



CITY OF PALO ALTO
UTILITIES

PV PARTNERS PROGRAM

2009 GUIDEBOOK

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Program Goals

The City of Palo Alto Utilities (CPAU) has offered incentives to encourage the installation of solar photovoltaic (PV) systems since 1999. The California Million Solar Roofs Bill (SB1, August 2006) requires an expanded funding commitment by all California electric utilities, with a statewide goal to add 3,000 MW of new PV systems over ten years. CPAU's PV Partners Program is designed to encourage high-quality photovoltaic installations on CPAU customers' premises in support of the Million Solar Roofs goals.

CPAU's PV Partners Program budget is approximately \$13 million over ten years. The total budget is divided into ten steps, each funded at \$1.3 million. Each step is allocated across four customer and rate classes: residential on E1 (\$221,000), small commercial on E2 and E4 (\$507,000), large commercial on E7 (\$442,000), and non-profit/public sector, (\$130,000). The rebate levels decrease over time per SB1 requirements.

Program Eligibility and Requirements

Applicant

The PV Partners Program is available to retail electric distribution customers of the City of Palo Alto Utilities (CPAU). The Host Customer must be the utility customer of record at the location where the generating equipment will be located. The system may be owned by a third party System Owner. The PV Partners Program Applicant may be the Host Customer, or System Owner, or an assigned designee such as the Installer. While the Applicant is the primary contact for the PV Partners application process, the legal party to the Program agreement is the Host Customer and/or System Owner.

To be eligible for an incentive, the Applicant must receive a confirmed reservation notice letter from CPAU prior to the Applicant receiving final interconnection authorization. The Applicant must meet all minimum equipment and performance requirements, solar energy system design and installation standards, and energy efficiency requirements prior to receiving an incentive. If a project cancels due to delays past the reservation period, the Applicant must reapply to the PV Partners Program prior to receiving a final interconnection authorization. If a Host Customer ceases to be a retail electric distribution customer of CPAU, the designated rebate recipient will not be eligible to receive any remaining unpaid incentive payments.

All solar electric systems receiving incentives under the PV Partners Program must be connected to the local electric utility's distribution system. The interconnection, operation, and metering requirements for solar systems shall be in accordance with CPAU's rules for customer generating facility interconnections. To connect a solar system to the utility distribution system, Host Customers, and/or System Owners will be required to execute certain documents such as, but not limited to, Interconnection Agreement and Net Energy Metering Agreement.

Installer

All eligible systems shall be installed by individuals with a current A, B, C-10, or C-46 contractor license. Roofing contractors with a current C-39 license may place PV panels in accordance with the limitations of their license. North American Board of Certified Energy Practitioners (NABCEP) certification of installers is encouraged, though not required. Systems may be self installed by the purchaser (owner).

In all cases, systems must be installed in conformance with the manufacturers' specifications and all applicable electrical and building codes and standards.

System Equipment

All major system components (panels and inverters) must be listed on the California Energy Commission's (CEC) [Eligible Equipment List](#)¹ and must be new and not previously placed in service in any other location or for any other application. Rebuilt, refurbished, or relocated equipment is not eligible

¹ <http://www.gosolarcalifornia.ca.gov/equipment/index.html>

for a PV Partners incentive. This list is continuously updated by the CEC. Performance meters are also required. For systems on the Performance Based Incentive (PBI), meters must have $\pm 2\%$ accuracy. All other meters are required to have a $\pm 5\%$ percent accuracy. All meters shall measure and display output in kW and kWh, retain production data during power outages, and have a communication port capable of enabling remote performance monitoring and reporting service.

System Size

To receive a PV Partners rebate, the system must be at least 1,000 watts_{AC} and no larger than 1,000 kilowatts_{AC}.

The solar energy system must be intended primarily to offset part or all of the consumer's own electricity demand.

Systems 5 kW_{AC} or less are assumed to be in compliance with being sized to serve on-site electric load and do not require substantiation.

For residential systems greater than 5 kW_{AC} but less than or equal to 10kW_{AC}, a calculation of 2 watts per square foot can be used instead of an engineering estimate.

For systems greater than 10 kilowatts_{AC} the Applicant must include an engineering estimate. The engineering estimate must include the appropriate substantiation of the forecast of the Host Customer site's annual energy use (in kWh) if the generating system size is based on future load growth, including new construction, load growth due to site expansion, or other load growth circumstances. Suggested methods of demonstrating load growth include an [Electric Load Sheet](#)² with corresponding equipment schedules and single-line diagram; building simulation program reports such as eQUEST, EnergyPro, DOE-2, and VisualDOE; or detailed engineering calculations.

Energy Efficiency

For residential sites, the Host Customer must include the Residential Efficiency Checklist along with the PV Partners Application. It is also recommended that the Host Customer schedule a "Green@Home" energy audit with Acterra (contact Twana Karney, twanak@acterra.org, 650-962-9876 x316) or use the CPAU [On-Line Home Energy Analysis](#)³ tool and implement efficiency measures where appropriate.

For commercial sites, the Host Customer should consider having an energy efficiency study prior to installing a PV system. The Consultant Assistance for Resource Efficiency (CARE) program may provide assistance or incentives for your energy study.⁴

Shading Analysis

A system is considered to have minimal shading if no obstruction is closer than a distance of twice its height. Obstructions include any roof equipment, neighboring trees, poles, buildings, or other objects. Landscaping should be evaluated at the expected mature height. If there are obstructions, then a shading analysis is required. Submittals may include a table showing distance to height ratios per orientation, photo of a Solar Pathfinder, or printouts from the Pathfinder Assistant, or Solmetric SunEye. Shading results shall be used to estimate the annual energy production. Rebates are not reduced due to shading results, but CPAU strongly recommends minimizing any shading of the PV modules during mid-day hours. Please consider the future growth of nearby trees. The California Solar Shade Control Act was amended in 2008⁵ to exempt trees and shrubs planted prior to the installation of a solar system. Also exempted are trees and shrubs that are subject to a local ordinance, or the replacement of trees or shrubs that had been growing prior to the installation of the solar device.

² <http://www.cityofpaloalto.org/civica/filebank/blobdload.asp?BlobID=9458>

³ <http://www.cpauc.com/forms/homeenergy/home-energy.htm>

⁴ To qualify for CARE program incentives, check with your CPAU Commercial Account Representative, (650) 329-2241.

⁵ http://info.sen.ca.gov/pub/07-08/bill/sen/sb_1351-1400/sb_1399_bill_20080409_amended_sen_v97.pdf

Annual Energy Production

The annual energy production shall be estimated using the Expected Performance Based Buydown (EPBB) [Calculator](#)⁶. Use Zip code = 94303, Utility = PG&E, and the appropriate Customer type. While the PV Partners rebate is not reduced for a design factor, all applications shall use the same methodology for estimating energy production.

Warranty

All systems must have a minimum 10-year warranty provided in combination by the manufacturer and installer to protect the purchaser against defective workmanship, system or component breakdown, or degradation in electrical output of more than fifteen percent from their originally rated electrical output during the 10-year period. The warranty must cover the entire solar generating system, including PV modules (panels) and inverters, and provide for no-cost repair or replacement of the system or system components, including any associated labor during the warranty period.

Meters must have a five-year warranty to protect against defective workmanship, system or component breakdown, or degradation in electrical output of more than fifteen percent from their originally rated electrical output during the warranty period.

Performance and Permanency

Equipment is intended to be in place for the duration of its useful life. Only permanently installed systems are eligible for incentives. This means that the PV system must demonstrate adequate assurances of both physical and contractual permanence prior to receiving an incentive. Physical permanence is to be demonstrated in accordance with industry practice for permanently installed equipment. Equipment must be secured to a permanent surface. Any indication of portability, including, but not limited to, temporary structures, quick disconnects, unsecured equipment, wheels, carrying handles, dolly, trailer, or platform, will deem the system ineligible.

Metering and Data Collection

The PV Partners Program requires accurate solar production meters for all projects that receive incentives. These meters are separate from the billing meter used for net energy metering.

For systems less than 100 kW_{AC}, meter accuracy of $\pm 5\%$ is required. Some inverters have a performance meter included which meets this requirement. If not, a separate meter is required to measure PV energy production. All meters must be listed on the CEC's [Eligible Meter](#)⁷ list for the PV Partners Program.

For systems 100 kW_{AC} and larger, a revenue grade meter ($\pm 2\%$) is required with remote communications capability. The meter shall be tested to all applicable ANSI C-12 testing protocols and shall have Interval Data Recording (15 minutes or less). The system Seller or Installer must retain and provide the System Owner and CPAU with remote access to 15 minute average data for a minimum of five years. A remote performance monitoring and reporting service is required. Monthly System energy production data shall be reported to CPAU for calculation of the performance based incentive. The Production Data Provider may be the System Owner, Seller, or a designated third party.

All program participants must allow access to the PV production meter for testing, inspection, or data collection. Installers are encouraged to locate PV production meters in an easily accessible area.

⁶ <http://www.csi-epbb.com/>

⁷ <http://www.gosolarcalifornia.org/equipment/meter.php>

Site Inspections and System Verification

To be eligible for PV Partners Program incentives, all Applicants, Host Customers, and System Owners must agree to provide CPAU and/or third parties contracted by CPAU access to the site and any available data and information collected on the system for a period up to 10 years.

CPAU will conduct system inspection visits on a sample of installations in order to verify that projects are installed as represented in applications, are operational, interconnected and conform to the eligibility criteria of the PV Partners Program. CPAU reserves the right to disqualify installers from future program participation for failed inspections due to gross negligence, fraud, or uncorrected mechanical failures within 60 days.

Incentive Structure

For PV systems under 100 kilowatts (kW_{AC}), the rebate is paid based on system capacity measured in watts_{AC}.

For systems 100 kW_{AC}, and above, the rebate is paid over a five-year period based on measured system energy production (kilowatt-hours). The performance-based incentive (PBI) is fixed for each applicant over the entire five-year term.

A project is counted toward each step's kW trigger once the application is deemed eligible and has been issued a confirmed reservation. As the number of kilowatts allocated through the confirmed reservations reaches its maximum within any particular step, CPAU moves to the next step. If there are any kilowatts that remain unused in a previous step due to events such as Applicants dropping out of the process, those kilowatts will be added to the current step.

If the total applications received on the same day exceed the available kilowatts of the current step, all of the applications for that day will receive the same rebate level. The rebate shall be prorated across the appropriate steps.

Incentive Tables

Please check the City of Palo Alto Utilities [website](#)⁸ to view current rebate levels. Shaded cells reflect completed steps as of 3/1/09.

Residential (E-1, E-1-G)			
Step	Budget (\$)	Rebate (\$/Watt)	kW available
1	\$ 222,000	\$ 3.00	74
2	\$ 221,200	\$ 2.80	79
3	\$ 221,000	\$ 2.60	85
4	\$ 220,800	\$ 2.40	92
5	\$ 220,000	\$ 2.20	55
6	\$ 222,000	\$ 2.00	22
7	\$ 221,400	\$ 1.80	123
8	\$ 220,800	\$ 1.60	138
9	\$ 221,200	\$ 1.40	158
10	\$ 220,800	\$ 1.20	184
TOTAL	\$ 2,211,200		1,144

⁸ www.cityofpaloalto.org/pvpartners

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Small Commercial (E-2, E-2-G, E-4, E-4-G, E-4TOU)			
Step	Budget (\$)	Rebate (\$/Watt)	kW available
1	\$ 507,000	\$ 3.00	169
2	\$ 506,800	\$ 2.80	181
3	\$ 507,000	\$ 2.60	145
4	\$ 506,400	\$ 2.40	211
5	\$ 506,000	\$ 2.20	230
6	\$ 508,000	\$ 2.00	254
7	\$ 507,600	\$ 1.80	282
8	\$ 507,200	\$ 1.60	317
9	\$ 506,800	\$ 1.40	362
10	\$ 507,600	\$ 1.20	423
TOTAL	\$ 5,070,400		2,624

Large Commercial (E-7, E-7-G, E-7 TOU)			
Step	Budget (\$)	Rebate (\$/Watt)	kW available
1	\$ 441,000	\$ 3.00	147
2	\$ 442,400	\$ 2.80	158
3	\$ 442,000	\$ 2.60	170
4	\$ 441,600	\$ 2.40	184
5	\$ 442,200	\$ 2.20	93
6	\$ 442,000	\$ 2.00	220
7	\$ 442,800	\$ 1.80	246
8	\$ 441,600	\$ 1.60	276
9	\$ 442,400	\$ 1.40	316
10	\$ 441,600	\$ 1.20	368
TOTAL	\$ 4,419,600		2,287

Non-Profit/Public Sector (E-2, E-2-G, E-4, E-4-G, E-4 TOU, E-7, E-7-G, E-7 TOU, E-18, E-18-G)			
Step	Budget (\$)	Rebate (\$/Watt)	kW available
1	\$ 131,250	\$ 3.75	25
2	\$ 131,350	\$ 3.55	37
3	\$ 130,650	\$ 3.35	39
4	\$ 129,150	\$ 3.15	41
5	\$ 129,800	\$ 2.95	44
6	\$ 129,250	\$ 2.75	47
7	\$ 130,050	\$ 2.55	51
8	\$ 129,250	\$ 2.35	55
9	\$ 129,150	\$ 2.05	63
10	\$ 129,200	\$ 1.70	76
TOTAL	\$ 1,299,100		489

Performance Based Incentives (\$/kWh)			
Step	Small Commercial	Large Commercial	Non-Profit/Public
1	\$ 0.38	\$ 0.38	\$ 0.47
2	\$ 0.35	\$ 0.35	\$ 0.44
3	\$ 0.33	\$ 0.33	\$ 0.41
4	\$ 0.30	\$ 0.30	\$ 0.38
5	\$ 0.28	\$ 0.28	\$ 0.35
6	\$ 0.25	\$ 0.25	\$ 0.31
7	\$ 0.23	\$ 0.23	\$ 0.28
8	\$ 0.20	\$ 0.20	\$ 0.25
9	\$ 0.18	\$ 0.18	\$ 0.22
10	\$ 0.15	\$ 0.15	\$ 0.19

Capacity-Based Incentives

For all systems under 100 kW_{AC}, the rebate will be calculated based on the CEC System Rating in watts_{AC}, per this formula:

$$\text{CEC System Rating (watts}_{AC}) = \text{Quantity of Modules} \times \text{CEC Rating of Photovoltaic Modules (watts/module)} \times \text{CEC Inverter Efficiency Rating (\%)}$$

Performance-Based Incentives

For systems 100 kW_{AC} and greater, the incentive is paid monthly over a 5-year term based on the actual energy produced, measured in kilowatt-hours, as measured by the production meter. Monthly production data shall be provided by the System Owner, Host Customer, or a designated third party. Production Data Providers may be the Seller or Installer. The monthly production data shall be reported every 30 days in the electronic format specified by CPAU.

Non-Profit and Government Entities

Government and non-profit entities will be required to submit verification of their tax-exempt status to receive this incentive amount and shall certify that the system will not receive any federal tax benefits through financial arrangements for the entire warranty period of the system (i.e., the System Owner if a third party, which will be receiving tax benefits from the system).

Project Costs

No project can receive total incentives (incentives from the PV Partners Program combined with other programs) that exceed total eligible project costs. The Applicant must submit project cost details to report total eligible project costs and to ensure that total incentives do not exceed out-of-pocket expenses for the System Owner. Total eligible project costs cover the solar system and its ancillary equipment. For large, multifaceted projects where the solar system costs are embedded, applications must include a prorated estimate of the total eligible costs for the solar system. CPAU has the right to conduct an audit of all relevant PV system project costs.

Application process

The reservation period is 12 months for retrofit projects and 18 months for new construction. The Applicant completes the PV Partners’ Application, with required attachments. If the application is complete, CPAU will send the Applicant a Reservation Confirmation and Claim Form, and the installation may proceed. Once the system has passed all required inspections, the Applicant completes the Claim Form and submits it with attachments to CPAU.

Step	Applicant/System Owner	CPAU
1	<p><u>Complete PV Partners Application:</u></p> <ul style="list-style-type: none"> - Sign, include attachments, and send to CPAU 	<p><u>Review Application:</u></p> <ul style="list-style-type: none"> - If incomplete, or ineligible, return to Applicant. - If complete, proceed to Step 2
2	<p><u>After Receiving Reservation Confirmation:</u></p> <ul style="list-style-type: none"> - Host Customer completes Net Metering and Interconnection Agreements and returns to CPAU. - Installer has 12 months (retrofit) or 18 months (new construction) to apply for permit, complete the project and get all final inspection approvals. -System Owner pays final invoice for system 	<p><u>Reservation Confirmation and Claim Form:</u></p> <ul style="list-style-type: none"> - Completes and sends to Applicant. - CPAU shall also send the Net Metering and Interconnection Agreements to Host Customer.
3	<p><u>After System Passes Final Inspections:</u></p> <ul style="list-style-type: none"> - Returns the Claim Form to CPAU, listing any changes to system equipment, and includes all attachments - For PBI, the designated Production Data Provider shall report monthly kWh produced each month to CPAU 	<p><u>After Receiving Claim Form:</u></p> <ul style="list-style-type: none"> - Reviews Claim Form and attachments - If complete, process rebate within 30 days - For PBI, credit Host Customer’s utility account each month, for 60 months

Application Attachments

- Recent CPAU utility bill showing electric usage
- Purchase order or contract for the PV system equipment and installation, with a 10-year warranty
- Printout of EPBB calculator showing estimate of annual energy production
- Shading Analysis, if not minimally shaded
- For residents: Residential Efficiency Checklist for PV Partners
- For Non-Profits or Public Entity: documentation of tax-exempt

Incentive Payments

Payments will be made to the Applicant, Host Customer, or a third party (as designated), as indicated on the PV Partners Application or on the Claim Form. CPAU shall process rebate payments within 30 days. For performance-based incentives (PBI), CPAU will issue the first PBI incentive payment approximately 30 days after the first scheduled performance output meter read.

System Changes Affecting Incentive Amount

If the installed system is smaller than specified in the Application, the incentive will be reduced proportionally based on the new system size. If the revised system is larger, the incremental rebate will be calculated using the rebate level available at the time that the change is made. If the size increase occurs after the expiration date of the reservation period, the Applicant must apply for the increment on a new PV Partners Application.

Permits and Interconnection

Permit Application

The Palo Alto Building Department has developed permit pre-submittal checklists for PV system installations. These checklists are modified as changes are necessary. Do not assume that a checklist downloaded previously is still current when applying for a permit. Please download the latest versions at: www.cityofpaloalto.org/pvpartners

Inspection

Unlike in PG&E-served areas, Palo Alto requires the Utility inspection ***before*** the Building Department inspection. For utility inspection, call the Utilities Electric Meter Shop at (650) 496-6978. To schedule the Building Department inspection, call the Development Center at (650) 329-2496. Please use the Building Department's inspection checklist to expedite your final inspection.

Net Metering

CPAU does not change the billing electric meter when the customer installs PV, since the existing analog meter spins forwards and backwards.

When a PV system generates more electricity than the building uses in a month, the customer receives an electric credit on the utility bill. The electric credit is calculated by multiplying the surplus monthly kilowatt-hours (kWh) by the applicable retail rate (\$/kWh). The Net Metering Agreement, which is active for the life of the PV system, states that CPAU will carry electric credits but will zero out any credit not used in 12 months.

CPAU's *current* billing system does not carry electric credits separately from the other commodity charges, so the existing practice allows a credit to be applied to other utility bill charges such as gas, water, refuse, storm drain and wastewater. If the electric credit exceeds all other charges on that month's utility bill, the credit will be carried forward to the next month. This practice will change to follow the process outlined in the paragraph above when CPAU changes the utility billing system (mid-2009).

Solar Renewable Energy Credit Purchase

PV systems greater or equal to 100 kW installed within the City of Palo Alto may be eligible to sell the solar renewable energy certificates (RECs) directly to the City of Palo Alto Utilities (CPAU). One REC is equal to 1,000 kilowatt-hour (kWh) generated by the PV system, as measured by a revenue-quality pre-approved meter.

The solar-generated RECs acquired by CPAU are used to meet the solar resource requirements for PaloAlto**Green**, a nationally-recognized green energy program. Once the program's need for solar RECs has been met, CPAU will discontinue purchasing RECs from Palo Alto PV system owners.

The current REC price offered for qualifying PV system owners is 5 ¢/kWh. The payments can be made over the term of the performance-based incentive (60 months).

The system owner must meet all terms and conditions listed in the Renewable Energy Certificate Purchase and Sale Agreement. Sale of RECs relinquishes the seller's rights to claim the environmental attributes of the project in published materials or public statements, which would instead be provided to CPAU and, in particular, to the PaloAlto**Green** renewable energy rate program. The PaloAlto**Green** program has been "Green-e" certified by the Center for Resource Solutions, which has established national and regional standards for verifying green power programs and establishing codes of conduct regarding the use and sale of renewable energy credits.

The Green-e Energy National Standard, Code of Conduct, and Customer Disclosure Requirements, which are referenced in the Agreement, are available at:

http://www.green-e.org/getcert_re_stan.shtml

For PV systems under 100 kW, system owners may sell their RECs to other Green-e certified marketers. For more information on Green-e certification, visit www.green-e.org.

Contact Information

PV Partners Program

City of Palo Alto Utilities (CPAU)
Marketing Services, CC-3
PO Box 10250
Palo Alto, CA 94303

(650) 329-2241

www.cityofpaloalto.org/pvpartners

Development Center

City of Palo Alto
Planning Department
285 Hamilton Avenue
Palo Alto, CA 94301

(650) 329-2496

<http://www.city.palo-alto.ca.us/planning-community/dev-index.html>