SUBMITTAL REQUIREMENTS FOR OFF GRID ALTERNATE POWER SYSTEMS

All submittals shall be site specific and designed to the provisions of the 2017 National Electrical Code (Electrical design), the 2018 International Residential Code and 2018 International Building Code (Structural design). Refer to PE-10 for additional permitting information.

MINIMUM CONTENT REQUIREMENTS FOR PLAN SUBMITTAL:

General:
- All offgrid/stand alone Alternate Power Systems shall be designed by a licensed Arizona Electrical Engineer.
- Two (2) sets of plans, minimum sheet size 11” x 17” that are site specific for the project.
- Plans shall be legible and clearly indicate the entire scope of proposed work.
- Provide an itemized list of components with cost break down including a separate line item for total labor/installation cost.
- In certain situations, additional information, and/or engineering may be required.

Site Plan:
- Single sheet site plan, minimum sheet size 11” x 17” clearly indicating the location(s) of all equipment.
- The site plan shall indicate the following:
  - Location of the photovoltaic array, batteries, and or the generator.
  - The distance of the equipment to any structures.
  - The type of fuel storage, the distance of the fuel storage to any structures, and the location of the fuel storage.
  - If LPG, indicate the size (gallons) of the fuel storage tank. Pipe sizing for LPG or natural gas lines shall be included.
  - The type/use of each structure on which the system is to be mounted or contained within: dwelling, garage, storage building, manufactured home, etc.
- Indicate the distance between structures and to solar system for all underground runs of conduit. If the run is one hundred feet (100’) or more, provide voltage drop calculations.
SUBMITTAL REQUIREMENTS FOR OFF GRID ALTERNATE POWER SYSTEMS Cont.

System Components:
- Provide manufacturer’s specifications for ALL system components: solar panels, inverters, controllers, disconnects, junction boxes, panel boards, etc. (Manufacturers Installation instructions shall be on site at time of inspection).
- The manufacturer’s specifications shall clearly indicate the specific model to be used.
- The manufacturer’s specifications shall include the approved testing laboratory listing: Underwriters Laboratories (UL), Intertek (ETL), or Canadian Standards Association (CSA) and listing number for each component. NOTE: ONLY LISTED AND LABELED COMPONENTS WILL BE ALLOWED.
- Provide the manufacturer’s specifications and the installation manual for the generator. The specifications shall include the generator output rating and the specific built-in over current protection.
- Provide a detail list of labeling for all components including breakers, transfer switches, conduit, disconnects, inverters, etc.

Array Drawing:
- Drawings shall specify the number of modules in series or in parallel for each array and total number of arrays.
- Include the operating voltage, operating current, maximum system voltage, and short-circuit current.
- Indicate the specific make and model of modules(s). These shall correspond with the provided manufacturer's specifications.
- Indicate wire size (AWG), type, insulation type, number of wires, conduit size, type and burial depth.

Three (3) – Line Electrical Diagram:
- Three (3) Line Electrical Diagram must be prepared by a Licensed Arizona Electrical Engineer.
- The wiring diagram shall include all wire sizes (AWG), type, insulation type, numbers of wires along with conduit sizes and types if applicable.
- All equipment/components shown, identifying specific make and model, shall correspond with the provided manufacturer’s specifications.
- The specific equipment grounding and bonding of the generator shall be based on the manufacturer’s specifications and Article 250 of the 2017 NEC.
SUBMITTAL REQUIREMENTS FOR OFF GRID ALTERNATE POWER SYSTEMS Cont.

**Systems with Batteries and/or Generator Power Backup:**
- Provide the manufacturer’s specifications for the specific type, brand and model of batteries.
- The plans shall include the number of batteries to be used and a floor plan of the battery storage location. Include the type of storage racks and show the working space access to the batteries and ventilation (amount and how being vented).
- The electrical wiring, disconnect types and related wiring connections to the system shall be included on the one (1) – and three (3) – line diagrams. Include electrical wiring, disconnect types and related wiring connections to the systems, and the transfer switch on the one (1) – and three (3) – line diagrams.

**Alternate Power systems used for Sole Source of Power:**
- Provide a list of **all** circuits and equipment to be powered, including a complete panel schedule.
- Provide load calculations, based on the requirements of 2017 NEC and 2018 IRC. The system shall be sized according to the calculations, completed by a licensed Arizona Electrical Engineer.

**Roof Framing Details: (Required for ANY/ALL roof mounted equipment)**
- Provide details indicating the type of roof structure system: manufactured trusses, conventional framed system, manufactured roof joist system, metal frame system, etc. Include the sheathing size/type, roof slopes, and type of roof covering materials (shingles/tile, etc.) Low slope roofs, less than 2:12 pitch, shall be designed and stamped by an Arizona registrant, including calculations.
- Indicate the size of support members, spacing of members, age of structure (or year built), and span between walls/beams supporting the roof. Systems cannot be mounted on the overhangs of any roof system.
- Location of all roof vent systems, plumbing or mechanical, in the array area. Vents shall not be covered by arrays.
- Show the location of any skylights or HVAC units including swamp coolers.
- Indicate the weight of array and all other components (pounds per square foot, load to roof supports). Include all module/array support or tilt systems.
- Provide manufacturer’s specifications and installation instructions for mounting systems and attachment hardware for the system to be used. **NOTE**: Engineering **shall** be required to
verify resistance of wind uplift on low slope roof with tilt systems, and of systems designed to be attached to the roof covering only and not direct to the roof frame members.

- Roof mounted systems on Manufactured Mobile Homes, Park Model Units and Factory Built Buildings will require the design to be provided by a licensed Arizona engineer/architect, and/or specific approval from the home manufacturer. Engineering shall include additional loading of inverters if attached to units.
- If not using a pre-engineered mounting/rack system, provide an engineered design, stamped by a licensed Arizona engineer, for the system.

Ground Set Systems:
- Provide a separate foundation plan fully dimensioned.
- Indicate the weight of array and all other components. Include all support members and equipment being supported by the foundation/footing.
- Provide manufacturer’s specifications of attachment hardware for mounting of system to the support members.
- If not using a pre-engineered mounting/rack system, provide an engineered design by an Arizona Registrant for the foundation/footing system. The design shall include attachment to foundation (anchor bolts, size [diameter]), and number of bolts, embedment depth, size and amount of reinforcement steel, depth and size of foundation/footing.

This list is not all-inclusive. Additional information and engineering as determined by the Building Official during plan review may be required.