

Part 1 - Introduction and Overview

- A. **Applicability:** This Generating Facility Interconnection Application (Application) shall be used to request the interconnection of a Generating Facility to Sacramento Municipal Utility District's (SMUD) **Distribution System**. Refer to SMUD's Rates Policy & Procedure 11-01 under Rule and Regulation 21 to determine the specific requirements for interconnecting a Generating Facility. Capitalized terms used in this Application, and not otherwise defined herein, shall have the same meanings as defined in SMUD's Rates Policy & Procedure 11-01.

Except as noted in the next paragraph, this Application may be used either for 1.) Any on-site Generating Facility to be operated by or for a Customer and/or Producer to supplement or serve the Customer's electric service requirements that would otherwise be served by SMUD, including "distributed" generation, cogeneration, emergency, backup, standby generation, storage, and Net Energy Metered Generating Facilities, or 2.) Renewable fueled generating facilities applying for export to SMUD's Distribution System. This Application must be completed even for Generating Facilities that will always be isolated from SMUD's Distribution System.

This Application **may not** be used to apply for interconnection to SMUD's Transmission System. Interconnection to SMUD's Transmission System is coordinated by SMUD's Grid Planning business unit and requires a different application available from SMUD.

- B. **Guidelines and Steps for Interconnection:** This Application must be completed and sent to SMUD along with the additional information indicated below to initiate SMUD's review and authorization to interconnect the proposed Generating Facility. **An application fee of \$1400 (payable by check or money order to SMUD) must accompany this Application.** This fee is waived for Applications submitted for isolated Generating Facilities, and most Net Energy Metered Generating Facilities. Additional fees and charges may also apply for large and/or more complex Generating Facility Interconnections; see SMUD's Rates Policy & Procedure 11-01.

This document is an application only. Upon acceptance, SMUD may prepare at its sole discretion an Interconnection Agreement for execution by SMUD and the "Producer," the party that is responsible for the Generating Facility. SMUD may also require inspection and testing of the Generating Facility and any related Interconnection Facilities prior to granting the Producer written authorization to Interconnect. **Unauthorized interconnections may be dangerous and may result in injury to persons and/or may cause damage to equipment and/or property for which a Producer may be liable!**

Additional approvals may be required and/or other agreements may be needed with SMUD or regulatory agencies, such as Air Quality Management Districts and local governmental building and planning commissions prior to operating a Generating Facility. SMUD's authorization to interconnect does not satisfy the need for an Applicant to acquire such other approvals and such approvals are the responsibility of the Applicant.

Please note that special considerations must be given to a proposed Generating Facility to be installed on Sacramento's Downtown Secondary (12kV) Network System because of design and operational aspects of network protectors. SMUD urges Applicant to contact SMUD during the early planning stages of the generation project. Refer to SMUD's Grid Planning and Operations Policy No. GP-001.

- C. **Required Documents:** The submission of this Application must be accompanied by each of the documents listed below. Drawings must conform to accepted engineering standards and must be legible; 11"x17" drawings are preferred.
1. A **Single-line drawing** showing the electrical relationship and descriptions of the significant electrical components such as the primary switchgear, secondary switchgear, protective relays, transformers, generators, and circuit breakers. The single line diagram shall include operating voltages, capacities, and protective functions of the Generating Facility, the Customer's loads, and the interconnection with SMUD's Distribution System.
 2. **Site plans and diagrams** showing the physical relationship of the significant electrical components of the Generating Facility such as generators, transformers, primary switchgear/secondary switchgear, and control panels, the Customer's loads and the interconnection with SMUD's Distribution System.
 3. If the use of new electrical equipment is proposed:
 - a. If **transformers** are used to interconnect the Generating Facility with SMUD's Distribution System, please provide transformer nameplate information (voltages, capacity, winding arrangements, connections, impedance, et cetera).
 - b. If a **transfer switch** or scheme is used to interconnect the Generating Facility with SMUD's Distribution System, please provide component descriptions, capacity ratings, and a technical description of how the transfer scheme is intended to operate.
 - c. If **protective relays** are used to control the interconnection, please provide protection diagrams or elementary drawings showing relay wiring and connections, proposed relay settings, and a description of how the protection scheme is intended to function.

- D. **Submittal Instructions:** Completed application may be printed and submitted to SMUD, along with the required attachments and application fee.

**Generators with no export to SMUD's
Distribution System and Net-Energy Metering
Facilities**

Sacramento Municipal Utility District
P.O. Box 15830, Mail Stop A203
Sacramento, CA 95852-1830
Attention: Commercial PV

Questions: Call (916) 732-6096

**Generators with export to SMUD's Distribution System under
Power Purchase Agreement or other Special Contracts**

Sacramento Municipal Utility District
P.O. Box 15830, Mail Stop A404
Sacramento, CA 95852-1830
Attention: Power Contracts

Questions: Call (916) 732-6244



**RULE 21 GENERATING FACILITY
INTERCONNECTION APPLICATION
SMUD's Distribution System**

Project Name:

Date received:

Generating Facility ID:

For SMUD Use Only

Part 2 - Identify the Generating Facility's Location and Responsible Parties

A. Host Customer Facility Information - Where will the Generating Facility be installed?

Name shown on SMUD service account

Electric Account number

Meter Number

Street Address

City

State CA

Zip

Note: If available, please also submit a copy of the host Customer facility's most recent SMUD bill

B. Contact Information - Who should be contacted for additional information, if necessary?

Contact Person & Title

Company Name

Phone

Fax

Email

Mailing Address

City

State CA

Zip

Backup Contact Person & Title (Optional)

Company Name

Phone

Fax

Email

Mailing Address

City

State CA

Zip

C. Operating Date - What date is this Generating Facility expected to begin operation?

Part 3 - Describe the Generating Facility and Host Customer's Electrical Facilities

A. Indicate how this Generating Facility will interface with SMUD's Distribution System. (Choose one)

- 1. **Parallel Operation:** The Generating Facility will interconnect and operate "in parallel" with SMUD's Distribution System for more than one (1) second.
- 2. **Momentary Parallel Operation:** The Generating Facility will interconnect and operate on a "momentary parallel" basis with SMUD's Distributions System for a duration of one (1) second or less through switches or circuit breakers specifically designed and engineered for such operation.
- 3. **Isolated operation:** The Generating Facility will be "isolated" and prevented from becoming interconnected with SMUD's Distribution System through a transfer switch or operating scheme specifically designed and engineered for such operation.

Instructions and Notes:

If option 1, "parallel operation" is selected, please supply all of the requested information for the Generating Facility. Be sure to provide adequate information including diagrams and written descriptions regarding the protective relays that will be used to detect faults or abnormal operating conditions on SMUD's Distribution System.

If option 2, "momentary parallel operation" is selected, only questions A and E of this Part 3 and questions A, B, E, F, I, L, M, N, and S of Part 4 need be answered. Be sure, however, to provide adequate information including diagrams and written descriptions regarding the switching device or scheme that will be used to limit the parallel operation period to one second or less. Please also describe the back up or protective device and controls that will trip the Generating Facility should the transfer switch or scheme not complete the transfer in one second or less.

If option 3, "Isolated Operation" is selected, only questions A and E of this Part 3 and questions A, B, F, and S of Part 4 need be answered. Be sure, however, to provide adequate information including diagrams and written descriptions regarding the isolating switching device or scheme that will be used to prevent the Generating Facility from operating in parallel with SMUD's Distribution System.

B. If option 1 or 2 is selected for Question A above, please indicate the type of interconnection arrangement that is being requested with this Application. If option 3 was selected, please skip to Question E. (Choose one)

- 1. Generating Facility Interconnection that provides for parallel or momentary parallel operation of the Generating Facility, but does not provide for exporting power to SMUD's Distribution System.
- 2. Generating Facility Interconnection that provides for parallel operation of the Generating Facility, and the occasional, inadvertent, non-compensated, export of power to SMUD's Distribution System.
- 3. Generating Facility Interconnection that provides for parallel operation of the Generating Facility, and for the export of power to SMUD's Distribution System.
- 4. Net Energy Metering Interconnection that provides for parallel operation of the Generating Facility, and exporting power to SMUD's Distribution System for credit under the terms of SMUD's Net Energy Metering Rate Schedule (NEM). Pursuant to Section 2827 of the California Public Utilities Code, this option applies to renewable electrical generating facilities that are eligible for certification as a renewable energy resource as defined by the California Energy Resources Conservation and Development Commission (CEC) - see the CEC's most current Renewable Portfolio Standard Eligibility Guidebook.
- 5. Interconnection that provides for parallel operation of the Generating facility, and exporting all power net of station load to SMUD's Distribution System for sale to SMUD.

If options 2, 3, or 4 to Question B are selected please provide an estimate of the monthly kWh the Generating Facility is expected to deliver to SMUD's Distribution System. If SMUD determines that the amount of power to be exported is significant in relation to the capacity available on its Distribution System, additional information may be requested, including time of delivery or seasonal kWh estimates.

kWh

Part 3 Continued - Describe the Generating Facility and Host Customer's Electrical Facilities

- C. If option 1 was selected for Question B, please indicate the option below that will be used to prevent energy from being exported to SMUD's Distribution System. (Choose one)
- 1. A reverse-power protection device will be installed at the Point of Common Coupling (PCC) to measure any outflow of power and trip the Generating Facility or open an intertie breaker to isolate the Generating Facility if limits are exceeded.
 - 2. An under-power protection device will be installed at the PCC to measure the inflow of power and trip or reduce the output of the Generating Facility if limits are not maintained.
 - 3. The Generating Facility's interface equipment will be certified as Non-Islanding and the incidental export of power will be limited by the design of the interconnection. If this option is to be used, the continuous ampere rating of the service entrance equipment (Main Panel size) that is used by the host Customer facility must be stated in the space provided below.
 - 4. The nameplate rating of the Generating Facility will not exceed 50% of the host Customer facility's minimum electrical load. If this option is to be used, the minimum load of the host Customer facility must be stated in the space provided below. Refer to SMUD's Rates Policy & Procedure 11-01 for additional information as to how to answer this question. If the Generating Facility will never export power to SMUD's Distribution System, a simpler, lower cost, protection scheme may be used to control the interface between the Generating Facility and SMUD's Distribution System.

If option 3 to Question C is selected, please provide the continuous current rating of the host Customer facility's service entrance equipment (service panel size):

Amps

If option 4 to Question C is selected, please provide the minimum load of the host Customer facility:

kW

- D. What is the maximum 3-phase fault current that will be contributed by the Generating Facility to a 3-phase fault at the Point of Common Coupling (PCC)? (If the Generating Facility is single phase in design, please provide the contribution for a line-to-line fault.)

Amps

Please indicate the short circuit interrupting rating of the host Customer facility's service entrance ("main") panel:

Amps

Instructions and Notes

Refer to SMUD's Rates Policy & Procedure 11-01 for additional information. To determine the Question D value, any transformers and/or significant lengths of interconnecting conductor used between each of the Generators (if there are more than one) that make up the Generating Facility and the PCC must be taken into account. The details, impedance, and arrangement of such transformers and cable runs should be shown on the single-line diagram that is provided. Consult an electrical engineer or the equipment supplier if assistance is needed in answering this question.

It is expected that most Applicants will want to reserve the flexibility to operate any or all of their Generators in parallel with SMUD's Distribution System. However, if the design of the proposed installation will limit the amount of generation that may be interconnected at any time to SMUD's Distribution System, please describe the assumptions used in calculating the maximum fault current contribution value.

Note: With SMUD's approval a Producer that wishes to retain the option to export power from a Generating Facility to SMUD's Distribution System may use a different protection scheme that provides for the detection of faults and other abnormal operating conditions.

Part 3 Continued - Describe the Generating Facility and Host Customer's Electrical Facilities

- E. Please indicate how this Generating Facility will be operated. *(Please choose all options that may apply)*
- 1. **Combined Heat and Power or Cogeneration** – Where the operation of the Generating Facility will produce thermal energy for a process other than generating electricity.
 - 2. **Peak Shaving/Demand Management** – Where the Generating Facility will be operated primarily to reduce electrical demands of the host Customer facility during SMUD's "peak pricing periods."
 - 3. **Primary Power Source** – Where the Generating Facility will be used as the primary source of electric power and that power supplied by SMUD to the host Customer's loads will be required for supplemental, standby or backup power purposes only.
 - 4. **Standby / Emergency / Backup** – Where the Generating Facility will normally be operated only when SMUD's electric service is not available.
 - 5. **Net Energy Metering** – Where the Generating Facility qualifies and receives service under SMUD's Net Energy Metering Rate Schedule (NEM).
 - 6. **Generator** – Intended for sale of electricity to SMUD.

Part 4 - Describe each of the Generators (See Instructions.)

Note: In the case of more than one unique type of generator or inverter, please provide a separate Part 4 (page 6) for each.

- A. How many generators or inverters with the same characteristics are being installed?
- B. If storage is being proposed, what is the rated output (kW) and the rated storage capacity is (kWhr)
- C. Generator (or inverter) Manufacturer (Name)
- D. Generator (or inverter) Manufacturer (Name/Number)
- E. Generator (or inverter) Software Version (Number)
- F. Is the Generator Certified by a Nationally Recognized Testing Laboratory (NRTL) according to Rates Policy & Procedure 11-01?
 Yes No
- G. Generator Design Synchronous Induction Inverter
- H. Gross Nameplate Rating (kVa)
- I. Gross Nameplate Rating (kW)
- J. Net Nameplate Rating (kW)
- K. Operating Voltage (Volts or kV)
- L. Power Factor Rating %
- M. PF Adjustment Range Min % Max %
- N. Wiring Configuration Single-Phase Three-Phase
- O. 3-Phase Winding Configuration 3 Wire Delta 3 Wire Wye 4 Wire Wye
- P. Neutral Grounding System Used UnGrounded Solidly Grounded Ground Resistor
 Ohms
- Q. For Synchronous Generators Only: Synchronous Reactance Transient Reactance Subtransient Reactance
 $X_d\%$ $X'd\%$ $X''d\%$
- R. For Induction Generators Only: Locked Rotor Current (Amps)
- or
- Stator Resistance: % Stator Leakage Reactance % Rotor Resistance % Rotor Leakage Reactance %
- S. Short Circuit Current Produced by Generator Amps

Part 4 Continued - Describe each of the Generators (See Instructions.)

T. For Generators that are Started as a "Motor" Only

1. In-Rush Current (Amps)

2. Host Customer's Service Entrance
Panel (Main Panel) Continuous
Current Rating (Amps)

U. Prime Mover Type

- Internal Combustion Engine - Natural Gas/Propane Fueled
- Internal Combustion Engine - Diesel Fueled
- Internal Combustion Engine - Other Fuel
- Microturbine (< 250 kW) - Natural Gas/Propane Fueled
- Microturbine - Other Fuel
- Combustion Turbine (> 250 kW) - Natural Gas/Propane Fueled
- Combustion Turbine - Other Fuel
- Steam Turbine
- Photovoltaic Panels
- Solar-thermal engine
- Fuel Cell- Natural Gas/Propane Fueled
- Fuel Cell- Other Fuel
- Hydroelectric Turbine
- Wind Turbine
- Other (please describe)

Other

Instructions for Part 4 - Describing the Generators

A	Please indicate the number of each "type of generator or inverter being installed:	Please provide the following information for each Generator "type". Be sure all Generators classified as one "type" are identical in all respects.
B	Generator/Inverter Manufacturer	Enter the brand name of the Generator.
C	Generator/ Inverter Model	Enter the model name or number assigned by the manufacturer of the Generator.
D	Generator/ Inverter Software Version	If this Generator's control and or protective functions are dependent on a "software" program supplied by the manufacturer of the equipment, please provide the version or release number for the software that will be used.
E	Is the Generator Certified by a Nationally Recognized Testing Laboratory (NRTL) according to Rates Policy and Procedure 11-01?	Answer "Yes" only if the Generator manufacturer can or has provided certification data. See SMUD's Rates Policy & Procedure 11-01 for additional information regarding Generator certification.
F	Generator Design	Please indicate the design of each Generator. Designate "Inverter" anytime an inverter is used as the interface between the Generator and the electric system regardless of the primary power-production/storage device used.
G	Gross Nameplate Rating (kVA)	This is the capacity value normally supplied by the manufacturer and stamped on the Generator's "nameplate". This value is not required where the manufacturer provides only a "kW" rating. However, where both kVA and kW values are available, please indicate both.
H	Gross Nameplate Rating (kW)	This is the capacity value normally supplied by the manufacturer and stamped on the Generator's "nameplate". This value is not required where the manufacturer provides only a "kVA" rating. However, where both kVA and kW values are available, please indicate both.
I	Net Nameplate Rating (kW)	This capacity value is determined by subtracting the "Auxiliary" or "Station Service" loads used to operate the Generator or Generating Facility. Applicants are not required to supply this value but, if it is not supplied, applicable Standby Charges may be based on the higher "gross" values.
J	Operating Voltage	This value should be the voltage rating designated by the manufacturer and used in this installation. Please indicate phase-to-phase voltages for 3-phase installations. See SMUD's Rates Policy & Procedure 11-01 for additional information.
K	Power Factor Rating	This value should be the nominal power factor rating designated by the manufacturer for the Generator. See SMUD's Rates Policy & Procedure 11-01 for additional information.

Instructions for Part 4 - Describing the Generators

L	Power Factor Adjustment Range	Where the power factor of the Generator is adjustable, please indicate the maximum and minimum operating values. See SMUD's Rates Policy & Procedure 11-01 for additional information.
M	Wiring Configuration	Please indicate whether the Generator is a single-phase or three-phase device. See SMUD's Rates Policy & Procedure 11-01 for additional information.
N	3-Phase Winding Configuration	For three-phase generating units, please indicate the configuration of the Generator's windings or inverter systems.
O	Neutral Grounding	Wye connected generating units are often grounded – either through a resistor or directly, depending upon the nature of the electrical system to which the generator is connected. If the grounding method used at this facility is not listed, please attach additional descriptive information.
P	<i>For Synchronous Generators Only:</i>	If the Generator is a "synchronous" design, please provide the synchronous reactance, transient reactance, and subtransient reactance values supplied by the manufacturer. This information is necessary to determine the short circuit contribution of the Generator and as data to be input in load flow and short circuit-computer models of SMUD's Distribution System. If the Generator's Gross Nameplate Capacity is 10 MW or greater, SMUD may request additional data to better model the nature and behavior of the Generator with relation to SMUD's Distribution System.
Q	<i>For Induction Generators Only:</i>	If the Generator is an "induction" design, please provide the "locked rotor current" value supplied by the manufacturer. If this value is not available, the stator resistance, stator leakage reactance, rotor resistance, rotor leakage reactance values supplied by the manufacturer may be used to determine the locked rotor current. If the Generator's Gross Nameplate Capacity is 10 MW or greater, SMUD may request additional data to better model the nature and behavior of the Generator with relation to SMUD's Distribution System.
R	Short Circuit Current Produced by Generator	Please indicate the current each Generator can supply to a three-phase fault across its output terminals. For single phase Generators, please supply the phase-to-phase fault current.
S	<i>For Generators that are Started as a "Motor" Only:</i> 1. In-Rush Current 2. Host Customer's Service Entrance Panel (Main Panel) Continuous Current Rating	This information is needed only for Generators that are started by "motoring" the generator. Refer to SMUD's Rates Policy and Procedure 11-01 for significant and additional information. If this question was answered in Part 3, Question C of this Application, it need not be answered here.
T	Prime Mover Type	Please indicate the type and fuel used as the "prime mover" or-source of energy for the Generator.