



HELPS PV / MuniSolar Minimum Technical Requirements

All PV projects must demonstrate compliance with the Minimum Technical Requirements set forth in this attachment. These requirements are not intended to be all encompassing, nor is this attachment intended to be a substitute for engineering specifications or for safety requirements. Site-specific conditions and/or local regulations may require additional requirements not contained in this attachment. HELPS PV / MuniSolar reserves the right to withhold payment to any project that does not satisfy the Minimum Technical Requirements.

Minimum Design and Estimated Production Requirements

The PV project must be designed so that the estimated annual energy output for the PV project, based on actual site specific shading, azimuth, and inclination is at least 80% of the default optimal output for a fixed PV project of the same capacity, as estimated by PVWATTS or a similar tool.

Optimal parameters for purposes of a PVWATTS estimate are: **1) 0.77 dc to ac derate factor, 2) 42 degree array tilt, and 3) 180 degree (True South) azimuth.** Please see the Application and Instructions (Attachment A) Part 3: PV Project Technical and Cost Worksheet for related information. PVWATTS is available at the following website: http://rredc.nrel.gov/solar/codes_algs/PVWATTS/.

Exception for Commercial Only:

- HELPS PV / MuniSolar will provide partial rebates to PV projects that meet or exceed 65% of optimal output but do not meet the 80% production requirement based on the following schedule:

Production	Percent of Optimal Percent of Rebate
80%	100%
79%	98%
78%	96%
77%	94%
76%	92%
75%	90%
74%	88%
73%	86%
72%	84%
71%	82%
70%	80%
69%	78%
68%	76%
67%	74%
66%	72%
65%	70%

Installation Requirements

The **PV project electrical work must be performed by a Massachusetts licensed electrician.** For more information: <http://www.mass.gov/?pageID=ocaconstituent&L=2&L0=Home&L1=Licensee&sid=Eoca>. The PV project must be installed according to the manufacturer's instructions and in compliance with all applicable codes and standards.

PV Project and Equipment Warranty Requirements

Installer Warranty. All PV projects must have a minimum 5 year labor warranty provided by the installer to protect the purchaser against defective workmanship, PV project or component breakdown (exceptions noted below), or degradation in electrical output of more than fifteen percent from their originally rated electrical output during the warranty period. The warranty must cover the PV project, including PV modules (panels) and inverters, and provide for no-cost repair or replacement of the PV project or system components, including any associated labor during the warranty period.

Manufacturer Warranty. All major equipment must meet the following minimum manufacturer warranties:

- Photovoltaic Module: Minimum of one-year product warranty from date of sale to first consumer purchaser for product workmanship and materials, plus a minimum performance warranty of 20 years within which time the module will produce, under standard test conditions, a minimum of 80% of the product's minimum rated power at time of sale;
- Inverters: Minimum of 10 years product warranty from date of sale to first consumer purchaser for product workmanship and materials;
- Revenue grade production meters: 2-year product warranty.
- Mounting equipment: 5-year product warranty.
 - Exception:

Aforementioned warranty requirements do not apply to the components of a Data Acquisition System with exception of the revenue grade meter. However, equivalent warranties, if available, or equivalent service contracts are strongly recommended for such equipment.

Additional Solar PV Equipment Requirements

The equipment and components that comprise the PV project must have the following characteristics:

- All electrical equipment funded in part or in whole by HELPS PV / MuniSolar must be new.
- Underwriters Laboratory (UL) listed and compliant with Institute of Electrical and Electronics Engineers(IEEE) standards, or other nationally recognized testing laboratory standards (e.g., UL, CSA, ETL, TUV, etc.).
- All photovoltaic modules must be certified by a nationally recognized testing laboratory as meeting the requirements of the UL Standard 1703. Inverters must be certified as meeting the requirements of IEEE 1547 and UL Standard 1741.
- All modules, inverters, and production meters must be on the California Energy Commissions list of eligible renewable energy equipment:
www.consumerenergycenter.org/erprebate/equipment.html
- Exceptions:
 - A Data Acquisition System does not need to be UL listed.
 - UL is not required, but is recommended, for PV projects operating at less than 30 volts.

Electricity Production Meter Requirements

All PV projects must have a dedicated production meter that:

- Is readily accessible and easily understood by the PV project owner;
- Records the PV project's AC output as measured on the AC side of the PV project's isolation transformer; in the case of DC-only PV projects the meter should record the PV project output provided to the facility load; if a storage device is integral to the PV project, the meter should record the output from the storage device;
- Shall be separate from the utility billing meter and shall not interfere with utility billing or net-metering;
- Must be a standard utility "revenue quality" meter that conforms to applicable American National Standards Institute (ANSI) C-12 standards and shall be installed on the AC output side of the PV projects inverter or isolation transformer; and

- Shall have a visible display of cumulative energy produced by the PV project and be available for Periodic meter reading, testing and/or re-calibration, as deemed necessary by the local light department or HELP PV / MuniSolar.

More information about meter requirements can be found by contacting your local light department

Automated Reporting

All PV projects must use an automated reporting system for the purpose of reporting data to the Production Tracking System (PTS)*, which meets the requirements described below.

There are three options for automated reporting:

- 1) Vendor-Supplied System: A Data Acquisition System (DAS) that has Automated Reporting features.
- 2) Vendor-Supplied Service: A DAS with a service that offers remote monitoring that incorporates Automated Reporting features.
- 3) Sample Source Code Integration: A DAS vendor or service provider can customize the software of their system to incorporate this data transfer functionality.

Ask our Installer, Vendor for a list of products that have incorporated automated reporting capabilities.

** The PTS is used for Solar Renewable Energy Credit (SREC) reporting purposes. Anyone desiring to receive SRECs needs this equipment.*