

**APPENDIX A**  
**INTERCONNECTION APPLICATION**

**Note: Residential installations participating in the APS Renewable Energy Incentive Program must complete the residential application located at <http://www.aps.com/dg> and not the application(s) included in this document.**

Non-residential installations need to complete all items on the attached Interconnection Application (Static Inverter or Rotating Machinery) and forward to APS along with all Supplementary Information requested.

APS will then review the application submitted to determine if the design appears to be in conformance with APS' requirements.

APS notification that the system design appears to be in conformance with APS' Interconnection Requirements does not represent APS' approval of system's design, or is it an assurance that your system complies with all applicable electric codes, laws, regulations and requirements applicable to its installation and operation. **It is also important that system not be interconnected or operated in parallel with APS' grid until APS has inspected the system and issues written notification that the system is in compliance with APS' requirements.**

Note that the APS Interconnection Inspection is in addition to, not in lieu of, an AHJ inspection. Proof of AHJ clearance or Letter-in-Lieu of Electrical Clearance will need to be provided to APS prior to our scheduling the APS Interconnection Inspection.

If you have any questions please call 602-371-6160 for assistance.

Please submit all documentation electronically in pdf format to: [Commercial-Renewables@aps.com](mailto:Commercial-Renewables@aps.com)

**Include Customer name in subject line of email.**

**INTERCONNECTION APPLICATION FOR STATIC INVERTERS** - APS Reservation # if applicable \_\_\_\_\_

**CUSTOMER AND SITE INFORMATION**

APS Customer Account Holders Name(s) \_\_\_\_\_

Company Name (if applicable) \_\_\_\_\_

Generating Facility Address \_\_\_\_\_

Customer Mailing Address \_\_\_\_\_

Telephone (day) \_\_\_\_\_ E-mail \_\_\_\_\_

APS Account Number \_\_\_\_\_ APS Meter No \_\_\_\_\_

**STATIC INVERTER INFORMATION**

A. Manufacturer \_\_\_\_\_ Model No. \_\_\_\_\_

B. Nameplate continuous power output (AC) rating kW \_\_\_\_\_

No. of Units \_\_\_\_\_ Total System Nameplate AC kW \_\_\_\_\_

C. Tested to UL1741? \_\_\_\_\_

If No, explain: \_\_\_\_\_

D. Energy Source (solar, wind, etc.) \_\_\_\_\_

**INTERCONNECTION APPLICATION FOR STATIC INVERTERS contd**

**PROPOSED OPERATION**

(1) Specify whether the inverter will be programmed to operate in parallel with the utility, or in backup ("battery charger") mode:

\_\_\_ Parallel mode

\_\_\_ Backup mode

(2) If the inverter will operate in parallel with the utility, specify which one of the following options you desire (refer to Section 10):

\_\_\_ Net metering in accordance with the EPR-6 rate

\_\_\_ Partial Requirements Service under the SCS rate (Solar, > 100 kW)

\_\_\_ Partial Requirements Service under the E-56 rate (Non Solar, > 100 kW)

\_\_\_ Sell excess energy to APS in accordance with the EPR-2 rate ( $\leq$  100kW)

\_\_\_ None of the above. Specify: \_\_\_\_\_

(3) Provide the anticipated project in-service date: \_\_\_\_\_

(4) Is an electrical permit and/or inspection required by the Authority Having Jurisdiction? \_\_\_\_\_

If no, explain: \_\_\_\_\_

(5) Is access by APS personnel to the Utility Disconnect Switch, electric service entrance, and any utility-required inverter metering in any way restricted or impeded (e.g. fences, locks, gates, walls, animals, etc.)? \_\_\_\_\_

If yes, explain: \_\_\_\_\_

**SYSTEM OWNER**

If the GF is owned by a person or entity other than the Customer, complete the following:

Name: \_\_\_\_\_ Company: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

**SYSTEM OPERATOR**

If the GF is to be operated by a person or entity other than the Customer, complete the following:

Name: \_\_\_\_\_ Company: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

**INTERCONNECTION APPLICATION FOR STATIC INVERTERS contd**

**Complete applicable sections of this page if participating in the APS Incentive Program**

**WIND TURBINE INFORMATION – (COMPLETE FOR WIND SYSTEMS ONLY)**

Manufacturer \_\_\_\_\_ Model # \_\_\_\_\_

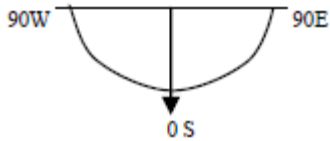
Nameplate Power Output /CEC Rating (Watts) \_\_\_\_\_

**PV MODULE AND ARRAY INFORMATION – (COMPLETE FOR UFI PHOTOVOLTAIC SYSTEMS ONLY)**

**If the design incorporates more than three types of modules, or different sized strings, please attach this sheet again, separately listing the information below for each module and/or string that will be installed. (Note: Modules must be listed to UL 1703 by an OSHA CERTIFIED NRTL)**

**Module Info:** Manufacturer \_\_\_\_\_ Model # \_\_\_\_\_ DC W-STC Rating \_\_\_\_\_

Number of Modules \_\_\_\_\_

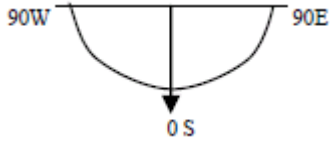


**Azimuth Angle from Due South [e.g. 15° W of South] \_\_\_\_\_ ° \_\_\_\_\_ of \_\_\_\_\_**

**Tilt Angle from Above Horizontal (in Degrees) \_\_\_\_\_ °**

**Module Info:** Manufacturer \_\_\_\_\_ Model # \_\_\_\_\_ DC W-STC Rating \_\_\_\_\_

Number of Modules \_\_\_\_\_



**Azimuth Angle from Due South [e.g. 15° W of South] \_\_\_\_\_ ° \_\_\_\_\_ of \_\_\_\_\_**

**Tilt Angle from Above Horizontal (in Degrees) \_\_\_\_\_ °**

**Module Info:** Manufacturer \_\_\_\_\_ Model # \_\_\_\_\_ DC W-STC Rating \_\_\_\_\_

**(Attach a separate sheet if necessary)**

Total Number of Modules \_\_\_\_\_ Total System Combined DC Watts (W-STC Rating) \_\_\_\_\_

**Is there a tree, building or overhang that is in proximity to the PV array?** \_\_\_\_\_

If you answered yes, please indicate the estimated percentage impact this will have on system production:

\_\_\_\_\_ **Less than 25 %**      \_\_\_\_\_ **26%- 40%**      \_\_\_\_\_ **40% - 60%**

Also, please describe the obstructions below **and** include the obstruction(s) in your Site Plan Diagram:

**INTERCONNECTION APPLICATION FOR STATIC INVERTERS contd**

**INTERCONNECTION PROCESS CONTACT INFORMATION**

If the primary contact for interconnection process is to be coordinated by someone other than the Customer, complete the following:

Name: \_\_\_\_\_ Company: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

**CUSTOMER CERTIFICATION**

This Application is complete and accurate to the best of my knowledge, and I hereby grant APS permission to coordinate the interconnection process with the person or entity specified above, if completed.

APS Customer Name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## INTERCONNECTION APPLICATION FOR STATIC INVERTERS contd

### **SUPPLEMENTARY INFORMATION**

Diagrams specified below are to be specifically prepared for APS' use, and to be submitted in pdf format for all static inverter based projects. APS will not accept any copyrighted drawings. These must be site specific regarding the information requested below, without extraneous information. All diagrams are to be professionally drawn, using only black print on white paper; and are not to be in color or shaded. Free hand drawn, photocopies and faxed diagrams will not be accepted by APS. All diagrams must include the project name and street address and include diagram revision numbers and dates.

Upon request, APS will provide Customer with a set of sample diagrams that indicate the general layout, the level of detail, the necessary information, and the required quality of the Customer diagrams for a typical inverter-based system.

Standard industry accepted electrical symbols shall be used on the diagrams. The required size for all drawings is 8.5"x11" or 11"x17".

**(a) Electrical One-Line Diagram:**

Diagram(s) must show all generation sources (e.g. photovoltaic panels, wind generator, etc.) and any associated DC electrical components, inverter(s), any combiner panels, metering, Utility Disconnect Switch, as well as the electric service entrance. In addition, the utility meter, connection points of facility loads, and all other associated electrical components must be shown. The electrical ratings of the wire and equipment including all backfed breakers or fuses and any subpanels, must be indicated.

**(b) Electrical Three-Line Diagram:**

Diagram(s) must show detailed phase wiring of all electrical equipment as specified in the Electrical One-Line Diagram, as well as all neutral, equipment ground and grounding electrode equipment (G.E.C.) conductors and connections.

**(c) Plant Location Diagram:**

Diagram must show major cross streets and location of facility. Include a North arrow.

**(d) Site Plan:**

Diagram must show the arrangement of the major GF equipment, including the electric service entrance section and utility meter, location of the inverter(s), Utility Disconnect Switch and any lock-boxes, etc. Include building structure location and any walls, fences and gates etc, to clearly indicate unobstructed access to APS equipment, any required special metering and the Utility Disconnect Switch. Include a North arrow.

**CUSTOMER AND SITE INFORMATION**

APS Customer Account Holders Name(s) \_\_\_\_\_

Company Name (if applicable) \_\_\_\_\_

Generating Facility Address \_\_\_\_\_

Customer Mailing Address \_\_\_\_\_

Telephone (day) \_\_\_\_\_ E-mail \_\_\_\_\_

APS Account Number \_\_\_\_\_ APS Meter No \_\_\_\_\_

**GENERATOR INFORMATION**

A. Manufacturer \_\_\_\_\_ Model No \_\_\_\_\_

B. Generator Type (Synchronous, Induction) \_\_\_\_\_

C. Generator Nameplate Rating

Voltage \_\_\_\_\_ Single or Three Phase \_\_\_\_\_

Power Factor \_\_\_\_\_ Continuous Power kW \_\_\_\_\_

No. of Units \_\_\_\_\_ Total System kW \_\_\_\_\_

D. Generator Electrical Characteristics (on the machine base, for above 50 kW)

Synchronous Reactance ( $X_d$ ) \_\_\_\_\_

Transient Reactance ( $X'd$ ) \_\_\_\_\_

Subtransient Reactance ( $X''d$ ) \_\_\_\_\_

Stator Resistance ( $R_a$ ) \_\_\_\_\_

Zero Sequence Reactance ( $X_0$ ) \_\_\_\_\_

Zero Sequence Resistance ( $R_0$ ) \_\_\_\_\_

Negative Sequence Reactance ( $X_2$ ) \_\_\_\_\_

Negative Sequence Resistance ( $R_2$ ) \_\_\_\_\_

**INTERCONNECTION APPLICATION FOR ROTATING MACHINERY (cont'd)**

E. Generator Neutral Grounding (for above 300 kW)

Specify whether the generator neutral will be solidly grounded or grounded through a neutral resistor:

\_\_\_\_\_

If grounded through a neutral resistor, specify the resistance: \_\_\_\_\_

**PRIME MOVER**

A. Manufacturer \_\_\_\_\_ Model No. \_\_\_\_\_

B. Fuel Source (Natural Gas, Landfill Gas, etc.) \_\_\_\_\_

C. Is useful heat recovered from the prime mover \_\_\_\_\_

D. Is the installation a Qualifying Facility (QF) \_\_\_\_\_

**INTERFACE EQUIPMENT AND PROTECTIVE RELAY INFORMATION**

(Complete all applicable items; attach a separate sheet if necessary).

A. Synchronizer for Synchronous Generator:

Manufacturer \_\_\_\_\_ Model No. \_\_\_\_\_

Automatic or Manual Synchronizer \_\_\_\_\_

B. Manufacturer's name and model number for each protective device  
(refer to section 8)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

C. Proposed settings (trip setpoint and time) for each protective device (refer to section 8)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**INTERCONNECTION APPLICATION FOR ROTATING MACHINERY (cont'd)**

**PROPOSED OPERATION**

A. (1) Specify the mode in which the Generator will operate:

- Continuous Parallel
- Smooth Parallel Transition (normally 5-15 seconds)
- Momentary Parallel Transition (normally <10 cycles)

(2) If the Generator will operate in continuous parallel with the utility, specify which one of the following options you desire:

- Net metering in accordance with the EPR-6 rate
- Partial Requirements Service under the SCS rate (Solar, > 100 kW)
- Partial Requirements Service under the E-56 rate (Non Solar, > 100 kW)
- Sell excess energy to APS in accordance with the EPR-2 rate ( $\leq$  100kW)
- None of the above. Specify: \_\_\_\_\_

B. Provide the anticipated project in-service date: \_\_\_\_\_

C. Is an electrical permit and/or inspection required by the Authority Having Jurisdiction? \_\_\_\_\_

If no, explain \_\_\_\_\_  
\_\_\_\_\_

D. Is access by APS personnel to the Utility Disconnect Switch, electric service entrance, and any utility-required generation metering in any way restricted or impeded (fences, locks, gates, walls, animals, etc.)? \_\_\_\_\_

If yes, explain \_\_\_\_\_  
\_\_\_\_\_

**INTERCONNECTION APPLICATION FOR ROTATING MACHINERY (cont'd)**

If the GF is to be operated by a person or entity other than the Customer, complete the following:

Name: \_\_\_\_\_ Company: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

**INTERCONNECTION PROCESS CONTACT INFORMATION**

If the primary contact for interconnection process is to be coordinated by someone other than the Customer, complete the following:

Name: \_\_\_\_\_ Company: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_

**CUSTOMER CERTIFICATION**

This Application is complete and accurate to the best of my knowledge, and I hereby grant APS permission to coordinate the interconnection process with the person or entity specified above, if completed.

APS Customer Name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## **SUPPLEMENTARY INFORMATION**

Diagrams and information specified below are to be specifically prepared for APS' use, and to be submitted in pdf format for all rotating machinery based projects. APS will not accept any copyrighted drawings. These must be site specific regarding the information requested below, without extraneous information. All diagrams are to be professionally drawn, using only black print on white paper, and are not to be color or shaded. Free hand drawn, photocopies and faxed diagrams will not be accepted by APS. All diagrams must include the project name and street address as well as diagram revision numbers and dates.

Standard industry accepted electrical symbols shall be used on the diagrams. The required size for all drawings is 8.5"x11" or 11"x17".

**(a) Electrical One-Line Diagram:**

Diagram(s) must show generators and all major associated electrical components including protective relaying, any interlocks and control functions, as well as the electric service entrance, utility meter, connection points of facility loads, any transformers, generator metering, and Utility Disconnect Switch. The electrical ratings of the equipment shall be shown.

**(b) AC & DC Control Schematics:**

Diagram(s) must show the detailed phase wiring of all electrical equipment as specified above for the Electrical One-Line Diagram, including protective relaying, associated instrument transformers, and control functions. Include control power source and all associated AC and DC connections.

**(c) Plant Location Diagram:**

Diagram must show major cross streets and location of facility. Include a North arrow.

**(d) Site Plan:**

Diagram must show the arrangement of the major GF equipment, including the electric service entrance section and utility meter, location of generator(s), interface equipment, Utility Disconnect Switch and location of any lock-boxes, etc. Include building structure location and any walls, fences and gates etc, to clearly indicate unobstructed access to APS equipment and Disconnect Switch. Include a North arrow.

**(e) Relay Setting Sheet(s):**

Setting sheet(s) for the APS-required minimum protective relay functions must show the trip setpoints and times. Settings may be provided after the initial APS review, once the final system configuration has been determined.