



California's Solar PV Paradox

Frequently Asked Questions

1) Why did DRA prepare this report?

The mission of the Division of Ratepayer Advocates (DRA) is to obtain the lowest possible rates for utility service consistent with reliable and safe service levels.

In the course of its work DRA noticed declining prices of solar photovoltaic (PV) technology and wanted to see if renewable energy projects that use solar PV technology were experiencing similar declines.

California's Solar PV Paradox represents DRA's review of the cost components of renewable energy and how this is associated with the price ratepayers will be expected to bear. The divergence in investor-owned utility (IOU) solar PV contract prices and residential solar PV installation prices raises questions about whether the IOUs can procure renewable energy in a cost-competitive manner. Moreover, whether or not the price of renewable energy can be lower, the public should be informed of the executed contract costs that renewable energy entails.

For more information about DRA, visit <http://www.dra.ca.gov/dra/>

2) What are DRA's findings?

- 1) Between 2007 and 2010, the costs of solar PV modules and materials declined globally, due to increases in supply, decreases in demand, and improvements in manufacturing processes.
- 2) Solar PV installed costs in the California Solar Initiative (CSI) program have also declined during this time.
- 3) IOU solar PV contract prices overall have not declined during this time.

3) What are DRA's recommendations?

- 1) The California Public Utilities Commission (CPUC) should be more discriminating in approving renewable contracts and favor those that are more cost-competitive to rein in bid prices.
- 2) The CPUC should continue to promote and support the inclusion of flexible compliance mechanisms to meet Renewable Portfolio Standard (RPS) procurement requirements. Flexible compliance gives the IOUs the option to temporarily defer their current year RPS requirement by earmarking signed renewable energy contracts with future deliveries to apply towards their current deficit. For example, with flexible compliance a renewable energy contract with an online date of 2013 could count towards the IOUs 2010 RPS requirement.



- 3) The CPUC should permit excess generation from CSI systems to count toward compliance with the RPS program requirements by allowing CSI program participants to sell excess renewable energy credits (RECs) to their utility company.

4) What kind of solar energy does this report cover?

This report specifically examines solar photovoltaic (PV) technology (a.k.a. “solar panels”); solar thermal energy is not included. Furthermore, we examine primarily polycrystalline silicon PV, which is the most common form of solar PV. Monocrystalline silicon and thin-film PV are not considered, due to their relatively low market share compared to polycrystalline silicon PV.

In California, solar PV is used in both distributed generation, behind-the-meter installations, such as when households install rooftop panels, and in utility-scale generation, such as when large arrays are constructed in the desert.

5) What does the price of residential-scale solar PV include?

In this report, we examine installed price of solar PV which includes the module, inverter, base of system components, labor, and other non-capital costs. If one were to break down the price of an installed solar PV system, the module would account for 54 – 58% of the overall price and the inverter 6 – 9%; the remaining 34 – 39% would be considered other costs (labor, overhead, and other non-capital costs). We do not count tax credits, rebates, or other incentives in the price.

6) What does the price of a utility-scale solar PV include?

In addition to the components mentioned above, utility-scale solar PV prices also include permitting, interconnection fees, certain capital costs, the [green attribute](#) price and other non-installation costs.

7) Why are there no numbers for the prices of utility-scale solar PV projects?

The CPUC considers utility contract prices to be confidential information and only publishes contract prices three years after the contracted facilities have come online.

8) How many solar PV contracts have prices above the MPR?

Of the 8 solar PV contracts that have been approved, 6 (75%) have contract prices above the applicable MPR. Of the 21 solar PV contracts now pending CPUC approval, 19 (90%) have contract prices above the applicable MPR.



	Solicitation Year			
	2007	2008	2009	Total
<i>Pending CPUC approval</i>				
Above MPR	1	7	11	19
Total	1	9	11	21
		Pct above MPR		90%
<i>Approved by CPUC</i>				
Above MPR	2	4	0	6
Total	4	4	0	8
		Pct above MPR		75%

9) What is the Renewables Portfolio Standard?

Established in 2002 under Senate Bill 1078 and accelerated in 2006 under Senate Bill 107, California's Renewables Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country. The RPS program requires electric corporations (such as PG&E, SCE, and SDG&E) to increase procurement from eligible renewable energy resources (solar, wind, geothermal, small hydro, and eligible biomass) by at least 1% of their retail sales annually, until they reach 20% by 2010. In 2008, Governor Schwarzenegger issued Executive Order S-14-08, raising the standard to 33% by 2020.

For more information on RPS, see <http://www.cpuc.ca.gov/PUC/energy/Renewables/>

10) How close is California to achieving the RPS Program targets?

According to CPUC analysis, the IOUs are expected to meet the 20% goal by 2012. Quarterly reports published by the Commission's Energy Division provide updates to the legislature as to the IOUs progress on meeting their 20% targets. The Q4 2009 report shows the IOUs reaching 20% in 2013 (<http://www.cpuc.ca.gov/NR/rdonlyres/52BFA25E-0D2E-48C0-950C-9C82BFEF54C/0/FourthQuarter2009RPSLegislativeReportFINAL.pdf>). This varies slightly from the Q2 2009 graph included in *California's Solar PV Paradox* that shows the IOUs reaching RPS goals in 2010. DRA realizes that the graph included in the report varies slightly; however, both graphs reveal the IOUs are on track to reach 20% RPS targets through current online projects, approved contracts, and contracts pending approval. Given the expected achievement of the 20% RPS target, the CPUC should be more discriminating on the grounds of cost-effectiveness.

11) What is the RPS Request for Offers process?

To meet RPS requirements, IOUs issue a Request for Offers (RFO) each year and receive bids from renewable energy project developers who wish to provide energy to the utility. The IOU then evaluates these offers on a Least-Cost Best-Fit (LCBF) basis, which examines



both quantitative costs -- such as transmission upgrades and time-of-delivery considerations -- and qualitative factors like project viability and delivery reliability. The IOU then generates a shortlist of acceptable bids which is reviewed by the Procurement Review Group (PRG), a CPUC-endorsed entity of non-market participants and stakeholders such as utility commissions and ratepayer advocacy groups. The PRG provides feedback throughout the RFO process and the Independent Evaluator (IE), a third-party entity, formally evaluates and reports on the IOUs' implementation of the RFO. Through this consultative process, the shortlist of offers is whittled down and the IOU negotiates terms with renewable energy project developers and executes final contracts. Upon signing a contract, the IOU submits an Advice Letter or Application to the CPUC seeking final approval of the project. The Commissioners of the CPUC then vote to approve or deny the proposed contract.



12) What is CSI and how is it different from the IOU RPS RFO process?

Authorized by SB 1 in 2006, the California Solar Initiative (CSI) is overseen by the CPUC and provides incentives for behind the meter solar system installations to customers of the state's three investor-owned utilities (IOUs): Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE) and San Diego Gas and Electric (SDG&E). The CSI Program provides upfront incentives for small solar systems (less than 1 MW in capacity) installed on existing residential homes, as well as existing and new commercial, industrial, government, non-profit, and agricultural properties within the service territories of the IOUs. Unlike RPS projects, CSI projects are initiated by individuals, businesses, non-profits, and local governments and do not require any contracting activity with IOUs.

In addition, CSI also funds R&D activities relevant to CSI project goals and provides incentives for the installation of solar thermal water heating. CSI is one of several programs promoting solar PV under the *Go Solar California* initiative. Other major programs include the New Solar Homes Partnership (NSHP) run by the California Energy Commission and solar programs run by publicly-owned utilities not regulated by the CPUC.

For more information on CSI, visit <http://www.cpuc.ca.gov/PUC/energy/Solar/>

13) What are DRA's next steps for the report?

DRA plans to update the report on an ongoing basis with price information for the CSI program and changes in the trajectory of IOU bid prices. For example, preliminary analysis shows that residential-scale solar PV prices continued to decline throughout 2010.



DRA also has plans to expand the report by conducting case studies comparing California's renewable energy programs and those in other states.