



Private-Sector Case Study: The Collaborative Solar Project

AUTHORS

JENNA GOODWARD
World Resources Institute

ALEX PERERA
World Resources Institute

CHRISTOPHER LAU
Formerly of the
World Resources Institute

Introduction

This case study describes the first attempt to structure a collaborative, aggregate purchase for commercial solar PV installations in the United States. The experience that WRI and its corporate partners gained in undertaking this pilot informs the best practices presented in this guide. Although in this case the pilot did not result in final contracting by the participant companies together, several participants later installed solar equipment at their facilities. The lessons learned through this pilot and these partners' additional feedback can guide future replications of this concept.

Background

The World Resources Institute convened a group of its partners to pilot a collaborative purchasing model for commercial solar PV installation in the United States.¹⁸ The Collaborative Solar Project (TCSP) had its genesis in the Green Power Market Development Group (GPMDG) and its California chapter (GPMDG-California Affiliates). WRI launched the GPMDG in 2000 to build corporate markets for renewable energy in the United States. The project's goal—to build corporate demand for 1,000 megawatts (MW) of new, cost-competitive green power by 2010 in the United States—was met a year early in 2009. Partners had discussed the barriers to solar PV in group meetings, especially problems related to fragmentation and high transaction costs. WRI and partners conceived of TCSP as a pilot to test whether collaborative purchasing could make solar PV more affordable by reducing the balance-of-system costs (those not related to the panel itself) and by lowering transaction costs (such as legal fees and staff time).

Objectives and Expected Outcomes

In February, 2008 WRI presented a proposal for a solar collaborative purchase to the GPMDG-California Affiliates at a semiannual meeting. Partners were interested, given that several of them were pursuing solar PV at their individual facilities, but acknowledged that it was a challenge even in the fairly solar friendly market of California. However, the goal of reducing costs and taking distributed solar to scale encouraged them to pursue the initiative despite the anticipated challenges of “selling” this new concept to developers and aligning their own preferences sufficiently to pursue a joint purchase. The companies involved, including Staples, Walmart, Intel, and Hewlett-Packard, were motivated by the desire to prove a model that would yield cost reductions and operational efficiency and that others could replicate.

Box 8

Expected Outcomes

The TCSP was initiated in an effort to—

- install solar at participants' facilities at the lowest possible cost via bulk procurement of components and integration services;
- facilitate the process of learning about solar technology and financing;
- reduce transaction costs and legal fees associated with solar purchasing via a standardized PPA;
- encourage corporations to invest in on-site renewable power generation;
- support technology advancements; and,
- reduce greenhouse gas emissions

Roles and Responsibilities

- Convener: World Resources Institute
- Technical Steering Committee:¹⁹ Staff from Staples and Walmart
- Lead Organization: World Resources Institute
- Participants:²⁰ Staples, Intel, Walmart, Hewlett Packard

In terms of roles and responsibilities, WRI fit naturally into the convener role, but in practice it also handled other responsibilities. WRI performed in-depth research on solar markets and financing models, and it also issued the RFP on behalf of participants. Staff from Staples and Walmart's energy procurement department provided valuable counsel on solar financing, procurement, and the strategy for the initiative. Participating companies attended meetings to shape the strategy of the initiative and selected facilities that were included in the pilot. WRI assisted with facility screening, which in best practice would be handled by a separate technical adviser.

Project Summary

TCSP began conceptually in February 2008 and then progressed through multiple steps, which roughly correspond to Steps 1- 8 of the Best Practices. Ultimately, a set of untimely real estate issues prevented the process from going beyond bid analysis and initial due diligence in October 2009. It is important to note that late 2008 through 2009 was an extremely poor environment for private investors to attempt to execute solar deals because solar developers had very little certainty about their future, especially their ability to finance deals (and on what terms). PV installations in the commercial solar sector did not grow at all in 2009 over 2008, reflecting the difficulty of predicting future electricity demand and power prices.²¹ In addition the value of the incentive provided by the California Solar Incentive (CSI) program stepped down from 22 to 15 cents/kWh in February 2009. These factors posed challenges to completing contracts in TCSP, but many useful lessons were learned that inform this guide. Participant companies benefited educationally from the pilot. A number of them have installed solar PV on their own facilities since then and have been satisfied with the results. This experience suggests that collaborative initiatives can add value by enabling more companies to purchase solar than would have the bandwidth to do so independently.

Timeline

From approximately February 2008 to late September 2008, WRI completed the steps of recruiting companies, mapping their roof space in California, identifying a bundle of proximate roofs, and prescreening them to exclude facilities that were clearly not feasible. An RFI was issued ahead of the RFP as WRI and the participants felt it would be beneficial to gather additional information, help shape the RFP, and “warm up” the development industry to the new idea of aggregate purchasing-installation. WRI and participants analyzed the indicative pricing and the cost savings information in the RFI responses and discussed the key relevant terms on which their purchase decision would rest.

**Table 4
Timeline of The Collaborative Solar Project**

Best Practice	Milestone	Date
1	Initial Recruitment Meeting	Feb 2008
3	Solar Project Workshop	May 2008
2	Assess Potential Sites & Participating Organizations	May–June 2008
4,5	Research Phase, Scoping RFP, Building Support from Participants	June–Sept 2008
4	Drafting RFI	Sept-Oct 2008
	RFI Issued	Nov 2008
	RFI Responses Received	Dec 2008
6	Drafting RFP and Process Documents	Jan-Feb 2009
5	Participants validated RFP	March 2009
-	California Solar Incentive Step-Down from 22 cents/W to 15 cents/W	Feb 2009
7	RFP Issued	April 2009
7	Site Evaluations	May 2009
8	RFP Responses	June 2009
8	Bid Evaluation and Initial Due Diligence	June-July 2009

Timing is a major challenge with a collaborative purchase. The slower decision making processes of individual participants can hold up group action. Because TCSP was the first pilot of commercial collaborative solar purchasing, the timeline was not entirely predictable. Based on this experience, the following actions are keys to mitigating timing risk:

- ➔ Early on (i.e., at the solar workshop and in initial recruitment) the convener highlights key timing contingencies such as foreseen changes in available incentives or policies.
- ➔ The convener establishes a timeline for the group to which all participants commit going into Step 5.
- ➔ The timeline is approved by decision makers in Step 5 so that the process timeline can be clearly specified in procurement documents in Step 6.

Preparatory Research and the RFI

Participants expressed interest in issuing a joint RFP by May 2008, but not enough was known about how developers would view such a concept, what terms to expect (i.e. pricing), and whether those would be attractive given the prices that companies were paying PG&E for electricity. WRI performed additional

research on the solar market, pricing, feasibility indicators, and business models. Participants needed further information in order to commit to a set of terms that they jointly expected would be attractive and feasible. The RFI was undertaken as a complementary piece to research already completed on solar technology and to get developer feedback on how to shape the eventual RFP. This is not to say, however, that it needs to be repeated in other future efforts at collaborative solar procurement. The results of the RFI indicated that the scale of solar purchase affects the cost for participants in several unique ways.

Seven RFI responses were received, and they indicated that the model could drive cost savings in some areas, especially in labor for installation as well as reducing the transaction costs associated with operations and maintenance and the PPA. Figure 7 illustrates responses from solar industry representatives about where they expected savings via aggregation of sites, based on their own cost structures for installation. They did not all respond in each category, hence total opinions differ in each row. It appears that benefits were expected mainly in installation services, contract negotiations, and operations and maintenance costs.

Figure 7
Areas for Cost Savings through Aggregation



Source: Vendor responses to WRI Request for Information, December 2009

Table 5
Evolution of TCSP Bundle Before and After Screening

	Facilities	Square Feet Roof Space	Radius of bundle
Prescreening Bundle (June 2008)	36	2.1 M	21 miles
RFI Bundle (Nov 2008)	27	1.8 M	10 miles
RFP Bundle (April 2009)	19	1.2 M	15 miles

Bundling and Portfolio Composition

The WRI initiative began with 11 interested participants who wanted to test their collective buying power. By May 2008, these companies had submitted facility location data for the mapping exercise. They supplied WRI with location data for about 500 facilities representing 22 million square feet of roof space, and WRI mapped these facilities across the entire state of California using Google maps to determine proximity.

The facilities under consideration were initially screened by WRI based on size of roof, building ownership (owned, or leased), and ability to enter into a third-party PPA. This narrowed the amount of roof space (square feet) in the portfolio by about half. Based on the initial statewide mapping, there was a high concentration of facilities within PG&E territory (almost twice as much roof square footage as in the second largest territory, Southern California Edison).

Based on feedback from solar developers before the RFI and in submissions to the RFI, the facilities in the bundle amounted to a transaction that they considered quite sizable. Eventually, a bundle of proximate sites was identified, including facilities belonging to five companies, and bids were solicited via RFP. The final RFP issued sought proposals for 19 facilities with aggregate roof space of 1.2 million square feet.

Issuing the RFP

The RFP issued for TCSP was written in close cooperation with the partner companies, ratified by them, and issued by WRI on their behalf. Drafting took approximately two months during January-February 2009 and the document was ratified and issued in April 2009. The RFP included a schedule of site visits for developers, evaluation criteria, and other components (the original document is available online in Technical Appendices). A thorough RFP includes description of the insurance requirements, both during construction as well as on PV systems installed, and specifies who arranges and bears the costs of such. The RFP should also provide pricing scenarios where the developer retains or remarkets the RECs, as well as where the host company retains the RECs (in order to be able to make claims about solar energy use). Technical warranty requirements of buyers should be provided up front if they are a firm requirement for purchase.

Participants agreed that the goal was to develop a common PPA with the best respondent to the RFP, if pricing was attractive. TCSP did not develop a boilerplate PPA for issuance with the RFP, but rather intended to develop and vet a boilerplate PPA among the group starting with the PPAs that vendors provided. (This is not recommended as a best practice.). Getting participant agreement on the length of the contract was more difficult than pricing. Some participants would have preferred to go with a longer term (20 years) because longer terms provide lower per kWh pricing. In WRI's experience from evaluating PPA pricing over different terms, 20-year PPA prices were 10 to 15 percent cheaper than for 15-year contracts. Fifteen-year PPA prices were 15 to 30 percent cheaper than for 10-year contracts. However, a number of companies could not get internal approval for 20-year contracts. The lesson

is that private-sector participants may be hesitant to take on longer-term commitments due to business uncertainties 20 years into the future. Because there was interest in different modes of purchasing and participants wanted to see all their options, the RFP requested three options:

- \$/kWh for a 10-year PPA
- \$/kWh for a 15-year PPA
- \$/watt installed for a turnkey development

This experience underlined the importance of involving the key internal decision makers from a participant organization early on, in order to establish the range of acceptable financing terms. These should include acceptable pricing ranges, tenor of contract, and escalator rates (in the case of a PPA), among other factors. It is important to establish participants' expectations on these key issues up front, before the group participants who will issue the RFP are finalized. It is also important to finalize a timeline that is feasible for all participants at this stage in the process. This makes it more likely that the RFP will achieve bids with terms attractive to all.

WRI had a good response rates to the RFI (7) and the RFP (4), considering that the RFP was issued in 2009 when the financial crisis was making many developers unsure about their ability to commit to financing such large projects. Only two of the original respondents dropped out between the RFI and RFP, while another two joined in a combined bid for the RFP stage. There are three drivers of strong participation in an RFP: a clear scope of work and associated evaluation criteria, ample technical information about the potential sites, and a demonstrated commitment by RFP issuers to closing a contract for the installation.

Results and Lessons Learned

The total "bundle" provided for bidding was assessed at between 6 and 8 MW of potential in total, with individual installation sizes ranging from 31 kW to 1,833 kW (1.8 MW). It is difficult to estimate how much the group of smaller sites caused a premium in the average applied to all sites, but the bundle was clearly at or above the scale "sweet spot" (i.e. big enough to enjoy any effects of bulk pricing). It could have been beneficial to break it into two separate (but still large) bundles. Turnkey installation pricing was received from three developers and was fairly consistent across proposals.

Ultimately, proposals received in response to the collaborative solar project were very encouraging. Bids ranged from \$0.09 to \$0.24 per kWh, varying based on term, technology, and the party retaining ownership of RECs. Prices for 15-year PPAs were competitive with the average brown power rate, even with the reduced CSI incentive. Prices for 20-year PPAs were below the brown power rates being paid by the commercial facilities participating in the RFP. In some instances, pricing for solar power dropped below the actual cost of grid power. Anecdotally, these prices were below the solar power prices quoted to companies for 2008 installations at individual facilities separately. An ex-post analysis of the turnkey pricing versus statewide (CA) 2009 pricing suggests that the pricing for TCSP was 7.9 to 10 percent lower per watt than the capacity-weighted average for commercial systems.²²

Several unexpected variables affected the final pricing of the RFP responses. First, in February 2009 the California Solar Incentive stepped down from \$0.22/kWh to \$0.15/kWh. This 33 percent drop in subsidy negatively affected solar project economics. However, the first six months of 2009 also saw a significant drop in the price of solar panels and solar modules. A combination of variables, including reductions in European incentives, decreased global demand for solar panels due to economic conditions, and large amounts of new silicon production capacity driving down raw material prices contributed to a 40 percent decline in panel prices.²³

This confluence of factors makes it difficult to differentiate the collaborative solar purchasing model's cost impacts from cost fluctuations in the PV market.

Vendors' feedback pointed to several types of aggregate pricing benefits. The geographical confluence can reduce installation costs by concentrating deployment resources and shipping costs. The volume of the portfolio was cited as a reason for pricing "sites more aggressively than any single site would have been priced." Other overhead and transaction costs could be lowered as well from elements such as a standardized PPA.

Obstacles and Lessons: Ultimately, TCSP did not proceed past proposal review and initial due diligence. After proposals were received, two real estate issues shrunk the portfolio considerably. One participant decided to scale back real estate holdings and was not able to provide certainty about which facilities would remain viable. Another participant ran into unexpected barriers to expansion of a key facility that they had included in the bundle. As a result, both participating companies had to withdraw a significant portion of their roof space from the bundle.

To maintain a critical mass of roof space, WRI approached the solar vendors for guidelines to "backfill" roof space by recruiting new RFP participants. During that process, one vendor indicated that the proposal pricing would be honored as long as the RFP included more than 3 MW of system capacity. Another vendor requested that any new facilities added to the RFP be located within the existing eight-mile radius to qualify for the RFP pricing. A final vendor requested that all new facilities meet a 500 kW threshold for participation. Recruiting other nearby companies to participate and replace the facilities lost would have been easier if macro factors such as the economy or the CSI incentives available had been more favorable.

This feedback for bringing new facilities into the RFP would indicate that total capacity, proximity, and scale of facilities are all factors to achieving the cost savings presented in the vendors' RFP proposals. The TCSP did not complete contracting due to nonsolar real estate issues and the poor economic climate. However, the project provided WRI and the participants with valuable lessons learned about the economics of solar energy, and how to structure solar purchases. Future collaborative purchases can learn from these insights into strategies to develop a regional base of support, facilitate participant data gathering, and build support early with internal decision makers, as well as from the template documents provided with this guide. Preliminary pricing data and feedback from companies support the conclusion that there were cost reductions resulting from the aggregation of individual participants' facilities.