Rooftop Solar Photovoltaic Systems ("Rooftop PV")

Solar Photovoltaic systems may be considered as a potential Energy Conservation Measure on site-built single family homes owned by the occupant and rentals with 1-4 units.

Manufactured homes are not eligible for rooftop PV at this time.

Policy Requirements:

Per the U.S. Department of Energy’s (DOE) requirements, all rooftop solar systems must achieve a savings to investment ratio (SIR) of 1.0 or greater.

To ensure that WAP solar PV installation projects qualify for a categorical exclusion from NEPA environmental review requirements, all solar PV systems in the WAP program must be installed on the household roof or attached to the building. Battery storage is not permitted as part of a WAP Solar PV project.

All equipment must be new and UL CERTIFIED and listed on the Go Solar California website at https://www.gosolarcalifornia.ca.gov/equipment/index.php

Each installed system will be no smaller than 1.8 kW and no larger than 4.0 kW.

PV systems will yield a weighted average generation capacity factor of at least fifteen (15) percent using the National Renewable Energy Laboratory’s (NREL) PVWatts® Calculator (to be provided to selected subcontractor(s)).

PV systems may not generate more than 100 percent of the electricity used by the WX customer during a typical year as determined by WX customer’s most recent electric usage (to be provided to selected subcontractor(s)).

For rental properties with 2-4 units, the landlord must contribute at least 15% of the net upfront installation cost. (Net upfront installation cost is defined as total install cost minus any upfront utility rebate or other fund rebate. Back-end production incentives should not be considered in this calculation.)

Adherence and compliance with a utility solar PV rebate, such as Xcel Energy’s Solar*Rewards Program. Requirements include submission and approval of Rooftop Solar PV Application for low-income project, and successful completion of required permitting, net metering and interconnectivity agreements.

All utility upfront and production based incentives issued by a utility, such as Xcel Energy’s Income-Qualified Solar*Rewards will be assigned to either the solar installer (front-end) or Commerce (production-based incentives), or an entity stipulated by Commerce, as determined by Commerce and the Service Provider. Assignment of utility incentives will help offset the upfront installation cost of the system.

All Rooftop PV systems must carry at least a five (5) year workmanship warranty from the manufacturer and selected subcontractor(s) that includes parts and labor. Warranty shall start on the date of weatherization agency’s final inspection.

PV modules must carry at least a ten (10) year manufacturer’s product warranty, and at least a twenty (20) year manufacturer’s performance/output warranty that modules will generate no less than 80% of rated output under Standard Testing Conditions (STC).
Inverters shall be UL 1741 Certified, and shall be, at a minimum, string inverters with DC optimizers or micro-inverters, and must have a minimum ten (10) year warranty.

All Rooftop PV systems will include theft deterrent devices, such as break away nuts and bolts, that will not void the PV panel/module manufacturer’s product warranty or production warranty.

All rooftop PV installations must receive a final inspection by a certified QCI inspector. Final inspection must verify that any and all permits are acquired and signed off by all required parties. The QCI inspector must also perform the following:

- confirmation of warranty information provided to homeowner;
- client education provided by PV installation contractor;
- quality of install, including required state electrical inspector sign-off;
- client interview for satisfaction;
- complete Solarbook;
- complete project recap sheet.

**Procedures:**

**Site Evaluations:** The Service Provider auditor should inspect the home during the initial energy audit to determine if the home is a good candidate for rooftop PV. The auditor should note the following items:

- age and condition of the roof,
- the roof covering type,
- roof orientation (azimuth) and roof tilt,
- any potential shading obstructions,
- the status and size of the home’s main electrical panel,
- available locations and space for mounting electrical components,
- available square footage and estimate the number of modules that can fit on the roof, and
- an evaluation of electricity usage. Initial evaluation may be based off estimated electrical load, but solar installers will need actual monthly electrical bills for final system design.

**Roof Condition:** If roof is in poor condition (framing, sheathing, roof leaks, missing or deteriorated shingles) it must be repaired prior to installation of rooftop PV. Repairs must be able to qualify as an IRM, or funded by funds other than USDOE funds, or the repair measure must be deferred until roof repairs are completed. See Policy Manual 4.2.2 for requirements to handle roof repairs as an IRM.

**Electrical Service:** A thorough inspection of the existing electrical system must be performed prior to considering the household for solar PV. Consideration must be given to ensuring enough physical space exists in close proximity to the electrical service to install the solar electrical components, as well as if space exists in the electrical panel to add the solar PV service. Electrical upgrades to the electrical system will be allowed as long as the upgrades can be handled as under the IRM policy. (See Policy Manual 4.2.2 and the Allowable Measures Chart.)
Preliminary Qualification work: In addition to onsite assessment of the potential of a Household to be suitable for solar PV, WAP personnel should also perform an in-office assessment of the HH suitability.

- **Household electrical bills**: Gather Household electrical bills, or use EAP application numbers, to get an estimated annual kwh usage number and cost. (Actual bills are not necessary at this point, but once a Solar Professional is involved, he/she will want to know exact kwh usage and cost for the last year. An analysis document of the full year electrical usage will need to be included in HH client files as part of the final SolarBook.

- **Solar Suitability application**: A solar lidar tool such as the Solar Suitability online analysis application should be accessed to determine initial solar resource. (Note: this tool is very sensitive to the exact placement of the locator on a rooftop. You will want to try a number of specific roof spots to determine the best solar lidar results). Print a copy of the REPORT for inclusion in the SolarBook for the HH file.

- **PV Watts**: utilize PV Watts to run an initial system size production estimate for the HH location.

- **SIR calculation**: Initial SIR should be run utilizing the Solar SIR spreadsheet developed by NREL and by entering the Solar measure in WA as an itemized cost.

Solar Professional Site Assessment: After the agency auditor determines that the home is potentially a candidate for rooftop PV, a rooftop PV site assessment must be performed by a North American Board of Certified Energy Practitioners (NABCEP) certified professional. If, after conducting a solar site assessment, the Solar professional agrees that Solar PV should be considered, the Solar Professional will determine solar system design and size (within the stipulations of the WAP program rules) and provide an estimated annual kwh production number. Re-run the SIR calculations with the production and system size details from the professional solar site assessment to ensure results are 1.0 or above; the Solar SIR must be run prior to installing Solar PV as a measure in the WAP work.

Solar Installation and Site Assessment professionals must be eligible Solar Contractors who meet all Federal and State stipulations.

**HH Client file inclusions**:

A detailed “solar book” must be included in the HH file. The SolarBook must include the following:

- An analysis of 1-year of HH energy usage, with both kwh and $$ cost information

- Preliminary site assessment work: WAP auditors site assessment checklist, PVWatts results, LiDAR / Solar Suitability report, Solar SIR, WA SIR estimated results, site pictures (Aerial and ground-based). (If during the pilot program period, the packet of information sent to Commerce for USDOE approval would meet this requirement.)

- All emails related to acquiring Commerce /USDOE project approval, including the package of information sent to Commerce/USDOE for approval and the final approval emails.

- Utility rebate related documents including the submitted application and approval documentation and any documents submitted with that application, as well as the signed assignment documentation transferring payment of any incentive to another party.
• Professional solar site assessment results, and resulting initial system design and generation estimate

• All system design documents as generated by the solar PV contractors including but not limited to permits, interconnect agreements, net metering agreements, electrical design specifications such as a one-line or three-line drawings.

• Specification sheets, warranty information, and operating/owner’s manuals for all major components of solar PV system.

• Signed HH owner or landlord agreement allowing installation of Solar PV, and acknowledging that the building owner does not intend to remove the system prior to the end of the system’s useful life. Landlord agreement for rental properties with 2-4 units must also stipulate that the landlord will contribute at least 15% of the net upfront installation cost.

Rooftop PV Subcontractor Requirements

Subcontractor will ensure that personnel are prepared to and capable of instructing WAP customers on system operations and provide all warranty information and operating manuals to the WAP customer, Service Providers and Commerce upon request.

Subcontractor will ensure that installed system is commissioned and operating properly. Subcontractor will provide Manufacturer’s Specification Sheets for each type of PV panel/module proposed in response, including warranty information.

• Subcontractor will provide Manufacturer’s Specification Sheets for each type of inverter proposed in response, including warranty information.

• Subcontractor will provide Manufacturer’s Specification Sheets for the mounting frames, brackets, and any other roof mounting equipment for the installation of the rooftop solar PV system, including warranty information.

• Subcontractor will provide all labor, materials, permits, supplies, equipment, and supervision required to design, furnish, construct, and commission the rooftop solar PV system, including all necessary devices and connections between inverter and main electrical service. MATERIALS EXCEPTION: If Service Provider has participated in and negotiated a Bulk-Buy master agreement to acquire the major solar PV components, those bulk-buy materials may be utilized as long as they meet all the other requirements and stipulations of this policy.

• Subcontractor will provide in electronic format as-built versions of the submittals and drawings, including shade analyses.

• Subcontractor will provide Installation drawings and field wiring diagrams.

• Confidentiality of all eligible WAP customers served by the subcontractor is required in accordance with the Privacy Act of 1974. Subcontractors shall be responsible for the privacy of all data disclosed to them as necessitated to participate in this project.

• Subcontractor shall agree to attend any pertinent meetings/conference calls as deemed necessary by any subgrantee, Commerce, and/or utility. Invoices submitted by subcontractor will be authorized for payment only after all required forms and documents have been submitted, and the weatherization agency verifies that all work is completed and conforms to the project standards and requirements as well as the appropriate WAP Field Work Standards.

• Callbacks required solely due to subcontractor error and/or deficiencies in subcontractor work will be performed promptly, and subcontractor will be responsible for all associated expenses.
Subcontractor is solely responsible for determining the techniques, means, methods, and materials of installation to meet the requirements of this solicitation and subsequent contract(s). All work shall comply with the following standards, regulations, policies, and procedures:

- OSHA worker safety regulations (29 CFR 1910 & 1926);
- WAP Policies and Procedures;
- DOE Federal Regulations:
  - [https://www.energy.gov/eere/wipo/weatherization-program-guidance](https://www.energy.gov/eere/wipo/weatherization-program-guidance) and;
- Xcel Energy’s Solar*Rewards Program Requirements (or similar utility solar incentive):
  - [https://www.xcelenergy.com/programs_and_rebates/resid_in_your_yard/solar_rewards_for_residences](https://www.xcelenergy.com/programs_and_rebates/resid_in_your_yard/solar_rewards_for_residences);
- EPA lead-safe renovation requirements:
  - [http://www.epa.gov/lead/pubs/renovation.htm](http://www.epa.gov/lead/pubs/renovation.htm) and the EPA Renovation, Repair and Painting Rule;
- All DOE requirements for lead-based paint safe work;
- NESC (National Electrical Safety Code), ANSI (American and Electronic Engineers), NEC (National Electrical Code) requirements.