

# SERC Solar PV System Field-Inspection Checklist

PROJECT INFORMATION				
Property Address				
Brief System Description				
Number of Modules and Array STC DC Wattage				
Array Orientation				
Array Tilt				
Inverter capacity (W or kW)				
Estimated System Annual kWh <sub>ac</sub> Production				
Inspection Checklist				
Yes	No	N/A	Prior to the Field Inspection	Note
			Utility has given permission to interconnect the PV system	
			System installed by a qualified installer	
			City inspection(s) have been passed: Permit # _____ Date _____	
			As-built electrical drawings received	
			Final electrical design has professional engineer's stamp	
			PV system plans and drawings received (showing array layout, balance-of-system (BOS) locations, components, disconnects, wiring, and conduit specifications)	
			Roof has 10 or more years useful life remaining (if roof-mounted). *Please note, SERC funds may be used to address the impacted roof area directly under the array, but not to replace an entire roof.	
			PV module specifications	
			Inverter specifications	
			Combiner-box specifications	
			Solar resource is documented from location where array shading will be most significant	
			Total Solar Resource Fraction (TSRF) is 75% or greater at all points on the collector(s)	

Yes	No	N/A	Field Inspection - PV Modules and Array	Note
			PV modules are physically installed per plans (number and layout)	
			Array is optimized for performance without sacrificing aesthetics	
			Trees and plants will not grow tall enough to shade array	
			Array installation is neat and permanent	
			Roof penetrations are secure and weather tight	
			PV module model number matches plans	
			PV modules warranted (recommended 10 year 90%, 25 year 80% minimum)	
			PV panels are new, UL listed and California Energy Commission (CEC) approved	
			Array is spaced a minimum of 1.5 inches off the roof, or is properly flashed into the roof	
			String fuses or circuit breakers are DC-rated and no larger than module fuse rating	
			PV modules are in good condition (no broken glass or cells, no discoloration, frames not damaged)	
			Module connectors tight and secure	
			Module interconnection conductors sunlight resistant, wet rated, 75°C or 90°C rated	
			Wire and conduit sizes installed per plans	
			Wiring is installed with shortest distance from PV panels to inverter or where aesthetically suitable	
			Wiring is neat and secure	
			Wiring is not readily accessible	
			Conductors are not in contact with roof surface	
			Conduit supported properly	
			Electrical boxes are accessible and suitable for environment	
			No potential for wire damage (e.g., deburred metal and proper sheathing to protect wires)	
			Confirm metallic PV module frame grounding uses a dedicated grounding conductor or the rack/module system is UL listed for grounding	
			Proper grounding of all other metallic surfaces that might possibly become energized (conduit, combiner boxes, disconnect enclosures, etc.)	
			Dissimilar metals are electrically isolated to avoid galvanic corrosion	
			Aluminum is not placed in direct contact with concrete	
			Protective fencing installed and will not shade array (if required)	

Yes	No	N/A	Field Inspection – Inverter and Electrical	Note
			Inverter is installed per work order	
			Confirm inverter model number matches plans	
			Inverter is warranted (recommended 10 years minimum)	
			Inverter(s) is new and CEC approved	
			Wire and conduit sizes installed per plans	
			Installation is neat and permanent	
			Inverter is easily accessible	
			DC disconnect is DC-rated and permanently installed and readily accessible	
			AC disconnect is permanently installed and accessible	
			Penetrations to building shell are sealed and fire resistance maintained	
			Sum of PV breaker and panel main breaker less than 120% of panel rating	
			Utility power connected	
			Internet connection operational (if applicable)	
Yes	No	N/A	Field Inspection - System Labeling	Note
			All equipment and parts are labeled as required	
			Label identifies PV power source attributes at DC disconnect	
			Label identifies AC point of connection	
			Outdoor labels designed to withstand the elements	
			Emergency and maintenance contact information	

Yes	No	N/A	System Documentation	Note
			Customer Manual is provided and mounted in a preserved location near the unit controls.	
			<u>  </u> Operation and maintenance instructions, including homeowner's responsibilities (if applicable)	
			<u>  </u> Electrical design showing modules and meters	
			<u>  </u> System & contractor warranty	
			<u>  </u> Manufacturers' warranties	
			<u>  </u> Permit(s)	
			<u>  </u> Parts and source list	
			<u>  </u> Emergency and maintenance contact information	
Yes	No	N/A	Owner Education	Note
			<u>  </u> Basic system operation	
			<u>  </u> Proper system disconnect sequence and safety procedures	
			<u>  </u> Reading meters and inverter display	
			<u>  </u> Required maintenance	
			<u>  </u> Emergency contact	

Yes	No	N/A	Post Inspection - Performance Testing (performed by Installer or Independent Contractor)	Note
			Performance tests performed by:	
			Date and time:	
			Solar irradiance level:	
			Ambient temperature:	
			Array temperature:	
			Measure and record open-circuit voltage (Voc) and polarity of each string (verify all strings have the same number of modules)	
			Measure and record short-circuit current (Isc) of each string	
			Inverter startup sequence – follow manufacturer’s instructions for initial startup	
			Confirm inverter shuts down if AC utility is disconnected and does not restart for at least five minutes after utility is reconnected (requirement of UL 1741)	
			Measure and record maximum power point current (Imp) for each string. (Current measurements for each string should be within a 0.1A range of each other, assuming consistent weather conditions, and all string having same tilt and azimuth angle. If a string is outside the range, check for shading or a ground fault.)	
			Confirm inverter’s power reading using independent meters. (afterwards, inverter power readings may be used for subsequent reporting.)	
			Confirm the system power output under actual conditions meets expected output. Actual performance should be within about 5% of expected STC power. This procedure includes system nameplate rating (kW), solar irradiance measurement (W/m <sup>2</sup> ) and module cell temperature (C). Procedure is best conducted during consistent weather conditions, where no array shading is present, and solar irradiance is not less than 400 W/m <sup>2</sup> .	
			Owner should check system AC power output monthly near solar noon on a clear day	

## References

- ❑ Field Inspection Guidelines for PV Systems. IREC V 1.1, June 2010. Brooks Engineering. [irecusa.org/2010/07/irec-releases-2010-edition-of-its-field-inspection-guidelines-for-pv-systems/](http://irecusa.org/2010/07/irec-releases-2010-edition-of-its-field-inspection-guidelines-for-pv-systems/)
- ❑ Procuring Solar Energy: A Guide for Federal Facility Decision Makers. DOE EERE, September 2010. [www1.eere.energy.gov/solar/pdfs/47854.pdf](http://www1.eere.energy.gov/solar/pdfs/47854.pdf)
- ❑ PV System Commissioning. Blake Gleason. SolarPro. October/November 2009. [solarprofessional.com/files/sample/sp2\\_6\\_pg34\\_gleason.pdf](http://solarprofessional.com/files/sample/sp2_6_pg34_gleason.pdf)
- ❑ Photovoltaic Power Systems and the 2005 National Electrical Code: Suggested Practices. John Wiles. SWTDI – NMSU November 2008. [www.nmsu.edu/~tdi/Photovoltaics/Codes-Stds/PVnecSugPract.html](http://www.nmsu.edu/~tdi/Photovoltaics/Codes-Stds/PVnecSugPract.html)
- ❑ 2005/2008/2011 Photovoltaic Electrical Power Systems Inspector/Installer Checklist. John Wiles. SWTDI, NMSU. June 2011. <http://www.nmsu.edu/~tdi/Photovoltaics/Codes-Stds/C-S-Resources.html?agree=agree>
- ❑ National Electrical Code (Article 690 – Solar PV Systems) . NFPA 70. [www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=70&cookie%5Ftest=1](http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=70&cookie%5Ftest=1)