

Production Estimation Website: EPBB calculator

Annotated explanation

The www.csi-epbb.com website is the official site for the CSI rebate program, and a printout from this site must be included in your rebate application. This site contains all the information on your system and gives an estimate of what the expected production will be per year. This production figure is essential in determining the economics of your system, and having a state-approved site makes it so you don't have to rely on the salesperson for your estimate. This site gives a reasonably conservative estimate, so if a salesperson assumes a higher annual production you need to ask why. Some salespeople will estimate lower based on their experience, and this can certainly be reasonable.

Ask to see this printout in any bid you receive. Here is how to interpret the most relevant fields.



	Proposed	Reference
Site Specifications:		
ZIP Code	94103	92867
City	San Francisco	Orange
Utility	PG&E	
Customer Type	Residential	
Incentive Type	EPBB	
PV System Specifications:		
PV Module	Sharp Corporation:ND-187U1 187.0W STC, 164.8W PTC, 165.7W PTC _{adj} ¹	
Number of Modules	20	
Mounting Method	>3" to 6" average standoff	

1: Reference location. The city of Orange in Southern California was chosen as the reference with regard to production. Cities that have equal or more average yearly sun will get a 100% rating; other cities will get less depending on their location. Most California cities get over 93%, with San Francisco over 96%.

2: Type of modules. There are many different manufacturers and sizes, and all are generally very good. Because of the variations multiple bids will not usually have the exact same total kilowatts, but they should be close.

3: Different panel power ratings as determined by the California Energy Commission (CEC). The STC is "Standard Test Conditions" in a lab and is the nameplate rating. The PTC is essentially "practical test conditions" and is more accurate to what they will produce in the real world. The "adjusted" PTC rating depends on the Mounting Method (#3) and the lesser of the two PTC ratings is used in the calculations of true system size. Ratings for all approved panels can be found at:

<http://www.gosolarcalifornia.org/equipment/pvmodule.php>

4: This is the height of the modules above the roof, typically about 3 to 6 inches.

EPBB printout explanation, page 2.

DC Rating (kW STC)	3.7400	← 5
DC Rating (kW PTC)	3.2960	
Inverter	SMA America:SB4000US (240V)	← 6
Number of Inverters	1	
Inverter Efficiency (%)	96.00 %	← 7
Shading	Shading Derate Factors (%) ← 8	
January	70	100
February	80	100
March	90	100
April	100	100
May	100	100
June	100	100
July	100	100
August	100	100
September	100	100
October	90	100
November	80	100
December	70	100


5: The DC rating is the “nameplate” rating of the system based on multiplying the STC rating of the panels (#3 above) by the number of panels. It should be ignored, as the important rating is AC, explained below.

6: There are many different inverter companies and inverters and again they are all generally high quality. The inverter should be sized appropriately to your system, with the system size in AC Kilowatts (#13 below) being around 60 to 90% of the inverter capacity (4000 Kw in this case).

7: Like modules, inverters are tested by the CEC and rated for efficiency in converting DC to AC. Their ratings can be found at: <http://www.gosolarcalifornia.org/equipment/inverter.php>.

8: If there are no shading issues, the “minimal shading” box will be checked (not shown here) and this Shading Derate Factors area will not appear. If there is shading, the monthly effects will be entered here. Shading is the most subjective area of analysis and can differ from bid to bid. If there are significant differences, or if one bid has “minimal shading” and others do not, you should ask about it. Shading can significantly affect the system’s output, so it is important.

EPBB printout explanation, page 3.

Array Tilt (degrees)	18	9	
Array Azimuth (degrees)	180	10	True North 0°
			
Optimal Tilt (proposed azimuth)	20	11	
Optimal Tilt (facing South)	20		17
Results			
Annual kWh	5,059 (a)	12	
at optimal tilt	5,455 (b)		
facing south	5,455 (c)		5,634 (d)
at optimal tilt			
Summer Months	May-October		May-October
Summer kWh	3,297 (e)		
at optimal tilt	3,340 (f)		
facing south	3,340 (g)	13	3,254 (h)
at optimal tilt			
CEC-AC Rating	3.164 kW		

9: Tilt angle of the modules from the horizon. The typical roof angles in our area are from 18 to 22 degrees, which is ideal for solar.

10: Compass orientation of the panels, with 0 degrees as north and 180 as south.

11: Optimal tilt for the compass orientation. "Optimal" in this case maximizes summer sun, since summer power is most valuable to the utility grid.

12: Expected annual kilowatt hours produced by the system. This is the most important number on the entire printout and is the one that should be used in the bids.

13: System size in CEC (California Energy Commission) AC watts. This is the true system capacity and is the one that should be listed on the bids and used in the \$-per-watt calculations. It is determined by taking the unadjusted panel PTC rating (#3 above), times the number of panels, times the inverter efficiency rating (#7 above). In this case, $164.8 \times 20 \times .96 = 3,164$ watts or 3.164 kilowatts.

EPBB printout explanation, page 4.

Design Correction ²	98.713%	14	\$1.90/Watt Reference Incentive
Geographic Correction ³	96.823%		
Installation Correction ⁴	100.000%		
Design Factor ⁵	95.576%	15	
Incentive Rate	\$1.82/Watt Eligible Incentive ⁶		
Incentive ⁷	\$5,746	16	
		17	

14: Correction factors, based on comparison to the reference values of an unshaded system installed at optimal tilt, facing due south, in Orange, CA. The Design Correction considers the shading, tilt and orientation. The Geographic Correction is based on zip code. The Installation Correction considers mounting method to adjust the panel PTC rating, and cannot be more than 100% even if the adjusted rating is higher. It can be less than 100%.

15: Multiplying the three Correction percentages together gives this Design Factor. This is the overall percentage by which your system differs from the reference system.

16: Since the rebate is based on estimated production, your rebate amount is adjusted by the Design Factor. In this case the Reference Incentive of \$1.90/Watt is multiplied by 95.576% to give \$1.82.

17: The adjusted Incentive Rate is then multiplied by your official CEC AC Watt system size (3.164 Kw or 3,164 watts) to give your total Incentive. In this case, \$1.82 x 3,164 = \$5,746. (These numbers are rounded and the actual totals are \$1.815944 x 3,164= \$5,745.64)

Note: This incentive calculation process is for a system of 50 Kw or less. Above that size requires that the incentive be PBI (Performance Based Incentive), which is based on actual production and is paid monthly for five years. The www.csi-epbb.com website will give estimates for PBI based on the same criteria, but the money will not be paid up front like the EPBB, but over time.