



## City of Fredericksburg Distributed Generation Ordinance – Summary

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### The City of Fredericksburg DG Ordinance accomplishes the following:

1. **Allows the interconnection and parallel operation of Distributed Generation facilities** within the City of Fredericksburg electric system under carefully controlled and managed conditions.
2. **Provides for the safety and non-interference with the quality and reliability of electric service** to other customers.
3. **Establishes the requirements and conditions for the interconnection and parallel operation of Distributed Generation facilities** within the City of Fredericksburg electric system.

### The City of Fredericksburg DG Ordinance makes / uses the following definitions:

- **Definition of Distributed Generation:** An electrical generating facility located at a customer's point of delivery (point of common coupling) of ten megawatts (MW) or less and connected at a voltage less than 60 kilovolts (kV) which may be connected in parallel operation to the Fredericksburg electric system.
- **Definition of Interconnection:** The physical connection of distributed generation to the utility system so that parallel operation of the City of Fredericksburg distribution system and the distributed generation system can occur.

### The City of Fredericksburg DG Ordinance establishes the process for a person or entity interested in connecting to / operating in parallel with the City of Fredericksburg electric system. The process includes the following key elements:

1. **Customer must complete and submit a DG Application** to the City of Fredericksburg.
2. **Customer/City of Fredericksburg must execute a DG agreement** that establishes the terms and conditions for the interconnection and parallel operation of the distributed generation system.
3. **The ordinance establishes the City Manager or the City Manager's Designee as the person/position with the authority to execute Agreements** with Customers for the interconnection and parallel operation of distributed generation.
4. **The ordinance establishes that the City of Fredericksburg will designate a contact person for review of applications and technical requirements.**

Note: the Ordinance only establishes that the City of Fredericksburg will designate a contact person. The recommendation from SE based on discussions with FBG Director of Public Works and Utilities is for FBG to designate the City of Fredericksburg Building Official as the designated contact person, outside of the ordinance (by memorandum or other internal process). The FBG Building Official will review all DG applications for the required technical documentation and determine compliance with the City of Fredericksburg technical requirements for interconnection and parallel operation of distributed generation. The City of Fredericksburg Building Official will notify the Director of Public Works and Utilities that application and required technical documentation has been satisfied.

5. **When satisfied that a customer has complied with the application requirements and that the Customer's system complies with the technical requirements** for interconnection and



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parallel operation of distributed generation, **the City Manager or the City Manager's Designee will execute an Agreement with the Customer.**

### **The City of Fredericksburg DG Ordinance establishes technical requirements for all DG in the City of Fredericksburg:**

1. **All interconnections shall comply with P.U.C. SUBST. R. 25.212** and successors. In addition, all interconnections must comply with applicable state and federal laws and regulations.
2. **All interconnections must comply with local building and electric codes** as adopted by the City of Fredericksburg. Installation of **all interconnections shall be inspected by the City of Fredericksburg**. Inspection and approval of the installation by the City of Fredericksburg is a condition of interconnection and parallel operation of distributed generation.
3. Variations from the Technical Requirements must be reviewed and approved by the City Manager prior to implementation. **Variations in the point of interconnection must be approved by the City Manager and included in the Agreement** approved by the City Council.

### **The City of Fredericksburg DG Ordinance technical requirements require a manual load break switch:**

- **The customer must install a manual load break switch** that provides clear indication of the switch position at the Point of Interconnection to provide separation between the City of Fredericksburg (FBG) electrical system and the customer's electrical generation system.
- **The location of the disconnect switch must be approved** by the City of Fredericksburg
- **The disconnect switch must be easily visible, mounted separately from metering equipment, readily accessible to City of Fredericksburg personnel at all times**, and capable of being locked in the open position with a City of Fredericksburg padlock.
- **The City of Fredericksburg reserves the right to open the disconnect switch isolating the customer's electrical generating system** (which may or may not include the customer's load) from FBG electrical system for the following reasons:
  1. To facilitate maintenance or repair of the FBG electrical system.
  2. When emergency conditions exist on the FBG electrical system.
  3. When the customer's electrical generating system is determined to be operating in a hazardous or unsafe manner or unduly affecting the FBG electrical system waveform.
  4. When the customer's electrical generating system is determined to be adversely affecting other electric consumers on the FBG electrical system.
  5. Failure of the customer to comply with applicable codes, regulations and standards in effect at the time.
  6. Failure of the customer to abide by any contractual arrangement or operating agreement with the City of Fredericksburg.



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### **The City of Fredericksburg DG Ordinance technical requirements establish the following power quality standards:**

1. **The customer must provide an automatic method of disconnecting generation equipment from the FBG electrical system.**
2. **There are important power quality standards that must be met by DG installations / interconnections. These include standards for the following:**
  - Voltage
  - Frequency
  - Harmonics
  - Flicker
  - Power factor

### **The City of Fredericksburg DG Ordinance technical requirements establish requirements related to a loss of source situation.**

**The customer must provide approved protective equipment necessary to immediately, completely and automatically disconnect the customer's electrical generation equipment from the FBG electrical system in the event of a fault on the customer's system, a fault on the FBG system or loss of source on the FBG system.** Such protective equipment shall conform to the criteria specified in UL 1741 and IEEE 1547.

The customer's generating system must automatically disconnect from the grid within 10 cycles if the voltage on one or more phases falls and stays below 70% of nominal voltage for at least 10 cycles. The automatic disconnecting device may be of the manual or automatic reclose type and shall not be capable of reclosing until after the FBG service voltage and frequency are restored to within the normal operating range and the system is stabilized.

### **The City of Fredericksburg DG Ordinance technical requirements establish requirements related to coordination and synchronization.**

**The customer is solely responsible for coordination and synchronization of the customer's electrical generating system with all aspects of the FBG electrical system** and the customer assumes all responsibility for damage or loss that may occur from improper coordination and synchronization of its generating system with the FBG electrical system.

### **The City of Fredericksburg DG Ordinance technical requirements establish policies and procedures related to metering of DG systems.**

**The actual metering equipment is dependent upon the type, size and location of the electric service provided.** City of Fredericksburg will provide, subject to existing rate schedules at the time of application, the metering equipment necessary to measure capacity and energy delivered to and from the customer and will measure (using a two-meter or single meter with programmable channels) the “energy delivered” to the customer and the “energy received” from the customer to the City of Fredericksburg distribution system. The City will charge the customer for the meter and the meter installation if a new meter is required.



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Note: FBG may decide to waive the meter purchase / installation fee in situations where the DG system requires a standard residential or commercial meter that is available at standard meter cost or typically used and/or standard equipment issued by the City of Fredericksburg.

**The City of Fredericksburg DG Ordinance establishes technical requirements, policies and procedures for interconnection studies and the specific requirements for “pre-certified” DG systems.**

If City of Fredericksburg determines that an interconnection study is necessary, City of Fredericksburg will perform the study under reasonable terms and conditions agreed upon by both the customer and FBG and at the customer's sole expense. No study fee will be charged if the proposed generation site is not on a networked secondary and if all of the following apply:

1. Proposed generation equipment is pre-certified.
  - Generation equipment less than 20 kW AC shall be considered pre-certified:
    - a. If a UL 1741 listed inverter that also meets IEEE 1547 specifications is used as well as UL 1703 listed PV modules.
    - b. Proposed generation system does not expect to export more than 15% of total load on the feeder.
    - c. Proposed generation system does not contribute more than 25% of the maximum possible short circuit current of the feeder.

**The City of Fredericksburg DG Ordinance technical requirements establish policies and procedures for protection of the City of Fredericksburg electric system.**

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

Three-Phase generators have additional technical devices with electronic or electromechanical control.

**The City of Fredericksburg DG has attached in “Exhibit A”, an Application Form for the “Interconnection and Parallel Operation of Distributed Generation within the City of Fredericksburg Electric System”.**

The application applies to interconnection and parallel operation of distributed generation on the electric service at the customer's location and agrees that the service will be supplied and used in accordance with the terms and conditions of the City of Fredericksburg Distributed Generation Ordinance.

The application form includes sections for the following information:

1. Customer – Account Information
2. Generator Information



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3. Project checklist
4. Signatures and approval section

**The City of Fredericksburg DG has attached in “Exhibit B”, an Agreement for the “Interconnection and Parallel Operation of Distributed Generation within the City of Fredericksburg Electric System”.**

The DG agreement is for City of Fredericksburg customers that intend to construct, own, operate, maintain and connect to the FBG electric distribution system, a Distributed Generation system less than 10MW in size.

The customer is required to install, operate and maintain the DG System in full and faithful compliance with all applicable federal, state and local laws, ordinances, rules and regulations, and generally accepted industry codes and standards, including the National Electrical Safety Code and the National Electrical Code.

The customer is responsible for all permits, inspections, approvals, and/or licenses necessary for the installation or operation of the DG System. The customer must ensure that the installed DG system has been successfully tested to UL 1741, IEEE 1547 or IEEE 929 standards, or has been satisfactorily tested by an independent laboratory with published results. The customer shall provide manufacturer's data or other written proof acceptable to City of Fredericksburg to verify the accuracy of the foregoing warranties and representations

The City of Fredericksburg will purchase from Customer, the electrical output made available to (“delivered to”) City of Fredericksburg at the point of delivery from the DG system. City of Fredericksburg shall pay Customer for the Electrical Output delivered to the City of Fredericksburg distribution system at the avoided cost of generation rate (ACGR).

The customer is solely responsible for the design, installation, operation, maintenance, and repair of the DG System and Customer's interconnection facilities. The interconnection of the DG System to the FBG electrical system shall comply with the Public Utility Commission of Texas Substantive Rules §25.212 relating to Technical Requirements for Interconnection and Parallel Operation of On-Site Distributed Generation.

The City of Fredericksburg will inspect the DG System and the interconnection equipment. All costs to interconnect with the City of Fredericksburg are the responsibility of Customer.

The City of Fredericksburg has the right to require Customer to temporarily curtail, interrupt, or reduce, deliveries of energy in order to construct, install, maintain, repair, replace, remove, investigate, inspect, or test any part of the interconnection facilities, equipment, or any part of the FBG electric system.

City of Fredericksburg can disconnect, without notice, the DG System from the electric distribution system, if, in FBG's opinion, a hazardous condition exists and such immediate action is necessary to protect persons, or FBG's facilities or other customers' facilities from damage or interference caused by Customer's DG System or lack of properly operating protective devices.

The Customer must maintain liability insurance including contractual liability insurance covering the indemnity with City of Fredericksburg. The amount of such insurance coverage shall be at least \$500,000 per occurrence, \$1,000,000 general aggregate. The customer must furnish a certificate showing proof of insurance. This insurance requirement will not apply to systems of 20 kW or less



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that are UL 1741 listed and meet the requirements of IEEE 1547 and are installed in accordance with the National Electric Code.

ORDINANCE NO. 22-031

**AN ORDINANCE ADDING SECTION 47-239 TO ARTICLE VI, ELECTRIC LIGHT AND POWER DISTRIBUTION SYSTEM, OF THE CODE OF ORDINANCES OF THE CITY OF FREDERICKSBURG ESTABLISHING THE REQUIREMENTS FOR INTERCONNECTION AND PARALLEL OPERATION OF DISTRIBUTED GENERATION FACILITIES WITHIN THE CITY OF FREDERICKSBURG ELECTRIC SYSTEM AND PROHIBITING INTERCONNECTION AND/OR PARALLEL OPERATION OF DISTRIBUTED GENERATION WITHOUT COMPLIANCE WITH THIS ORDINANCE AND ESTABLISHING PENALTIES FOR FAILURE TO COMPLY PROVIDING FOR A PENALTY OF NOT MORE THAN \$1,000 PER VIOLATION.**

**WHEREAS**, The City of Fredericksburg operates an electric distribution utility for the benefit of the citizens and customers of the utility; and

**WHEREAS**, The City of Fredericksburg wishes to promote the use of renewable sources of energy; and

**WHEREAS**, The Public Utility Regulatory Act, TEX. UTIL. CODE ANN. § 31.005 (Vernon 1998 & Supp. 2005) (PURA) authorizes and encourages electric utilities to establish customer option programs that encourage the reduction of air contaminant emissions including distributed energy generation technology; and

**WHEREAS**, The Public Utility Regulatory Act, TEX. UTIL. CODE ANN § 39.101 (b)(3) (Vernon 1998 & Supp. 2005) (PURA) entitles all Texas electric customers to access to on-site distributed generation; and

**WHEREAS**, The Public Utility Regulatory Act, TEX. UTIL. CODE ANN § 39.916 (Vernon 1998 & Supp. 2005) (PURA) authorizes the interconnection and parallel operation of Distributed Renewable Generation with electric utilities, specifies requirements for same, and requires the Public Utility Commission of Texas to promulgate rules and regulations for same; and

**WHEREAS**, The Public Utility Commission of Texas has promulgated rules and regulations regarding the interconnection and parallel operation of Distributed Generation facilities with electric utilities as P.U.C. SUBST. R. 25.211, 25.212 and 25.217; and

**WHEREAS**, Unauthorized, inadequately protected, or substandard Distributed Generation equipment that is interconnected or operated in parallel to the electric distribution system can pose a safety hazard to Fredericksburg Electric Department personnel and to other persons; and

**WHEREAS**, Unauthorized, inadequately protected, or substandard Distributed Generation equipment that is interconnected or operated in parallel with the electric distribution system can interfere with the quality and reliability of service to other customers; and

**WHEREAS**, The City Council, after careful consideration of the matter, hereby finds and declares that allowing the interconnection and parallel operation of Distributed Generation facilities within the City of Fredericksburg electric system under carefully controlled and managed conditions to provide for the safety and non-interference with the quality and reliability of service to other customers is in the best interests of the general welfare of the City and its residents; and

**WHEREAS**, The City Council, after careful consideration of the matter, hereby finds and declares that the requirements and conditions set forth herein for the interconnection and parallel operation of Distributed Generation facilities within the City of Fredericksburg electric system are necessary to protect the health and safety of the City, its employees and residents, are necessary to protect the quality and reliability of the electric distribution system, are equitable, and do not impose an unfair burden on the owners and users of Distributed Generation facilities:

**NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF FREDERICKSBURG, TEXAS THAT THE FOLLOWING REGULATIONS WHICH WILL BE CODIFIED AS SECTION 47-239 ARE HEREBY ADOPTED AND ADDED TO ARTICLE VI, ELECTRIC LIGHT AND POWER DISTRIBUTION SYSTEM:**

#### **ARTICLE VI, ELECTRIC LIGHT AND POWER DISTRIBUTION SYSTEM**

##### **Sec. 47-239 DISTRIBUTED GENERATION**

###### **(a) General Provisions**

1. **Intent.** This Ordinance is intended to provide for the orderly, safe and effective interconnection and parallel operation of Distributed Generation facilities within the City of Fredericksburg electric system by customers of the City of Fredericksburg Electric Utility.
2. **Authority.** The City is authorized to enact this Ordinance by the Public Utility Regulatory Act, TEX. UTIL. CODE ANN. § 31.005 (Vernon 1998 & Supp. 2005) (PURA) and successors, which authorizes and encourages electric utilities to establish customer option programs that encourage the reduction of air contaminant emissions including distributed energy generation technology. Additionally, the Public Utility Regulatory Act, TEX. UTIL. CODE ANN § 39.101 (b)(3) (Vernon 1998 & Supp. 2005) (PURA) entitles all Texas electric customers to access to on-site distributed generation. Finally, the Texas Public Utility Regulatory Act, TEX. UTIL. CODE ANN § 39.916 (Vernon 1998 & Supp. 2005) (PURA) and its successors authorizes electric utilities to establish requirements for and allow the interconnection and parallel operation of Distributed Renewable Generation, and requires the Public Utility Commission of Texas to promulgate rules and regulations for the implementation of interconnection and parallel operation of Distributed Renewable Generation.
3. **Definitions.** As applied in this Ordinance, the following words and terms shall be used:

**City Manager:** the City Manager and/or his/her duly authorized representative.

**Commission:** the Public Utility Commission of Texas or its successor organization having jurisdiction over the matters herein contained.

**Customer:** a person or entity interconnected or seeking interconnection to the Fredericksburg electric system for the purpose of receiving or exporting electric power from or to the Fredericksburg electric system.

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

**Interconnection:** The physical connection of distributed generation to the utility system in accordance with the requirements of this ordinance so that parallel operation can occur.

**Networked secondary:** two or more utility primary distribution feeder sources electrically tied together on the secondary (low voltage) side to form one power source for one or more customers. The service is designed to maintain service to the customers even after the loss of one of these primary distribution feeder sources.

**Parallel operation:** The operation of distributed generation by a customer while the customer is connected to the Fredericksburg electric system.

**Point of Interconnection (Point of Service, Point of Common Coupling):** The point where the electrical conductors of the City of Fredericksburg utility system are connected to the customer's conductors and where any transfer of electric power between the customer and the City of Fredericksburg utility system takes place, such as switchgear near the meter.

**Pre-certified equipment:** A specific generating and protective equipment system or systems that have been certified as meeting the applicable parts of this ordinance relating to safety and reliability by an entity approved by the Commission.

**Stabilized:** The Fredericksburg electric system shall be considered stabilized when, following a disturbance, the system returns to the normal range of voltage and frequency for a duration of two minutes.

- 4. Applicability.** This Ordinance applies to all persons or entities that desire to interconnect or operate in parallel a distributed generation system within the City of Fredericksburg electric system.

## **5. Application and Agreement Required**

- (A) Before a person or entity may interconnect or operate in parallel a distributed generation system within the City of Fredericksburg electric system, that person or entity must apply with the City on the form provided by the City (an example is attached as Exhibit A) and execute an agreement with the City that establishes the terms and conditions for the interconnection and parallel operation of the distributed generation system. The Agreement shall be in the general form of the Agreement in Exhibit B of this ordinance.
- (B) The City Council hereby delegates to the City Manager the authority to execute Agreements with Customers for the interconnection and parallel operation of distributed generation within the City of Fredericksburg electric system in accordance with this ordinance, the Public Utility Commission of Texas rules and regulations, and in accordance with all state and federal laws applicable. The Agreement shall not vary substantially in form and intent from Exhibit B of this ordinance.
- (C) Substantial changes to the form and/or intent of the Agreement in Exhibit B must be approved by the City Council before the execution of the Agreement.
- (D) The interconnection shall not be energized prior to the execution of the Agreement as required herein, and the fulfillment of the requirements for interconnection.
- (E) The application, Exhibit A, may be modified from time to time by the City Manager as is required for efficient processing of applications.

## **6. Utility Contact Person**

- (A) In accordance with P.U.C. SUBST. R. 25.11 (I), the City Manager shall designate the appropriate City staff member or members as contact person or persons for all matters related to distributed generation interconnection.
- (B) The City Manager shall identify to the Public Utility Commission of Texas the contact person or persons for all matters related to distributed generation interconnection.
- (C) The City Manager shall cause the City of Fredericksburg internet web site to provide access through the internet web site to the names, telephone numbers, mailing addresses and electronic mail addresses for the distributed generation contact person or persons.
- (D) The designated contact person or persons shall review applications for distributed generation with attached technical documentation and determine compliance with the City of Fredericksburg technical requirements for interconnection and parallel operation of distributed generation.
- (E) When satisfied that a customer has complied with the application requirements and that the Customer's system complies with the technical requirements for interconnection and parallel operation of distributed generation, the contact

person shall recommend to the City Manager that an Agreement be executed with the Customer for the interconnection and parallel operation of distributed generation. The City Manager shall review the application and technical information submitted, and if the City Manager finds that the Customer has complied with the application requirements and that the Customer's system complies with the technical requirements for interconnection and parallel operation of distributed generation, the City Manager shall execute an Agreement with the Customer substantially in the form attached to this ordinance as Exhibit B.

**(b) Technical Requirements**

**1. General Requirements**

- (A) All interconnections shall comply with P.U.C. SUBST. R. 25.212 and successors. In addition, all interconnections shall comply with applicable state and federal laws and regulations.
- (B) All interconnections shall comply with local building and electric codes as adopted by the City of Fredericksburg. Installation of all interconnections shall be inspected by the City of Fredericksburg. Inspection and approval of the installation by the City of Fredericksburg is a prerequisite and a continuing condition of interconnection and parallel operation of distributed generation.
- (C) Variations from the Technical Requirements herein must be reviewed and approved by the City Manager prior to implementation. Variations in the point of interconnection must be approved by the City Manager and included in the Agreement approved by the City Council.

**2. Manual Disconnect**

The customer shall provide and install a manual load break switch that provides clear indication of the switch position at the Point of Interconnection to provide separation between the City of Fredericksburg electrical system and the customer's electrical generation system. The location of the disconnect switch must be approved by the City of Fredericksburg. The disconnect switch shall be easily visible, mounted separately from metering equipment, readily accessible to City of Fredericksburg personnel at all times, and capable of being locked in the open position with a City of Fredericksburg padlock. The City of Fredericksburg reserves the right to open the disconnect switch isolating the customer's electrical generating system (which may or may not include the customer's load) from City of Fredericksburg electrical system for any of the following reasons:

To facilitate maintenance or repair of the City of Fredericksburg electrical system, or

When emergency conditions exist on the City of Fredericksburg electrical system, or

When the customer's electrical generating system is determined to be operating in a hazardous or unsafe manner or is or potentially can unduly affect the City of Fredericksburg electrical system waveform, or

When the customer's electrical generating system is determined to be adversely affecting other electric consumers on the City of Fredericksburg electrical system, or

Failure of the customer to comply with applicable codes, regulations and standards in effect at the time, or

Failure of the customer to abide by any contractual arrangement or operating agreement with the City of Fredericksburg.

### **3. Power Quality**

- (A) Voltage - The City of Fredericksburg shall endeavor to maintain the distribution voltages on the electrical system but shall not be responsible for factors or circumstances beyond its control. The customer shall provide an automatic method of disconnecting generation equipment from the City of Fredericksburg electrical system within 10 cycles should a voltage deviation greater than +5% or -10% from normal be sustained for more than 30 seconds (1800 cycles) or a voltage deviation greater than +10% or -30% from normal be sustained for more than 10 cycles. If high or low voltage complaints or flicker complaints result from the operation of the customer's electrical generation, the customer's generating system shall be disconnected until the problem is resolved.
- (B) Frequency - The City of Fredericksburg shall endeavor to maintain a 60-hertz nominal frequency on the electrical system. The customer shall provide an automatic method of disconnecting generation equipment from the City of Fredericksburg electrical system within 15 cycles should a deviation in frequency of +0.5Hz or -0.7Hz from normal occur.
- (C) Harmonics -In accordance with IEEE 519, the total harmonic distortion (THD) of voltage shall not exceed 5% of a pure sine wave of 60-hertz frequency or 3% of the 60-hertz frequency for any individual harmonic when measured at the point of interconnection with the City of Fredericksburg electrical system. Also, the total current distortion shall not exceed 5% of the fundamental frequency sine wave. If harmonics beyond the allowable range result from the operation of the customer's electrical generation, the customer's generating system shall be disconnected until the problem is resolved.
- (D) Flicker - The distributed generation facility shall not cause excessive voltage flicker on the City of Fredericksburg electrical system. This flicker shall not exceed 3% voltage dip, in accordance with IEEE 519 (Section 10.5), as measured at the point of interconnection.
- (E) Power factor - The customer's electrical generation system shall be designed, operated and controlled at all times to provide reactive power requirements at the point of interconnection from 0.95 lagging to 0.95 leading power factor. Induction generators shall have static capacitors that provide at least 95% of the magnetizing current requirements of the induction generator field. The City of Fredericksburg may, in the interest of safety, authorize the omission of capacitors. However, where capacitors are used for power factor correction,

additional protective devices may be required to guard against self-excitation of the customer's generator field.

**4. Loss of Source.**The customer shall provide approved protective equipment necessary to immediately, completely and automatically disconnect the customer's electrical generation equipment from the City of Fredericksburg electrical system in the event of a fault on the customer's system, a fault on the City of Fredericksburg system or loss of source on the City of Fredericksburg system. Such protective equipment shall conform to the criteria specified in UL 1741 and IEEE 1547. The customer's generating system shall automatically disconnect from the grid within 10 cycles if the voltage on one or more phases falls and stays below 70% of nominal voltage for at least 10 cycles. The automatic disconnecting device may be of the manual or automatic reclose type and shall not be capable of reclosing until after the City of Fredericksburg service voltage and frequency are restored to within the normal operating range and the system is stabilized.

**5. Coordination and Synchronization.** The customer shall be solely responsible for coordination and synchronization of the customer's electrical generating system with all aspects of the City of Fredericksburg electrical system, and the customer assumes all responsibility for damage or loss that may occur from improper coordination and synchronization of its generating system with the City of Fredericksburg electrical system.

**6. Metering.** The actual metering equipment required, its voltage rating, number of phases and wires, size, current transformers, number of input and associated memory is dependent upon the type, size and location of the electric service provided. The Customer shall pay for the installation of the data recorder (meter) that is capable of measuring the "Delivered KWh" (energy delivered by the City of Fredericksburg); the "Received KWh" (energy delivered to the City of Fredericksburg by the Customer) using a single meter or two-meter configuration. Additionally, for all Customers, The City of Fredericksburg reserves the right to install, at its own expense, a meter to measure the output of the DG system.

**7. Interconnection Study.** The City of Fredericksburg will determine whether an interconnection study is necessary, based on relevant engineering factors including the output of the system, the location of the system and other City of Fredericksburg distribution system factors. If the interconnection study is deemed necessary, the City of Fredericksburg shall perform the study under reasonable terms and conditions agreed upon by both the customer and City of Fredericksburg and at the customer's sole expense. No study fee will be charged if the proposed generation site is not on a networked secondary and if all of the following apply:

The proposed generation equipment is pre-certified. Generation equipment that are less than 20 kW AC shall be considered pre-certified if a UL 1741 listed inverter that also meets IEEE 1547 specifications is used. For solar PV installations, to be pre-certified system must have UL 1703 listed PV modules, and

The proposed generation system does not expect to export more than 15% of total load on the feeder, and

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

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

### **9. Three-Phase Generators.**

#### **(A) Synchronous machines:**

1. The distributed generation facility's circuit breakers shall be three-phase devices with electronic or electromechanical control.
2. The Customer is solely responsible for proper synchronization of its generator with the City of Fredericksburg system.
  - a. The excitation system response ratio shall not be less than 0.5.
  - b. The generator's excitation system shall conform to the field voltage versus time criteria specified in ANSI Standard C50.13-1989.

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

#### **(C) Inverters:**

1. Line-commutated inverters do not require synchronizing equipment.
2. Self-commutated inverters require synchronizing equipment.

### **10. Standards**

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

#### **(c) Penalty and Enforcement**

Any person violating this Ordinance by interconnecting distributed generation to the Fredericksburg electric system without a complete Application and executed Agreement shall, upon conviction, be guilty of a misdemeanor and shall be fined

up to \$1,000.00 per violation, and each day that a violation continues or each occurrence shall be considered a separate offense and punished accordingly. Any violation of this Ordinance can be enjoined by a suit filed in the name of the City of Fredericksburg in court of competent jurisdiction, and this remedy shall be in addition to any penalty provision in this Ordinance.

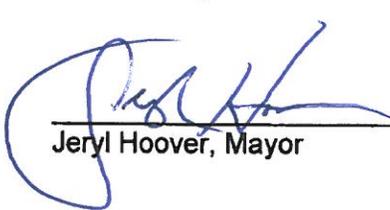
End of Code Text

**Severability Clause:** If any sentence, section, subsection, clause, phrase, part or provision of this Ordinance be declared by a court of competent jurisdiction to be invalid, the same shall not affect the validity of the Ordinance as a whole, or any part thereof, other than the part declared to be invalid.

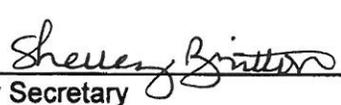
**Liability:** The provisions of this Ordinance shall be liberally construed to effectively carry out its purposes, which are hereby found and declared to be in the furtherance of the public health, safety, and welfare. Any member of the City Council, City official, or employee charged with enforcement of this Ordinance, acting for the City in the discharge of his or her duties, shall not thereby render himself or herself personally liable; and is hereby relieved from all personal liability for any damage that might accrue to persons or property as a result of any act required or permitted in the discharge of said duties.

**Effective Date:** This ordinance shall take effect immediately upon passage and publication in accordance with law.

PASSED, APPROVED and ADOPTED on December 17, 2012.

  
\_\_\_\_\_  
Jeryl Hoover, Mayor

ATTEST:

  
\_\_\_\_\_  
City Secretary

APPROVED AS TO FORM:

  
\_\_\_\_\_  
Pat McGowan, City Attorney

**EXHIBIT A**

**APPLICATION FOR INTERCONNECTION AND PARALLEL OPERATION OF DISTRIBUTED  
GENERATION IN THE CITY OF FREDERICKSBURG ELECTRIC SYSTEM**

APPLICATION FOR THE INTERCONNECTION AND PARALLEL OPERATION OF  
DISTRIBUTED GENERATION IN THE FREDERICKSBURG ELECTRIC SYSTEM

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The undersigned (the "Customer") hereby applies to the City of Fredericksburg (FBG) for the interconnection and parallel operation of distributed generation on the electric service at the service address herein specified and agrees that such service shall be supplied and used in accordance with the terms and conditions of the FBG Distributed Generation Ordinance. The following information shall be supplied by the Customer or Customer's designated representative. All applicable items must be accurately completed in order that the Customer's generating facilities may be effectively evaluated by FBG for interconnection with the utility system.

**Customer – Account Information**

**Customer's Name:**

**Customer's Account No.:**

**Contact Person:**

**Telephone Number:**

**Service Point Address:**

**Generator Information**

**Number of Units:**

**Power Factor:** \_\_\_\_\_

**Manufacturer:**

**Voltage Rating:** \_\_\_\_\_

**Type (Synchronous, Induction, or Inverter):**

**Ampere Rating:** \_\_\_\_\_

**Fuel Source (Solar, Natural Gas, Wind etc.)**

**Number of Phases:** \_\_\_\_\_

**Kilowatt Rating (95' F at location):**

**Frequency:** \_\_\_\_\_

**Kilovolt Ampere Rating (95' F at location):**

**Do you plan to export power (circle one):**      Yes      No

**If Yes, maximum amount expected:** \_\_\_\_\_ KW \_\_\_\_\_ KWH

**Pre-certification Label or Type Number:**

**Expected Energizing and Startup Date:**

**Normal Operation of Interconnection: (examples: provider power to meet base load, demand management, standby, backup, other (please describe):**

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**Complete set of system engineering drawings and specifications:**

- system one-line diagram
- system grounding schematic
- metering devices and equipment included as per FBG specification
- meets or exceeds requirements of NEC, NESC, ANSI, other applicable codes, ordinances, rules, regulations

Complete set of manufacturer's Drawings and Specifications for major components of proposed system:

- certifying compliance with **IEEE 519**
- certifying compliance with **IEEE 929**
- certifying compliance with **UL 1741** and **IEEE 1547**
- certifying compliance with PUCT Substantive Rule 25.212

Has the generator Manufacturer supplied its dynamic modeling values to the Host Utility?

- Yes
- No

(Note: Require a Yes for complete application. For pre-certified equipment answer is Yes)

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Information Prepared and Submitted by:	
Name:	
Address:	
Phone:	
Signature:	
Date:	
<p>Note: Acceptance of this application is made contingent upon the customer executing an Agreement for Interconnection and Parallel Operation of Distributed Generation and providing certification of insurance.</p>	
Customer:	
Signature:	
Date:	
<b>City of Fredericksburg Approval</b>	
By:	
Title:	
Date:	
<p>Return completed Application to: City of Fredericksburg Building Official</p>	

**EXHIBIT B**

**AGREEMENT FOR THE INTERCONNECTION AND PARALLEL OPERATION OF DISTRIBUTED  
GENERATION IN THE FREDERICKSBURG ELECTRIC SYSTEM**

AGREEMENT FOR THE INTERCONNECTION AND PARALLEL OPERATION OF  
DISTRIBUTED GENERATION IN THE FREDERICKSBURG ELECTRIC SYSTEM

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THIS AGREEMENT is entered into by and between the City of Fredericksburg, Texas (City of Fredericksburg) and

\_\_\_\_\_ Customer (Customer). City of Fredericksburg owns and operates a municipal electric utility engaged in the distribution of electricity serving the City of Fredericksburg and portions of Fredericksburg County, Texas; and Customer intends to construct, own, operate, maintain and connect to the City of Fredericksburg electric distribution system, a Distributed Generation system less than 10MW in size (the DG System) at address:

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

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

Article V. The DG System will be installed at Customer's premises at the address specified above. The DG System shall not have a generation capacity greater than 10 MW. Customer shall install, operate and maintain the DG System in full and faithful compliance with all applicable federal, state and local laws, ordinances, rules and regulations, and generally accepted industry codes and standards, including, but not limited to the National Electrical Safety Code and the National Electrical Code. Customer shall promptly notify City of Fredericksburg upon receipt of any citation or other official notice of alleged violation of laws, ordinances, rules and regulations concerning the DG System.

Article VI. Customer warrants and represents that:

Section 6.01 The information regarding the characteristics of the DG System are as specified in the Application for Interconnection and Parallel Operation of Distributed Generation with the City of Fredericksburg Electric System filed by the Customer with City of Fredericksburg;

Section 6.02 The DG System and associated other electrical components and devices meet National Electrical Code standards;

Section 6.03 All permits, inspections, approvals, and/or licenses necessary for the installation or operation of the DG System have been obtained; and Section 6.04. The DG System has been successfully tested to UL 1741, IEEE 1547 or IEEE 929 standards, or has been satisfactorily tested by an independent laboratory with published results.

Customer shall provide manufacturer's data or other written proof acceptable to City of Fredericksburg to verify the accuracy of the foregoing warranties and representations. If any of foregoing warranties and representations are inaccurate, the City of Fredericksburg may, without

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DISTRIBUTED GENERATION IN THE FREDERICKSBURG ELECTRIC SYSTEM

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waiver of or prejudice to any other remedy, immediately disconnect the DG system from the City of Fredericksburg electric system and terminate this agreement.

Article VII. City of Fredericksburg will purchase from Customer, and Customer will sell exclusively to City of Fredericksburg the electrical output from the DG system that is "received" by the City of Fredericksburg Distribution System. During the term of this Agreement, Customer shall exclusively purchase from City of Fredericksburg its requirements of electric energy above the amounts generated by the DG system.

Article VIII. As provided for in the City of Fredericksburg DG Rate Rider, the City of Fredericksburg shall pay Customer for the "KWh Received" (energy received by the City of Fredericksburg Distribution System) at the "Avoided Cost of Generation Rate" (ACGR). The ACGR is determined by the average per KWH cost of generation for the preceding year for electric energy purchased by City of Fredericksburg from its wholesale electric energy provider(s). The City of Fredericksburg reserves the right to amend the ACGR at any time.

Article IX. Customer shall pay for the installation of the data recorder (meter) that is capable of measuring the "KWh Delivered" (energy delivered to the Customer) and the "KWh Received" (energy received by the City of Fredericksburg Distribution System) in intervals established by the City of Fredericksburg, using a single meter or two-meter configuration.

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

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

Article XII. Customer hereby grants City of Fredericksburg access on and across its property at any reasonable time to inspect the DG System and the interconnection equipment, to read or

AGREEMENT FOR THE INTERCONNECTION AND PARALLEL OPERATION OF  
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test meters and metering equipment, and to operate, maintain and repair City of Fredericksburg' facilities. No inspection by City of Fredericksburg of the DG System or the interconnection facilities shall impose on City of Fredericksburg any liability or responsibility for the operation, safety or maintenance of the DG system or Customer's interconnection facilities.

Article XIII. Customer shall indemnify, defend and save harmless City of Fredericksburg, its elected and non-elected officials, officers, agents and employees from and against any and all liabilities, losses, claims, damages, actions, suits or demands for damages (including costs and attorney's fees, both at trial and on appeal) arising out of, resulting from, or in any manner connected with the breach of any warranty or representation made by Customer in this Agreement, or in any manner connected with the design, construction, operation, maintenance or repair of any part of Customer's DG System or interconnection facilities, including, without limitation liabilities, losses, claims, damages, actions, suits or demands for damages for or on account of personal injury to, or death of, any person, or damage to, or destruction or loss of, property belonging to Customer, City of Fredericksburg or any third person.

Article XIV. The Customer shall maintain liability insurance including contractual liability insurance covering the indemnity agreement set forth herein, with City of Fredericksburg as a named insured, which insures City of Fredericksburg against all claims for property damage and for personal injury or death arising out of, resulting from or in any manner connected with the installation, operation and maintenance of the Customer's DG System. The amount of such insurance coverage shall be at least \$500,000 per occurrence, \$1,000,000 general aggregate. Within 10 days of the date of this Agreement Customer shall furnish a certificate from Customer's insurance carrier showing that it has complied with the provisions of this section and providing that the insurance policy will not be changed or canceled during its term without written 30 day notice to City of Fredericksburg. This insurance requirement will not apply to systems of 20 kW or less that are UL 1741 listed and meet the requirements of IEEE 1547 and are installed in accordance with the National Electric Code.

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

**If to Company:**

The City of Fredericksburg  
<address>

**If to Customer:**

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

AGREEMENT FOR THE INTERCONNECTION AND PARALLEL OPERATION OF  
DISTRIBUTED GENERATION **IN** THE FREDERICKSBURG ELECTRIC SYSTEM

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

Article XVII. This Agreement shall inure to the benefit of and by binding upon the heirs, successors, or assigns of each of the parties hereto. Customer may not assign this Agreement without the prior written consent of City of Fredericksburg. Any assignment without such consent shall be null and void.

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

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

Article XX. This Agreement and all disputes arising hereunder shall be governed by the laws of the State of Texas. Venue for all such disputes shall be proper and lie exclusively in Austin County, Texas.

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

<b>City of Fredericksburg</b>	<b>Customer</b>
By: _____	By: _____
Name: _____	Name: _____
Title: _____	Title: _____
Date: _____	Date: _____

**CITY OF FREDERICKSBURG**

All Services	xxx	xxx
<b>TARIFF</b>	<b>SECTION NO.</b>	<b>SHEET NO.</b>
ELECTRIC RATE SCHEDULE		<b>December 17, 2012</b>
<b>SECTION TITLE</b>		<b>EFFECTIVE DATE</b>

**DISTRIBUTED GENERATION RIDER**

**APPLICABILITY**

This Rider is available to any retail customer receiving electric service under a City of Fredericksburg electric rate schedule who owns and operates an on-site generating system capable of producing ten megawatts (10 MW) or less, who interconnects with the City of Fredericksburg’s electric system. Customers requesting interconnection and parallel operation of Distributed Generation (“DG”) shall complete the Application for Interconnection and Parallel Operation of Distributed Generation (“Application”) with the City of Fredericksburg. For purposes of this rate schedule, Distributed Generation refers to an electrical generating facility located at a Customer’s point of delivery of ten megawatts (10 MW) or less and connected to the City of Fredericksburg distribution system at a standard available voltage less than or equal to 60 kilovolts (kV) and 60 Hertz alternating current.

**AGREEMENT**

Upon determination by City of Fredericksburg that the Customer’s facility is consistent with the safe and reliable operation of the City of Fredericksburg’s distribution system, City of Fredericksburg and Customer shall enter into an Agreement for Interconnection and Parallel Operation of Distributed Generation (“Interconnection Agreement”), which sets forth the contractual conditions under which City of Fredericksburg and Customer agree that one or more facilities may be interconnected with City of Fredericksburg’s distribution system.

**CONDITIONS OF SERVICE:**

1. All charges, character of service, and terms and conditions of the City of Fredericksburg Electric Rate Schedule under which the customer receives service apply except as expressly altered by this Rider.
2. The customer shall comply with the technical requirements in the City of Fredericksburg’s Ordinance NO. 22-031 and procedures set forth in The Public Utility Commission of Texas Substantive Rule 25.212 for safe and effective connection and operation of Distributed Generation, which describes typical interconnection requirements. City of Fredericksburg may require Customer to install and use more sophisticated protective devices and operating schemes when the DG facility is exporting power to City of Fredericksburg’s system or when otherwise required due to specific interconnection location and condition. The customer shall obtain approval from the City of Fredericksburg before the customer energizes the customer’s on-site generating system or interconnects it with the City of Fredericksburg’s

electric system. The term of an agreement under this Rider is one year, and month to month thereafter.

3. The customer is responsible for the costs of interconnecting with the City of Fredericksburg' electric system, including transformers, service lines, or other equipment determined necessary by the City for safe installation and operation of the customer's equipment with the City's system. The customer is responsible for any costs associated with required inspections and permits.
4. City of Fredericksburg may perform interconnection studies, which shall include service study, coordination study, and utility system impact study, as needed and determined in the sole discretion of City of Fredericksburg. In instances where such studies are deemed necessary, the scope of such studies shall be based on the characteristics of the particular distributed generation facility to be interconnected and the City of Fredericksburg's distribution system at the specific proposed location. City of Fredericksburg will charge Customer fees for Pre-Interconnection Studies that recover the costs of performing such studies. Any modifications or additions to City of Fredericksburg's Electric System identified through the interconnection study as required for the safe and reliable interconnection of Customer's facility shall be solely at the Customer's expense. Customer shall not acquire any ownership in such modifications or additions to City of Fredericksburg's Electric System.
5. All other terms and conditions will be negotiated between the City of Fredericksburg and the customer in the Agreement for Interconnection and Parallel Operation of Distributed Generation.

**METERING:**

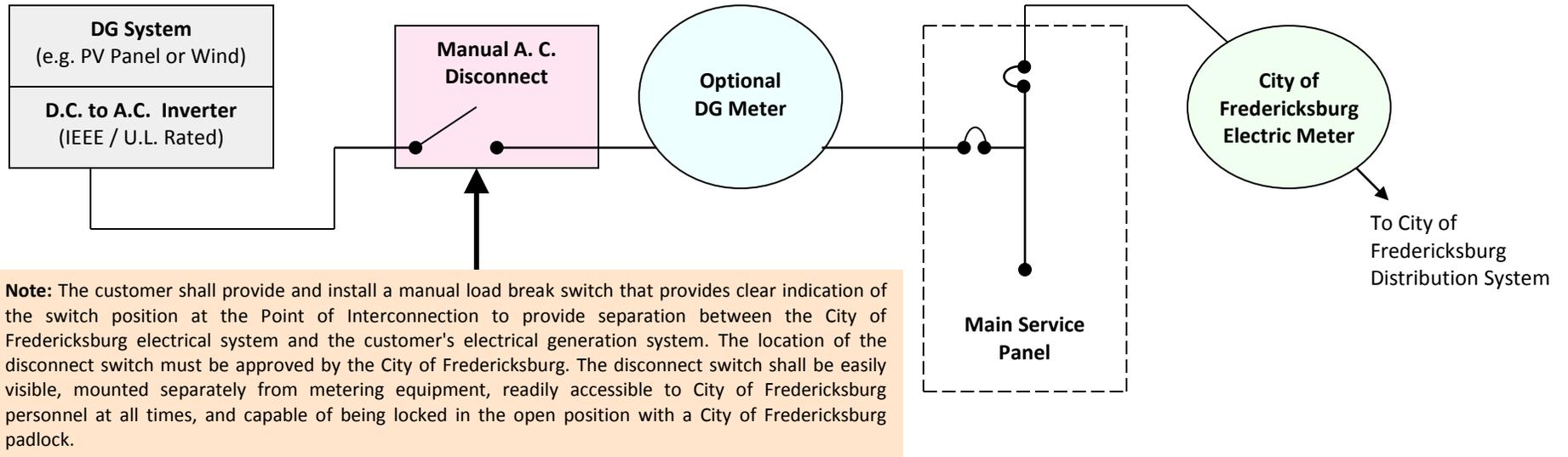
1. The actual metering equipment required, its voltage rating, number of phases and wires, size, current transformers, number of input and associated memory is dependent upon the type, size and location of the electric service provided. The Customer shall pay for the installation of the data recorder (meter) that is capable of measuring the "Delivered KWh" (energy delivered by the City of Fredericksburg); the "Received KWh" (energy delivered to the City of Fredericksburg by the Customer) using a single meter or two-meter configuration. Additionally, for all Customers, The City of Fredericksburg reserves the right to install, at its own expense, a meter to measure the output of the DG system.

**RATE:**

1. In a billing month after a customer receives approval to interconnect the customer's on-site generating system from the City of Fredericksburg, the City of Fredericksburg will determine the "Delivered KWh" and the "Received KWh".
2. The "Delivered KWh" (energy) will be billed on the standard applicable rate schedule.
3. The "Received KWh" (energy) will be multiplied by the City of Fredericksburg' Avoided Generation Cost to determine the amount the City shall credit the Customer.
4. The Avoided Generation Cost is based on the actual cost of generation from the City's wholesale supplier(s). The City shall credit the Customer's account for this amount.
5. Any credit shall be applied to the utility charges due from the customer to the City of Fredericksburg.



## City of Fredericksburg Distributed Generation (DG) Interconnection Diagram



## Distributed Generation (DG) Interconnection Process

**Step 1: Make application for your planned “grid-connected” project.** Pick up application at City Building Official’s Office or download from the City of Fredericksburg website [fbgtx.com](http://fbgtx.com)

**Contact:** Kyle Staudt, Building Official, City of Fredericksburg; (830) 997-7521; [kstaudt@fbgtx.org](mailto:kstaudt@fbgtx.org)

**Recommendation:** Contact the City early in the process. Much of the information on the application is specific to the respective DG system.

**Step 2: City of Fredericksburg will review the application** within a reasonable timeframe. The City will determine if a study is required.

**Contact:** Wallace Britton, Building Official, City of Fredericksburg; (830) 997-7521  
[wbritton@fbgtx.org](mailto:wbritton@fbgtx.org)

**Recommendation:** The City may need to ask follow up questions. Pre-certified equipment is a big plus in this phase.

**Step 3: City will prepare DG Agreement. Both parties must sign agreement before system can be connected** to the City of Fredericksburg system.

**Note:** The DG agreement documents the requirements and obligations of both parties and addresses the rate and billing aspects of the DG interconnection.