



**PHOTOVOLTAIC OFF-GRID
EQUIPMENT QUALIFICATIONS AND INSTALLTION GUIDANCE
APS RENEWABLE ENERGY INCENTIVE PROGRAM**

Systems receiving incentives under this program must be installed according to manufacturers' recommendations and generally accepted industry standards. Requirements not specified in this program, but which are applicable under this program, include, but are not limited to, the following:

- The project must comply with all applicable local, state, and federal regulations.
- Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.
- Systems must be permitted with and pass inspection by the Authority Having Jurisdiction (AHJ) over construction projects in the Participant's locale, or, if the site is not governed by an AHJ, the Participant must provide a certification in lieu of AHJ clearance.
- If the inverter of the DE system is interconnected or in any way connected to the APS grid – a "Grid-Tied System" – the system must meet all applicable APS Interconnection Requirements.
- APS may request copies of any documents to assure compliance with government, institutional, or DE program requirements that are either explicitly or implicitly described by this program.
- APS may request/require construction/as-built drawings of the system.

All major components of the DE system must be new and must not have been previously placed in service in any other location or for any other application. A DE system purchased more than 180 days before the date that APS receives the reservation request will not be considered "new" under this program. APS may consider exceptions to this timeframe when justified by the Participant in writing. The DE system must also comply with the technology specific criteria detailed below. When some technology-specific criteria reference third party standards, the requirements of those standards are fully applicable when referenced as part of technology specific criteria.

The following standards or standard development bodies are referenced as part of the technology specific criteria:

- The Active Solar Heating Systems Design Manual developed by the American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. ("ASHRAE") in cooperation with the Solar Energy Industries Association ("SEIA") and the ACES Research and Management Foundation (the "Design Manual").
- Arizona state boiler regulations (A.A.C. R4-13-406).

- Select technology specific qualification requirements developed by the California Energy Commission (“CEC”).
- Solar Rating and Certification Corporation (“SRCC”). The SRCC criteria and ratings can be viewed at www.solar-rating.org.
- The Underwriters Laboratory (“UL”).

Where the equipment qualifications detailed below are required for program participation, the technology specific installation guidance is provided to program participants to convey information on installation and operation practices that are most likely to achieve the DE system’s designed output. The requirements described herein are not intended as engineering recommendations, services, or technical advice. Engineering recommendations, design, and performance data will be provided to the Participant by their supplier, installer, or professional advisor. Although installation guidance is not currently mandated for a project to receive an incentive, it does reflect both industry and utility concurrence on those practices that are important for a technology to best achieve the designed output. APS reserves the right to modify equipment qualifications and/or installation guidance if APS becomes aware that such qualifications or guidance results in unsafe conditions, provides inappropriate results for our customer, or is inconsistent with program objectives.

Equipment Qualifications

- The minimum, single-system PV array size shall be 200 W-DC.
- All photovoltaic modules must be certified by a nationally recognized testing laboratory as meeting the requirements of the UL Standard 1703.
- All other electrical components used in the installation must be UL listed.
- “As-built” drawings shall be submitted to APS upon completion of the project and shall include: an electrical three-line diagram, a site plan, and a plant location map.

Installation Guidance

- All systems shall be installed with a horizontal tilt angle between 0 degrees and 60 degrees, and azimuth angle of +/- 110 degrees of due south. Since some installation alternates are less than ideal for energy production, some installation configurations for some systems receiving a UFI will not be eligible for the full incentive applicable to that system. APS will apply the PV off-angle and shading factor adjustment for the PV installation (Section 6.5).
- Photovoltaic modules must be covered by a manufacturer’s warranty of at least 20 years.
- Inverters must be covered by a manufacturer’s warranty of at least five years. The remaining operational life must be supported by a planned maintenance or equipment replacement schedule.