that, for any fault on SSVEC's system, SSVEC protective devices will operate and normally isolate the generation with a large amount of load, causing under-voltage automatic shutdown of the generator. For larger installations the probability of isolated operation is higher since the available generation may be adequate to carry the entire load, or part thereof, of the local utility circuit. In instances where the utility system arrangement is such that it is possible that the generators will not always be isolated with comparatively large amounts of load, additional protection (including a transfer trip scheme) and generator shutdown schemes are required.

SSVEC and AEPCO apply automatic reclosing to overhead distribution and transmission circuits. When the utility source breaker trips, the Member must ensure that their generator is disconnected from the utility circuit prior to automatic reclosure. SSVEC applies reclosing at substations and at other protective device locations along its distribution lines, in which the distribution circuit can be re-energized in less than 20cycles (333 msec) after a protective relay trip. In order to assure reliable service to other SSVEC Members, the Member's generator shall be disconnected from SSVEC's system within 5 cycles (83.3 msec) of a utility initiated protective relay trip. Inability of the Members equipment to meet these time constraints may require the Member to install a transfer trip scheme. In addition, automatic reclosing out-of-synch with the Member's generator may cause severe damage to Member equipment and could also pose a serious hazard to Member or utility personnel. In a few cases, there are in-line reclosers away from the substation. In these situations, transfer trip is not possible. Additional review by SSVEC is required in these cases.

7.1 General Technical Requirements

(a) Member is responsible for obtaining and maintaining all required permits.

(b) Multiple generator connections on the same utility service are permitted; however, a DG Service Disconnect for the facility will be required (normally located at the service entrance section).

(c) In the event that a generator, or aggregate of generators, are of sufficient size to carry the entire (minimum) load of the SSVEC distribution feeder, or if a generator size and physical location on a feeder is such that it could support an isolated (islanded) section of the feeder, then a transfer trip scheme shall be required at the Member's expense. If a transfer trip is required, a communication channel and telemetering shall also be required, at the Member's expense, to facilitate proper parallel operation. The transfer trip channel may be microwave or fiberoptic, or other SSVEC approved medium. The transfer trip equipment will be configured to trip the Member's generator for loss of the channel signal.

(d) For synchronous generators, the Member shall ensure that any potential open points such as breakers, fused disconnect switches, etc., located between the generator breaker and utility service are appropriately equipped with either (1) keyed or other suitable mechanical interlocks to prevent them from being inadvertently opened when the generator breaker is closed, or (2) contacts that will instantaneously trip the generator breaker if any such switch were opened while the generator breaker was closed. The intent of the above is to prevent the opening and subsequent (inadvertent) re-closing of such a breaker or switch onto an un-synchronized generator.

(e) Member shall ensure that the design and installation of electric meter(s) is such that the meter(s) are located on SSVEC's-side of the generator breaker on a normally energized bus.

(f) The Member is responsible for the design, installation, operation and maintenance of all equipment on the Member's side of the Point of Interconnection. It is required that the Member submit specifications and detailed plans as specified in the Application and Equipment Information Form (see Appendix) for the installation to SSVEC for review. Review by the SSVEC does not indicate acceptance or approval by the utility or other authorities.

7.2 DG Service Disconnect

The Member shall install and maintain a DG Service Disconnect in order to isolate all ungrounded conductors of the Member's generating facility from SSVEC's system.

The DG Service Disconnect will normally be required to be installed at the Member's electrical service entrance section; however, it may be located in the immediate vicinity of the generator, subject to utility approval.

The DG Service Disconnect must be rated for the voltage and current requirements of the generation facility, and must meet all applicable UL, ANSI and IEEE standards. The DG Service Disconnect shall meet the requirements of the National Electric Code (NEC), and shall be properly grounded.

In cases where the DG Service Disconnect is a load break switch, the switch blades, jaws and the airgap between them shall all be clearly visible when the switch is in the "open" position. It is not acceptable to have any of the "visible open" components obscured by the switch case or an arc-shield, etc. Only switches specifically designed to provide a true "visible open" are acceptable. Such

switch shall be installed in a place to provide easy and unrestricted accessibility to SSVEC personnel on a 24-hour basis. SSVEC shall have the right to lock open the switch without notice to the Member when interconnected operation of the Member's generating facility with the SSVEC's system could adversely affect the system or endanger life or property, or upon termination of the Interconnect Agreement. For multi-phase systems, the switch shall be gang- operated.

In cases where the DG Service Disconnect will be installed on a line at a voltage above 500V, SSVEC may require the Member to install protection equipment appropriately sized for the proposed DG system. This may include, but not necessarily so in all cases, a rack-out breaker, along with a racking tool and grounding device, in lieu of a load break switch. In these cases, SSVEC will work with the Member to determine the best option and ensure that the safety requirements are met.

7.3 Dedicated Transformer

Member generators with a combined total rating of over 10 kW, as measured at the service entrance, may be required to be isolated from other Members fed off the same utility transformer by a dedicated power transformer connecting to the utility distribution feeder. The primary purpose of the dedicated transformer is to ensure that (a) the generator cannot become isolated at the secondary voltage level with a small amount of other-Member load, and (b) the generator does not contribute any significant fault current to other Members' electrical systems. Dedicated transformers also help to confine any voltage fluctuation or harmonics produced by the generator to the Member's own system. The utility will specify the transformer winding connections and impedance.

7.4 Power Quality

Member shall ensure that the electrical characteristics of its load and generating equipment will maintain the SSVEC's normal power quality requirements. Any deviation from sine wave form or unusual short interval fluctuations in power demand or production shall not be such as to result in impairment of service to other Members or in interference with operation of computer, telephone, television or other communication systems or facilities. Those power quality items will generally include the following:

- Current Imbalance
- Harmonics
- Voltage Flicker
- Power Factor

Exhibit 1 lists, for general informational purposes, SSVEC's Power Quality requirements which may be updated from time to time. The Member should verify actual requirements before designing/installing GF.

7.5 Voltage Requirements

Member generating equipment must deliver at the Point of Interconnection, 60 Hertz, either single or three-phase power at one standard SSVEC voltage as may be agreed upon by the Member and SSVEC subject to availability at the premises.

7.6 Telemetry

For Class III generators, the Member shall provide to SSVEC, at Member's cost, MW and MVAR transducer output quantities for the purpose of control area system load calculations.

7.7 WECC/NERC Requirements

If applicable, Member shall comply with WECC/NERC generator testing criteria, including but not limited to, the applicable criteria regarding the installation and operation of Power System Stabilizers (PSS) and Automatic Voltage Regulators (AVR).

7.8 Labeling Requirements

(a) General Requirements

The Member shall conform to the NEC for labeling of generation equipment, switches, breakers, etc. SSVEC will assume the responsibility for labeling any SSVEC owned equipment.

(b) DG Service Disconnect

The Member shall label the DG Service Disconnect by means of a permanently attached placard with clearly visible and permanent letters minimum 1" high. Such Label shall say "DG SERVICE DISCONNECT". In addition, SSVEC may need to attach its own label to the DG Service Disconnect.

If the DG Service Disconnect is located other than at the Service Entrance (allowed by mutual agreement only) a special placard shall be installed on the Service Entrance announcing the location of the DG Service Disconnect

(c) Service Entrance

A sign shall be placed at the service entrance indicating type and location of onsite emergency power sources, legally required standby power sources, and onsite optional standby power sources, as defined by the NEC.

The NEC also requires a permanent directory, denoting all electrical power sources on or in the premises, shall be installed at each service equipment location and at locations of all electric power production sources capable of being interconnected. Installations with large numbers of power production sources shall be permitted to be designated by groups.

7.9 Protective Requirements

(a) General Requirements

1. The Member shall be solely responsible for properly protecting and synchronizing the Member's generator(s) with SSVEC's system. The Member is solely responsible for the protection of their equipment from automatic reclosing by the utility.

2. Devices with definite level and timing characteristics (e.g., micro-processor type relays) will be necessary to meet the requirements established herein.

3. Generator classes II and above (>20 kW), must utilize discrete relays, separate and independent voltage and frequency relays and associated trip paths to the generator breaker (automatic interrupting device). This is to ensure a redundant trip function in the event of a single relay failure or out-of-tolerance condition.

   - The instantaneous/time overcurrent functions can be integrated into a single ground overcurrent relay.
   - The over/under voltage functions can be integrated into a single over/under voltage relay.
   - The over/under frequency functions can be integrated into a single over/under frequency relay.

   Protective relays or micro-processor based devices may be used provided that the required functionality described herein is demonstrated. For generating equipment that is capable of sustained operation above its normal current rating, phase overcurrent tripping shall be required to trip the unit should it exceed this rating.

4. For generator protection schemes that utilize microprocessor based, multi-function relays, one of the following requirements must be met:

   (a) Protective relay failure will not only alarm but will also trip the generator breaker/contactor.

   (b) If relay failure alarms, but does not trip the generator breaker, then additional relaying which meets the requirements stated herein for each class must be provided.

5. With the addition of generation at a Member site, the ground fault current magnitude might increase to the level where the grounding grid is insufficient to protect personnel from step or touch potentials. Therefore, the Member is required to ensure the adequacy of the Member's grounding grid to keep the step and touch potentials at a safe level in the vicinity of equipment accessible by utility personnel or the general public.

6. The Member shall ensure that the GF protective relaying and controls are adequately protected from electrical surges that may result from lightning, utility switching or electrical faults.

7. Addition of the Member's GF may require additional control, metering and protective devices on SSVEC's facilities. The Member will be responsible for all labor and material costs associated with their installation.

8. Exhibit 2 lists for general informational purposes SSVEC's relay settings which may be updated from time to time. The Member should verify with SSVEC prior to designing/installing a GF

(b) Generator Class Protective Requirements

SSVEC shall require the following as minimum acceptable protection:

1. Class I (Single or Three Phase: <20 kW)

a) The minimum protection required is an under-voltage contactor.

b) For all synchronous generators and forced commutated inverters, either a manual or automatic synchronizing scheme is required.

2. Class II (Three Phase: 20 kW – 2 MW)

a) Protection for overvoltage, undervoltage, over-frequency, and under-frequency is required.

b) For all synchronous generators and forced commutated inverters, either a manual or automatic synchronizing scheme is required

c) Phase time and instantaneous overcurrent relays are required.

d) A ground time and instantaneous over current relay is required. For installations interconnected to the utility through a transformer with connections that will not supply current to a ground fault on the utility system, a special ground fault detection scheme shall be necessary. The utility will notify Member of any such requirements after a preliminary review of the Member's proposed installation.

e) Other equipment such as supervisory control and alarms, telemetering, transfer trip and associated communications channel may be required in some instances, including but not limited to the following situations: (a) the generator, or an aggregate of generators is large relative to the minimum load on a feeder or sectionalized portion of the feeder, (b) the GF is involved in power transactions requiring the grid, or (c) the GF is remotely controlled by, or dispatched by the utility. The utility will notify Member of any communications requirements after a preliminary review of the proposed installation.

f) Overload tripping shall be required for any generator capable of sustained operation above its normal current rating

3. Class III (Three Phase: >2 MW)

a) For this class of installation, utility grade protection devices and equipment will be required. If a static inverter type system is utilized, the system must adhere to IEEE 929-2000, NEC 690, and UL 1741 guidelines.

b) Protection for overvoltage, undervoltage, over-frequency, under-frequency and loss of utility source and loss of phase is required.

c) For all synchronous generators and forced commuted inverters, either a manual or automatic synchronizing scheme is required.

d) A ground time and instantaneous overcurrent relay is required. For installations interconnected to the utility through a transformer with connections that will not supply current to a ground fault on the utility system, a special ground fault detection scheme shall be necessary. The utility will notify Member of any such requirements after a preliminary review of the Member's proposed installation.

e) Voltage-controlled/restrained time overcurrent relays may be required.

f) A phase sequence voltage relay is required.

g) Other equipment such as supervisory control and alarms, telemetering, transfer trip and associated communications channel may be required in some instances, including but not limited to the following situations: (a) the generator, or an aggregate of generators is large relative to the minimum load on a feeder or sectionalized portion of the feeder, (b) the GF is involved in power transactions requiring the grid, or (c) the GF is remotely controlled by, or dispatched by the utility. The utility will notify Member of any communications requirements after a preliminary review of the proposed installation.

h) Overload tripping shall be required for any generator capable of sustained operation above its normal current rating.

i) Static Inverters must comply and meet testing requirements of IEEE 929- 2000 and UL 1741 to prevent islanding and meet power quality requirements.

4. Soft Loading Requirement

All Class II (3 phase 21kw – 2MW), and Class III (>2MW) Units shall have a soft loading feature to gradually transfer the load between Sulphur Springs Valley Electric Cooperative's distribution system and the Generation System. This minimizes the voltage and frequency problems, by softly loading and unloading the Generation System.

8.0 APPLICATION PROCESS AND DOCUMENTATION REQUIREMENTS

8.1 SSVEC approvals given pursuant to the review and approval process and the Interconnection Agreement shall not be construed as any warranty or representation to Member or any third party regarding the safety, durability, reliability, performance or fitness of Member's generation and service facilities, its control or protective device or the design, construction, installation or operation thereof.

8.2 The "Application and Equipment Information Form" (see Appendix) must be completed by the Member and all supplementary information requested therein must be provided to SSVEC for review.

8.3 Pre-Application Report

A. An Applicant requesting a Pre-Application Report shall submit to SSVEC:

1. The Applicant's contact information (name. address. phone, and email);
2. A proposed Point of Interconnection. Sufficiently identified by latitude and longitude, site map, street address, meter number, account number, or some combination of these to identify the location of the Point of Interconnection,
3. A description of the proposed generation technology and fuel source, and;
4. A non-refundable processing fee of $150.00 is due at time of the application.

B. An Applicant requesting a Pre-Application Report shall understand that:

1. The existence of "available capacity" does not mean that the Interconnection of a Generating Facility with a nameplate capacity that is equivalent to the available capacity may be completed without impacts, because the Pre-Application Report does not address all of the variables studied as part of the Interconnection review process;
2. The Distribution System is dynamic and subject to change; and
3. Data provided in the Pre-Application Report may become outdated and may not be useful at the time an Application is submitted.

C. Within 21 calendar days of receipt of a completed Pre-Application Report request, SSVEC shall provide a Pre-Application Report, which shall include the following information. as available:

1. The total capacity (MW) of the substation/area bus or bank and circuit likely to serve the proposed site;
2. The allocated capacity (MW) of the substation/area bus or bank and circuit likely to serve the proposed site;
3. The queued capacity (MW) of the substation/area bus or bank and circuit likely to serve the proposed site;
4. The available capacity (MW) of the substation/area bus or bank and circuit most likely to serve the proposed site;
5. Whether the proposed Generating Facility is located on an area. spot. or radial network;

6. The substation nominal distribution voltage or nominal transmission voltage. if applicable;
7. The nominal distribution circuit voltage at the proposed site;
8. The approximate circuit distance between the proposed site and the substation;
9. The peak load estimate and minimum load data of each relevant line section, when available;

84 Application Tracks

A. Level 1 Super Fast Track

1. A Customer interconnecting an inverter-based Generating Facility with a Maximum Capacity of 20 kW or less, which only uses Certified Equipment, shall apply for Interconnection under the Level l Super Fast Track.

2. To qualify for Level 1 Super Fast Track, the Generating Facility shall comply with Section 3 Screens (A), (E), and (F).

3. Level 1 Super Fast Track to proceed as follows:

    a. Within 14 calendar days of receiving a submitted Interconnection Application, SSVEC will determine if the GF design meets the requirements for Interconnection approval or not.

    b. If the applicant is notified that the application fails to meet the Interconnection Requirements, the applicant has 30 calendar days to notify SSVEC of their intent to proceed with the application process and submit additional information as needed to meet the Interconnection Requirements. Failure to notify SSVEC within 30 calendar days will result in the application being considered withdrawn.

    c. A 30 day extension may be requested to extend the time period for submission.

    d. After receiving a revised submission, steps (a-c) are repeated until the design is approved or withdrawn.

    e. Additional review fees will not be charged to the applicant as long as the revised submission includes only corrections and/or additions or subtractions as specified in the original SSVEC review comments.

f. Generating Facility owner/operator will be responsible for any costs necessary to modify SSVEC facilities or equipment to accommodate Interconnection.

g. If operating characteristics of GF system can be modified and agreed to by both SSVEC and Member, the GF operating characteristics may be modified to reduce GF costs.

B. Level 2 Fast Track:

1. A Customer interconnecting a Generating Facility with a Maximum Capacity of up to, but not exceeding 2 MW, excluding a Generating Facility processed in accordance with the Level 1 Super Fast Track, shall apply for Interconnection under the Level 2 Fast Track Application process.

2. To qualify for Level 2 Fast Track, the Generating Facility shall comply with Section 3 Screens (A) through (J).

3. Level 2 Fast Track to proceed as follows:
    a. Within 21 calendar days of receiving a submitted Interconnection Application, SSVEC will determine if the GF design meets the requirements for Interconnection approval or not.

    b. If the applicant is notified that the application fails to meet the Interconnection Requirements, the applicant has 30 calendar days to notify SSVEC of their intent to proceed with the application process and submit additional information as needed to meet the Interconnection Requirements. Failure to notify SSVEC within 30 calendar days will result in the application being considered withdrawn.

    c. A 30 day extension may be requested to extend the time period for submission.

    d. After receiving a revised submission, steps 1to3, are repeated until the design is approved or withdrawn.

    e. Additional review fees will not be charged to the applicant as long as the revised submission includes only corrections and/or additions or subtractions as specified in the original SSVEC review comments.

    f. Generating Facility owner/operator will be responsible for any costs necessary to modify SSVEC facilities or

equipment to accommodate Interconnection.

g. If operating characteristics of GF system can be modified and agreed to by both SSVEC and Member, the Gf operating characteristics may be modified to reduce GF costs.

C. Level 3 Study Track

1. A Customer interconnecting a Generating Facility with a Maximum Capacity of 2MW or greater, or a Generating Facility that does not meet the screening requirements for Level l Super Fast Track, Level 2 Fast Track, or Supplemental Review, shall apply for Interconnection under the Level 3 Study Track Application process.

2. An Applicant may request a pre-application meeting with the Utility to discuss the proposed design insulation and operation of the Generating Facility prior to submission of an Application.

3. Level 3 Study Track to proceed as follows:

a. Within 30 calendar days of receiving a submitted Interconnection Application transferred from Level 1, Level 2, or Supplemental Review, SSVEC will determine if the GF design meets the requirements for Interconnection approval or not.

b. If the applicant is notified that the application fails to meet the Interconnection Requirements, the applicant has 30 calendar days to notify SSVEC of their intent to proceed with the application process and submit additional information as needed to meet the Interconnection Requirements. Failure to notify SSVEC within 30 calendar days will result in the application being considered withdrawn.

c. A 30 day extension may be requested to extend the time period for submission.

d. After receiving a revised submission, steps (a-c) are repeated until the design is approved or withdrawn.

e. Additional review fees will not be charged to the applicant as long as the revised submission includes only corrections and/or additions or subtractions as specified in the original SSVEC review comments.

f. Generating Facility owner/operator will be responsible for any costs necessary to modify SSVEC facilities or equipment to accommodate Interconnection.

g. If operating characteristics of GF system can be modified and agreed to by both SSVEC and Member, the Gf operating characteristics may be modified to reduce GF costs.

4. Feasibility Study:

The Feasibility Study shall be completed within 90 calendar days and shall include;

a. Review of short circuit currents, including contribution from the proposed generator, as well as coordination of and potential overloading of distribution circuit protection devices,
b. Provide initial details and ideas on the complexity and likely costs to interconnect prior to commitment of costly engineering review. and
c. May be used to focus or eliminate some or all, of the more intensive System Impact Study.

5. System Impact Study

When required, a System Impact Study will be conducted within 90 days to include:

a. Load Flow Study
b. Short-circuit Study
c. Circuit protection and coordination study
d. Impact on system operation
e. Stability study, and the conditions justifying inclusion
f. Voltage collapse study. and the conditions justifying inclusion

6. Facilities Study

The Facilities Study shall be completed within 90 calendar days.

The Facilities Study shall delineate the detailed costs of construction and milestones. Construction may include new circuit breakers, relocation of reclosers. new grid extensions, reconductoring lines, new transformers. protection requirements, and interaction.

D. Supplemental Review

1. If SSVEC determines that an Application for Interconnection cannot be approved without conducting a Supplemental Review, or if requested by the Applicant:

a. SSVEC shall, within seven calendar days of making the determination or receiving the request, provide the Applicant a good faith estimate of the cost of the Supplemental Review and a written agreement setting forth the terms of the Supplemental Review, and

b. If the Member desires to proceed with the Application. the member shall, within 14 calendar days of receipt of the good faith estimate and written agreement, size the written agreement and submit to SSVEC a deposit for the full estimated cost of the Supplemental Review.

2. The Applicant may specify the order in which SSVEC will complete the screens in Item 5 below, (Supplemental Review Screens).

3. The Applicant shall be responsible for SSVEC's actual costs for conducting a Supplemental Review and must pay any review costs exceeding the deposit amount within 30 calendar days of receipt of an invoice for the balance. or resolution of any dispute as to those costs. If the deposit amount exceeds the actual costs of the Supplemental Review. SSVEC shall return such excess to the Applicant, without interest, within 30 calendar days of completing the Supplemental Review.

4. Within 21 calendar days following receipt of the deposit for a Supplemental Review, SSVEC shall:

   a. Perform a Supplemental Review by determining compliance with the screens in subsections (5) (a), (b), and (c);

   b. Unless the Applicant has previously provided instructions for how to respond to the Generating Facility's failure to meet any of the Supplemental Review screens:

      i. Notify the Applicant following the failure of any of the screens, and

      ii. If SSVEC is unable to determine compliance with the screen in subsection (5) (a), notify the Applicant within two calendar days of making such determination and request the Applicant's permission to:

         1. Continue evaluating the Interconnection under subsection (5);

         2. Terminate the Supplemental Review and continue evaluating the Generating Facility under Rl4-2-26 l 9 or

         3. Terminate the Supplemental Review upon withdrawal of the interconnection request by the Applicant; and

   c. Notify the Applicant of the results of the Supplemental Review along with copies of the analysis and data underlying SSVEC's determinations of compliance with the screens.

5. Supplemental Review Screens
    a. Minimum Load screen
        i. the aggregate Generating Facility Maximum Capacity on the line section shall be less than 100% of the minimum load for all line sections bounded by automatic sectionalizing devices upstream of the Generating Facility.

        ii. Refer to R14-2-2620 for additional details concerning minimum load requirements.
    b. Voltage and Power Quality screen
        i. Voltage regulation on the line section shall be maintained in compliance with relevant requirements under all system conditions;

        ii. Voltage fluctuation shall be within acceptable limits as defined by IEEE 1453, IEEE Recommended Practice for the Analysis of Fluctuating Installations on Power Systems (October 30, 2015), with no future editions or amendments, which is incorporated by reference; on file with the Commission; and published by and available from IEEE, 3 Park Avenue, l7th Floor, New York, New York 10016, and through http://ieeexplore.ieee.org: and

        iii. Harmonic levels shall meet IEEE 519 limits, IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems (June l1, 2014), with no future editions or amendments, which is incorporated by reference: on file with the Commission, and published by and available from IEEE, 3 Park Avenue. 17th Floor, New York, New York 10016, and through http://ieeexplore.ieee.org.

    c. Safety and Reliability screen - The location of the Generating Facility and the aggregate Maximum Capacity on the line section shall not create impacts to safety or reliability that cannot be adequately addressed without application of the Interconnection Study process. in making this determination regarding potential impacts to safety and reliability, SSVEC shall give due consideration to the following, and any other relevant factors:

        i. Whether the line section has significant minimum loading levels dominated by a small number of members (e.g., several large commercial members);
        ii. Whether the loading along the line section is uniform or even,

iii. Whether the Generating Facility is located in close proximity to the substation (i.e., within less than 2.5 electrical circuit miles);

iv. Whether the line section from the substation to the Point of Interconnection is a main feeder line section rated for normal and emergency ampacity;

v. Whether the Generating Facility incorporates a time delay function to prevent reconnection of the generator to the system until system voltage and frequency are within normal limits for a prescribed time;

vi. Whether operational flexibility is reduced by the Generating Facility. such that transfer of the line section(s) of the Generating Facility to a neighboring distribution circuit/substation may trigger

vii. overloads or voltage issues; and

viii. Whether the Generating Facility employs equipment or systems certified by a recognized standards organization to address technical issues such as, but not limited to, Islanding, reverse power flow, or voltage quality.

6. If the Interconnection satisfies Item 5 above (Supplemental Review Screens), the Application shall be approved for Interconnection and SSVEC shall provide the Applicant notice of the Supplemental Review results.

7. If Interconnection Facilities or minor modifications to SSVEC's system are required for the Interconnection to meet the screens in Item 5 above (Supplemental Review Screens), SSVEC shall notify the Applicant and request for the Applicant to pay for the modifications. If the Applicant agrees to pay for the modifications to SSVEC's electric system, SSVEC shall provide an Interconnection Agreement, along with a non-binding good faith estimate of the cost for the Interconnection Facilities and minor modifications, to the Applicant within seven calendar days after the Applicant agrees to pay for the modifications.

8. If more than Interconnection Facilities or minor modifications to the SSVEC's system would be required for the Interconnection to meet the screens in Item 5 above (Supplemental Review Screens), SSVEC shall notify the Applicant at the same time it notifies the Applicant of the Supplemental Review results, that the Interconnection request shall be evaluated under R14-2-2619, unless the Applicant withdraws its Application.

9. If the Interconnection fails any of the screens in Section 5 above (Supplemental Review Screens), and the Applicant does not withdraw its Application, SSVEC shall continue to evaluate the Application under R14-2-2619.

Each Member shall contact and work closely with SSVEC at all stages of the design to ensure that the project proceeds smoothly. SSVEC will require a single point of contact, identified in the Interconnection Application, with which to coordinate the interconnection process. Exhibit 3 lists for general informational purposes the typical steps required to interconnect a DG with SSVEC.

Contact Persons:

SSVEC's initial contact person for all matters related to DG interconnection shall be:

Title: SunWatts, Program Manager, Member Services
Address: 311 E. Wilcox Drive, Sierra Vista, Arizona, 85635
Phone: (520) 458-4691
Email: Sunwatts@ssvec.com

DG Interconnections requiring SSVEC Engineering support such as when the DG output is intended for power export to or wheeling by the Cooperative, will be forwarded to the Engineering Department after initial contact with the contact person above.

The contact person for SSVEC's Power Supplier for all matters related to DG interconnection shall be:

Name: Eileen Brien, Arizona Electric Power Cooperative, Inc.
Address: P.O. Box 670, Benson, Arizona, 85602
Phone: (520) 586-5228
Email: ebrien@azgt.coop

85 In the event it is necessary for SSVEC to install facilities on its system (including but not limited to control or protective devices, or any other facilities) in order to accommodate the Member's generation facility, SSVEC will install such facilities at the Member's expense.

SSVEC shall also charge the Member for any administrative costs and/or the costs of studies required to interconnect the Member's generation facilities. The payment for SSVEC's services to prepare estimates, design, procure material, and construct will be arranged in a payment schedule agreed to by both SSVEC and Member prior to the start of the project.

86 Following SSVEC's approval of the Member's proposed interconnection, the Member cannot remove, alter or otherwise modify or change the equipment specifications, including, without limitation, the operational plans, control and protective devices or settings, and the generating facility system design, type, size or configuration. If the Member desires to make such changes or modifications, the Member must revise and resubmit to SSVEC plans describing the changes or modifications for approval by SSVEC. No change or modification may be made without the prior written approval of SSVEC.

9.0 TESTING AND START-UP REQUIREMENT

9.1 Following SSVEC's approval of the Member's interconnection, the Member shall, at a minimum, have all specified interface equipment, and associated protective devices field tested and calibrated at the time of installation and shall also perform functional trip testing of these relays and associated generator or inverter breaker. All testing will conform to that specified in *1547.1-2020 - IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces*. Calibration shall include on-site testing of trip setpoints and timing characteristics of the protective functions as required herein. Functional testing, witnessed by SSVEC personnel, must demonstrate that each protective relay or device function as required herein, upon a (simulated) out-of- tolerance input signal, will trip the generator breaker. Functional testing shall also include a simulated loss of control power to demonstrate that the generator breaker or contactor will open. A trip timing test (simulated loss of voltage) will suffice for static inverters rated 50kW or less.

9.2 The Member shall provide SSVEC with a copy of calibration and functional test results. Member must also notify SSVEC at least fifteen (15) working days in advance that such tests are to be performed and allow utility personnel to witness such tests and/or conduct additional startup tests if necessary.

9.3 The Member shall be required to have a signed Interconnect Agreement with SSVEC; and must provide SSVEC with a copy of the insurance certificate, as applicable, prior to electrically paralleling the generating facility with the utility system.

9.4 The Member shall not commence interconnected operation of its generating facility until the installation has been inspected by a SSVEC authorized representative and final written approval is received from SSVEC to commence interconnected operation. The Member shall give notice to SSVEC at least fifteen (15) working days prior to when initial startup is to begin. This notice can run concurrently with 9.2 above, assuming all calibration and functional tests indicate proper operation. SSVEC shall have the right to have a representative present during initial energizing and testing of the Member's system.

9.5 The Member shall have all protective devices tested at the time of installation, prior to initial interconnection, and at intervals not to exceed four years. The Member shall (i) notify SSVEC as to when such tests are to be performed at least fifteen (15) working days prior to such tests and allow SSVEC personnel to witness the testing, and (ii) provide SSVEC with a certified copy of the test results.

10.0 OPERATIONAL AND MAINTENANCE REQUIREMENTS

10.1 Member shall be responsible for operating and maintaining the generator facility in accordance with the requirements of all applicable agencies having jurisdiction.

10.2 The Member shall protect, operate and maintain the generating facility in accordance with those practices and methods, as they are changed from time-to-time that are commonly used in prudent engineering practice and shall operate and maintain the generating facility lawfully in a safe manner and non-hazardous condition.

10.3 In the event SSVEC authorized personnel lock open the DG Service Disconnect, the Member shall not remove or tamper with such lock.

10.4 SSVEC (including its employees, agents and representatives) shall have the right to enter Member's premises at any time without notification to Member to: (a) inspect Member's GF, protective devices, and to read or test SSVEC installed equipment and (b) isolate the GF from SSVEC's system without notice if, in SSVEC's opinion, a hazardous or emergency condition exists and such immediate action is necessary to protect persons, SSVEC facilities or other Members' or third parties' property and facilities from damage or interference caused by Member's GF, or improperly operating protective devices.

Additionally, upon 72hr notice given to Member for planned and scheduled maintenance, SSVEC shall have the right to: (a) maintain or repair SSVEC equipment, and (b) open the Service Disconnect when a clearance is required by SSVEC personnel.

10.5 Following the release of a SSVEC clearance, where it was necessary for the utility to open the DG Service Disconnect, SSVEC personnel will normally leave the disconnect in the open position. It will be the Member's responsibility to close the disconnect after ensuring that all generation sources that could potentially energize the Member's side of the disconnect are off, or isolated, so as to eliminate any possibility of paralleling the utility grid with an out-of-sync generator.

However, SSVEC personnel may, without liability, close the DG Service Disconnect provided that (a) Member requests, and agrees to allow, SSVEC to close the disconnect, following the release of a SSVEC clearance, and (b) SSVEC personnel can verify that the Member side of the DG Service Disconnect is not energized.

10.6 Upon termination of the Interconnection Agreement, the Member shall be responsible for ensuring that the DG Service Disconnect is immediately opened, and that the electric conductors connecting the Member's generator(s) to the DG Service Disconnect are physically removed, so as to preclude any possibility of inadvertent interconnected operation in the future. SSVEC reserves the right to inspect the Member's facility to verify that the generator is appropriately disconnected.

EXHIBIT 1

POWER QUALITY CHARACTERISTICS FOR
SULPHUR SPRINGS VALLEY ELECTRIC COOPERATIVE, INC.

SETTING TYPE	Sulphur Springs Valley
Power Factor [1]	No less than 0.95 for Class II units and above
Phase Current Imbalance	[3]
Voltage Characteristics	ANSI C84.1
Sine Wave Form	IEEE 519
Harmonics [2]	Voltage: 5% THD, with no single harmonic greater than 3% of the fundamental, IEEE Std. 519-1992, Sect. 10.3 Current: See Table 10.3 of IEEE Std. 519-1992, Sect. 10
Voltage Flicker	IEEE 519, Sect. 10.5[3]

Notes:

[1] This power factor provides for spinning VAR support and minimizes the impact of many small generators on SSVEC's system voltage stability.

[2] Harmonics limits shall be met for all generation levels from 10 – 100% of each generator's nameplate kVA or kW rating.

[3] Need to consult Sulphur Springs Valley Electric Cooperative, Inc.

EXHIBIT 2

SULPHUR SPRINGS VALLEY ELECTRIC COOPERATIVE, INC.
RELAY SETTINGS AND RE-CLOSING PRACTICES

SETTING TYPE	Sulphur Springs
Over-frequency Time delay [1]	60.9 Hz 0.1 Seconds
Under-frequency Time delay [2]	59.5 Hz 0.1 Seconds
Over-voltage Time Delay	110% 1.0 Second
Under-voltage Time Delay	90% 1.0 Second
Re-closing, first shot [3]	0.5 Seconds
Re-closing, second shot [3]	0.5 Seconds [4]
Re-closing, third shot [3]	2 Seconds [4]

Notes:

[1] Guidelines do not specify a setting or time delay; they state, "trip the circuit breaker when the frequency varies from the nominal 60 Hz."

[2] If generator is considered a WSCC generator, the under-frequency setting might be different to comply with WSCC guidelines.

[3] Times are for typical overhead/residential type feeders (not necessarily line reclosers) and are the time delay from the trip to the next reclosure. Actual number of re-close shots on a particular feeder may vary.

[4] Varies based on type of reclosing utilized.

EXHIBIT 3

DG APPLICATION PROCESS

Step 1 – Member contacts SSVEC for the Interconnection Requirements, Interconnection Agreement, and applicable tariffs and outlines proposed project. SSVEC forwards appropriate information to Member within five (5) working days and provides a SSVEC SunWatts Program Manager's name and number should Member decide to proceed with project.

Step 2 –Member is encouraged to meet with SSVEC and discuss the type and size of system, location and proposed operation. A preliminary electrical one-line diagram would be very helpful at this stage. This step will help ensure that SSVEC is able to determine up-front if any special studies are required, which could then be initiated as early on as possible, and that the applicable interconnection and protective requirements are properly understood and implemented.

Step 3 - SSVEC will require a retainer to develop conceptual estimates for any interconnection equipment that will be required. After reviewing the conceptual estimates, Member may proceed with the design and prepare the utility-required information – application form, electrical diagrams, protective relaying and settings, site equipment and layout plans, etc.

Step 4 – Upon completion of the design, the Member submits the final design package (as specified in the Application Form of the Interconnection Requirements) to SSVEC for final review and approval. SSVEC reviews information and informs Member within fifteen (15) working days of receipt as to sufficiency of information and whether any information is missing. In the event of incomplete information, Member will re-submit the final design package and Step 4 will be re-initiated.

Step 5 – Upon receipt of completed and sufficient application information, SSVEC reviews the application for conformance to the interconnection requirements within thirty (30) working days, unless other timeframes are mutually agreed upon. SSVEC will respond to Member within this time as to whether the submitted design information complies with the interconnection requirements or if there are any issues in non-compliance. (In the event of non-compliance, Member will re-submit corrected information and Step 5 will be re-initiated). In addition, SSVEC will provide an invoice for the interconnection project cost, and a timeline for the project completion.

Step 6 – Upon completion of the signed Interconnection Agreements, and receipt of payment, SSVEC will order material and schedule construction for the interconnection project and will provide Member with an estimated startup date.

Step 7 – Following construction/installation of the facility, Member will provide SSVEC with at least fifteen (15) working day notice as to when the utility can perform an on-site inspection and when the protective device tests, as applicable, are to be performed so that SSVEC may witness and/or review them.

Step 8 – Upon satisfactory completion of the site inspection, protective relay testing, and operating procedure, SSVEC notifies Member in writing that the facility may be operated in parallel with the utility grid per the agreed terms and conditions.

EXHIBIT 4

SUPPLEMMENTARY INFORMATION

Information below to be submitted for all projects. All diagrams are to be professionally and neatly drawn. Generally, sketches, free-hand drawings, or illegible diagrams will not be accepted by SSVEC. Provide 1 set of physical or electronic plans for each item below.

A. Electrical One-Line Diagram:
Include any and all revisions or changes as they are made. Diagram(s) must also include project name and address, show generator size and all protective relaying and control equipment, as well as electric service entrance and utility meter.

B. Electrical Three-Line Diagram:
Include any and all revisions or changes as they are made. Diagram(s) must also include project name and address, show generator size and all protective relaying and control equipment, as well as electric service entrance and utility meter, and include all neutral and ground conductors and connections.

C. AC & DC Control Schematics:
Include any and all revisions or changes as they are made, for all projects comprising rotating machinery. Diagrams must show the detailed wiring of all protective relays and control functions; and include control power source and wiring.

D. Detailed Map:
Include any and all revisions or changes as they are made. Maps should show major cross streets and proposed plant location; and include the street address.

E. Site Plan:
Include any and all revisions as they are made, showing the arrangement of the major equipment, including the electric service entrance section and utility meter, location of generator and interface equipment, and location of the Disconnect Switch. Include the street address, and location of any lockboxes, etc.

F. Testing Company:
Provide the name of the company that will do the protective relay bench testing and the trip circuit functional tests and the anticipated start-up date.

G. Point of Contact
If the interconnection and start-up process is to be coordinated through a party or individual other than the Member, provide the name, company, address and phone number of that individual or party with whom the utility is to coordinate the interconnection.

APPENDIX 1 – FOR CLASS 1 SYSTEMS ONLY

Sulphur Springs Valley Electric Cooperative, Inc.
A Touchstone Energy® Cooperative
OWNED BY THOSE WE SERVE

SUN Watts

Installation Certification Forms to be filled out by your Contractor

NOTE: Systems larger than 20kW require pre-construction SSVEC review and a written permission to proceed

Please print the following information.

Interconnect Customer Information

Customer Name: _____ Account Number: _____

Customer Service Address (Street, City, State, ZIP Code): _____

_____

GPS Coordinates (optional): _____

Customer Mailing Address: _____

Customer Telephone Number: _____

Customer Cell Number: _____ Customer E-Mail: _____

Designated Agent (Engineer, Contractor, Electrician) other than Customer: _____

Photovoltaic Inverter/Panel Information

Inverter Manufacturer: _____Model Number: _____

Is the equipment UL 1741 listed? YES ___ NO ___ Attach manufacturer's cut-sheet showing UL 1741 listing or certified sheet stating tested to UL 1741

Number of PV Panels _____Model Nos. _____

Are the PV panels UL 1703 listed? YES ___ NO ___ Attach manufacturer's cut-sheet showing UL 1703 listing or certified sheet stating tested to UL 1703

AC Output Voltage (☐120 V or ☐120/240 V AC)

Total Power Output (☐ kVA or ☐ kW)_____

Estimated Installation Completion Date with Building Inspector's Approval: _____

Protection Information (complete this section if inverter is not UL 1741 compliant)

Please list the available range of protection settings, which should include pickup values and time delays.

Under/Over Voltage Protection_____

Under/Over Frequency Protection_____

Under/Over Current Protection _____

Other Protection_____

System Performance and Solar Array Data

Max. Power Output (Watts): _____ Max. Power Voltage(Volts): _____

Max. Power Current (Amps): _____ Does Inverter Disconnect Properly? _____

Miscellaneous System Design Information

Is a gate code(s) necessary for access to the property and/or community? If yes, please provide_____

Will the system utilize a supply (line) side tap per NEC 690.64(A)? _____(See SSVEC Requirements)

Will the system consist of two or more power sources (PV, Wind, Emergency generator, etc.)? _____

Is this a system expansion that only adds panels?_____

Other information contractor or engineer believes will be important, i.e., proposed exceptions _____

_____

_____

_____

_____

_____

Sulphur Springs Valley Electric Cooperative, Inc.
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SUN Watts

Installation Certification

The system has been installed in compliance with IEEE 929 "Recommended Practice for Utility Interface of Photovoltaic (PV) Systems" and the latest edition of the National Electric Code. The Photovoltaic System components are listed and tested by a NRTL to UL Standard 1741.

Contractor (signed): _____

Contractor License No.:_____ Class: _____ Expiration Date: _____
(You must include a copy of your ROC license.)
Name (print): _____

Mailing Address: _____

Telephone Number: _____Cell Number: _____

E-Mail Address: _____

Disconnect Switch Verification

Electrician's Name (print): _____

Electrician (signed): _____

Electrician License No.: _____ Expiration Date: _____

Telephone Number: _____ Cell Number: _____

E-Mail Address: _____

State of Arizona Registered Engineer (where required, see Note 1)

Engineer Name: _____ Business Name: _____
AZ Registration No.: _____
Business Address (Street, City, State, ZIP Code):_____
_____
Telephone Number_____Cell Number _____
E-Mail Address _____

Government Authority Having Jurisdiction (AHJ)
Check one:

___ City of Benson
___ City of Sierra Vista
___ City of Willcox
___ Cochise County
___ Graham County
___ Pima County
___ Santa Cruz County
___ Exemption (see Note 2)
___ Other, explain: _____

MISC. NOTES

1) PV/Wind Generation designs shall be prepared by and/or under the direct supervision of an AZ registrant where prescribed by the Arizona Board of Technical Registration in their Rules and Statutes. The complete Rules and Statutes may be found at the Arizona State Board of Technical Registration website: http://www.btr.state.az.us . Objections to interpretations of these Rules and Statutes will be submitted to the AZ Board of Technical Registration for resolution. SSVEC will support the following but not limited to Rules and Statutes:

   (a) the Arizona Administrative Code Title 4, Chapter 30, Article 3, Section R4-30-302 Electrical Plans, A. states:

   > "A registrant shall prepare and submit drawings and specifications for a new electrical system or an addition or modification to an existing electrical system provided the service and associated electrical feeders exceeds 600 amperes 120/240 volts, single phase or 225 amperes 120/208 volts, three phase and the fault current exceeds 10,000 amperes. "

   (b) Arizona Revised Statutes, Title 32, Chapter 1, Article 3. Regulatory Provisions, 32-142 Public Works A., states:

   > "Drawings, plans, specifications, estimates for public works of the state or a political subdivision thereof involving architecture, engineering, shall be prepared by or under the direct supervision of a registrant within the category involved."

2) The SunWatts program requires the customer/contractor obtain a construction permit, pass AHJ plans review, and an AHJ installation inspection. If the customer submits an exemption from the AHJ installation inspection, the owner may at their option and expense, provide to SSVEC a certification from a State of Arizona registered professional engineer. The certification shall be stamped by the engineer and state the installation adheres to all applicable local, national and industry codes and standards. In addition, the engineer shall certify that all equipment and material are in agreement with SunWatts application and design information submitted to SSVEC, and the equipment and material are installed according to manufacturer's recommendations, SSVEC SunWatts requirements and SSVEC Service Entrance Requirements.

Additional Information

The customer must include an electrical one-line and three-line diagram of the PV installation with this agreement form. The electrical one-line diagram must show connections, bus size, circuit breakers (size & backfeed rated), fuses, etc. between main electrical components such as meter(s), main panel, main disconnect switch/breaker, PV breaker, AC utility disconnect switch, PV inverter(s), sub-panel, loads, etc. The customer must also include a detailed map that shows major crossroads and plant locations. A Site Plan must be submitted showing the arrangement of major equipment, including the electric service entrance section and utility meter, locations of PV inverter, interface equipment, and Disconnect Switch. The licensed electrical or PV contractor should be able to provide the electrical one-line diagram, three-line diagram, detailed map, site plan, and invoice. Incomplete submittals may result in project delays.

Customer and Customer contractor/electrician agree not to tamper and/or disable any SSVEC Hold Tag or SSVEC padlock on the AC utility disconnect switch. The purpose of this switch is to protect SSVEC personnel and emergency agency personnel from dangerous backfeeds on circuits they are working on. The Customer is aware that SSVEC personnel will not energize the solar system when they remove the SSVEC hold tag and padlock.

Customer agrees not to encroach on or reduce the safe workspace area required by SSVEC Service Entrance Specifications around the SSVEC service meter and the AC utility disconnect switch.

Customer agrees that SSVEC equipment, in particular the AC utility disconnect switch, shall remain readily accessible on 24 hour/7 days a week basis.

SSVEC Interconnection Application Form

When this form is completed by the member, and received by Sulphur Springs Valley Electric Cooperative, Inc. (SSVEC), the member will be placed on the Sun Watts reservation list and subject to the interconnection requirements, rate classifications, charges and tariffs in effect on the date SSVEC receives the form (Receipt Date). Submission of this form (prior to the start of installation) completes the requirements of Arizona law (SB1417) as the notice to the Electric Utility. The local Building Inspection Department is responsible to assure that the proposed installation meets all applicable codes. Submission of this Application gives the Solar Contractor permission to proceed from SSVEC.

If your Renewable Project is not completed within SIX (6) MONTHS from the Receipt Date, your reservation will be canceled, and you must fill out a new Application. You will be subject to the rules and regulations in effect as of the date SSVEC receives the new application, including but not limited to, any changes in net metering rules, rate classifications, charges and tariffs.

RATES DISCLAIMER

I understand that notwithstanding any other provisions of this Agreement, SSVEC may file with the Arizona Corporation Commission ("Commission"), pursuant to the Commission's rules and regulations, an application for a change in the requirements, charges, classification, or service, and any rule or regulation relating to this photovoltaic system, as all utility customers are subject to such changes relating to their energy service. ***The Commission may also, of its own initiative, alter the rates, rules or regulations that pertain to this photovoltaic system.***
Net Metering for residential services is no longer available as of 11/17/17.

Customer Name: _____ Date: _____
(Signature)

Customer Name: _____
(Printed)
Customer Address: _____

Phone number: _____ Alternate Phone: _____

System Type: ☐ Solar PV ☐ Solar Water ☐ Wind ☐ Other _____

☐ Residential ☐ Non-Residential Proposed PV System Size (in kW): _____

NOTE: Systems larger than 20kW require pre-construction SSVEC review and a written permission to proceed

SSVEC Office Use:
Received by_____ Date: _____
(Cooperative employee): (Receipt Date):

Customer Account #:_____ Date placed on reservation list: ____

APPENDIX 2 - FOR CLASS 2 AND ABOVE

SITE AND MEMBER INFORMATION
(Complete all items)

Member Name_____Telephone _____

Company Name (if applicable)_____

Mailing Address_____

Generating Facility Address _____

Project Contact_____Telephone_____

SSVEC Account Number_____Electric Meter No. _____

Application Completed By_____Title_____

PROPOSED OPERATION
(Answer all questions)

A. Do you plan to operate the Generation Facility as a net exporter of energy into the utility grid? (Yes or No)_____. If "Yes", explain the proposed operation and estimated power to be exported.

_____

_____

B. If the Generating Facility will be used only for on-site power, will it be operated as a peak-shaving unit during utility peak load conditions, partial day (weather dependent such as solar or wind) or as a base-loaded unit operating 24hrs a day?

_____

C. Proposed In Service Date.

_____

D. Will the Generating facility be interconnected to an existing electric service entrance?

_____

If yes, what voltage rating and ampere rating is the present electric service entrance?

Voltage_____Ampere Rating _____

If no, what voltage rating and ampere rating electric service entrance do you plan to construct?

Voltage_____Ampere Rating _____

E. Will a consultant, contractor or dealer be involved in design & installation of the generating facility? _____

If yes, please list consultant(s), contractor(s), dealer(s) with contact person & phone numbers.

Company Name	Contact	Phone

GENERATOR INFORMATION
(Complete for each rotating generator only)

A. Manufacturer _____

B. Type (Synchronous, Induction, D.C.) _____

C. Nameplate rating

Voltage_____kW _____
Power Factor_____Frequency _____
Model No._____Single or Three Phase_____

D. Type of Excitation System (Self or Separate)_____

E. Generator Electrical Characteristics (on the machine base, for Class II and above)

Synchronous Reactance (X'd) _____
Transient Reactance (X'd) _____
Sub-transient Reactance (X"d) _____
Zero sequence reactance (XO) _____
Negative sequence reactance (X2) _____

PRIME MOVER
(Complete for rotating machinery only)

A. Manufacturer _____
B. Manufacturer's Reference Number _____
C. Energy Source (Natural Gas, Steam, etc.) _____

INTERFACE EQUIPMENT
(Complete for each rotating generator only)

A. Synchronizer for Synchronous Generator:
Manufacturer _____
Manufacturer's Model Number _____
Automatic or Manual Synchronizer _____

B. Inverter for DC generator:
Manufacturer _____
Manufacturer's Model Number _____
Line or Self Commutated Inverter _____

STATIC INVERTER
(Complete for DC to AC Inverters only)

A. Manufacturer _____ Model No. _____
B. Terminal Voltage _____ Single, Split or Three Phase _____
C. Nameplate kW _____ No. of Units _____
D. Frequency _____ Power Factor _____
E. Line or Self Commutated _____ Battery Back Up (Y/N)? _____
F. Total System AC kW Output _____
G. Energy or Fuel Source _____

PROTECTION EQUIPMENT
(Complete all applicable items, attach a separate sheet if necessary)

A. Manufacturer's Name for each Protective Device

_____
_____

B. Manufacturer's Model Number for each Protective Device

_____
_____

C. Range of Available Settings for each Protective Device

_____
_____

D. Proposed Settings (trip setpoint and time) for each Protective Device

_____
_____

E. Ratios of associated current transformer. If multi-ratio, state the available ratios and which ratio will be used

F. Describe operation for tripping of the interface or generator circuit breaker for the following occurrences:

1. Utility outage

2. Utility short circuit (three phase and single phase to ground)

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OWNED BY THOSE WE SERVE

SUN Watts

Installation Certification

The system has been installed in compliance with IEEE 929 "Recommended Practice for Utility Interface of Photovoltaic (PV) Systems" and the latest edition of the National Electric Code. The Photovoltaic System components are listed and tested by a NRTL to UL Standard 1741.

Contractor (signed): _____

Contractor License No.:_____ Class: _____ Expiration Date: _____
(You must include a copy of your ROC license.)
Name (print): _____

Mailing Address: _____

Telephone Number: _____Cell Number: _____

E-Mail Address: _____

Disconnect Switch Verification

Electrician's Name (print): _____

Electrician (signed): _____

Electrician License No.: _____ Expiration Date: _____

Telephone Number: _____ Cell Number: _____

E-Mail Address: _____

State of Arizona Registered Engineer (where required, see Note 1)

Engineer Name: _____ Business Name: _____
AZ Registration No.: _____
Business Address (Street, City, State, ZIP Code):_____
_____
Telephone Number_____Cell Number _____
E-Mail Address _____

Government Authority Having Jurisdiction (AHJ)
Check one:

___ City of Benson	___ Cochise County	___ Santa Cruz County
___ City of Sierra Vista	___ Graham County	___ Exemption (see Note 2)
___ City of Willcox	___ Pima County	

___ Other, explain: _____

MISC. NOTES

1) PV/Wind Generation designs shall be prepared by and/or under the direct supervision of an AZ registrant where prescribed by the Arizona Board of Technical Registration in their Rules and Statutes. The complete Rules and Statutes may be found at the Arizona State Board of Technical Registration website: http://www.btr.state.az.us . Objections to interpretations of these Rules and Statutes will be submitted to the AZ Board of Technical Registration for resolution. SSVEC will support the following but not limited to Rules and Statutes:

   (a) the Arizona Administrative Code Title 4, Chapter 30, Article 3, Section R4-30-302 Electrical Plans, A. states:

   > "A registrant shall prepare and submit drawings and specifications for a new electrical system or an addition or modification to an existing electrical system provided the service and associated electrical feeders exceeds 600 amperes 120/240 volts, single phase or 225 amperes 120/208 volts, three phase and the fault current exceeds 10,000 amperes. "

   (b) Arizona Revised Statutes, Title 32, Chapter 1, Article 3. Regulatory Provisions, 32-142 Public Works A., states:

   > "Drawings, plans, specifications, estimates for public works of the state or a political subdivision thereof involving architecture, engineering, shall be prepared by or under the direct supervision of a registrant within the category involved."

2) The SunWatts program requires the customer/contractor obtain a construction permit, pass AHJ plans review, and an AHJ installation inspection. If the customer submits an exemption from the AHJ installation inspection, the owner may at their option and expense, provide to SSVEC a certification from a State of Arizona registered professional engineer. The certification shall be stamped by the engineer and state the installation adheres to all applicable local, national and industry codes and standards. In addition, the engineer shall certify that all equipment and material are in agreement with SunWatts application and design information submitted to SSVEC, and the equipment and material are installed according to manufacturer's recommendations, SSVEC SunWatts requirements and SSVEC Service Entrance Requirements.

Additional Information

The customer must include an electrical one-line and three-line diagram of the PV installation with this agreement form. The electrical one-line diagram must show connections, bus size, circuit breakers (size & backfeed rated), fuses, etc. between main electrical components such as meter(s), main panel, main disconnect switch/breaker, PV breaker, AC utility disconnect switch, PV inverter(s), sub-panel, loads, etc. The customer must also include a detailed map that shows major cross roads and plant locations. A Site Plan must be submitted showing the arrangement of major equipment, including the electric service entrance section and utility meter, locations of PV inverter, interface equipment, and Disconnect Switch. The licensed electrical or PV contractor should be able to provide the electrical one-line diagram, three-line diagram, detailed map, site plan, and invoice. Incomplete submittals may result in project delays.

Customer and Customer contractor/electrician agree not to tamper and/or disable any SSVEC Hold Tag or SSVEC padlock on the AC utility disconnect switch. The purpose of this switch is to protect SSVEC personnel and emergency agency personnel from dangerous backfeeds on circuits they are working on. The Customer is aware that SSVEC personnel will not energize the solar system when they remove the SSVEC hold tag and padlock.

Customer agrees not to encroach on or reduce the safe work space area required by SSVEC Service Entrance Specifications around the SSVEC service meter and the AC utility disconnect switch.

Customer agrees that SSVEC equipment, in particular the AC utility disconnect switch, shall remain readily accessible on a 24 hour/7 days a week basis.

SSVEC Interconnection Application Form

When this form is completed by the member, and received by Sulphur Springs Valley Electric Cooperative, Inc. (SSVEC), the member will be placed on the Sun Watts reservation list and subject to the interconnection requirements, rate classifications, charges and tariffs in effect on the date SSVEC receives the form (Receipt Date). Submission of this form (prior to the start of installation) completes the requirements of Arizona law (SB1417) as the notice to the Electric Utility. The local Building Inspection Department is responsible to assure that the proposed installation meets all applicable codes. Submission of this Application gives the Solar Contractor permission to proceed from SSVEC.

If your Renewable Project is not completed within SIX (6) MONTHS from the Receipt Date, your reservation will be canceled and you must fill out a new Application. You will be subject to the rules and regulations in effect as of the date SSVEC receives the new application, including but not limited to, any changes in net metering rules, rate classifications, charges and tariffs.

RATES DISCLAIMER

I understand that notwithstanding any other provisions of this Agreement, SSVEC may file with the Arizona Corporation Commission ("Commission"), pursuant to the Commission's rules and regulations, an application for a change in the requirements, charges, classification, or service, and any rule or regulation relating to this photovoltaic system, as all utility customers are subject to such changes relating to their energy service. ***The Commission may also, of its own initiative, alter the rates, rules or regulations that pertain to this photovoltaic system.***

Net Metering for residential services is no longer available as of 11/17/17.

Customer Name: _____ Date: _____
(Signature)

Customer Name: _____
(Printed)

Customer Address: _____

Phone number: _____ Alternate Phone: _____

System Type: ☐ Solar PV ☐ Solar Water ☐ Wind ☐ Other _____

☐ Residential ☐ Non-Residential Proposed PV System Size (in kW): _____

NOTE: Systems larger than 20kW require pre-construction SSVEC review and a written permission to proceed

SSVEC Office Use:

Received by_____ Date: _____
(Cooperative employee): (Receipt Date):

Customer Account #:_____ Date placed on reservation list: ____
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