

Solar Market Pathways: San Francisco Solar and Storage for Resilience Project

Financial Feasibility Analysis



ARUP

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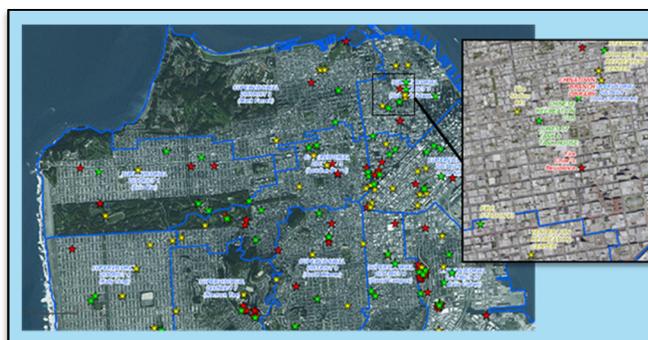
Project Background

The San Francisco Solar and Storage for Resilience Project (the “Project”) examines the combined use of microgrids and solar electric generation with battery storage to provide power to critical facilities (e.g., schools, recreation center, libraries). This approach would provide resilient power for critical facilities, which require electricity for their continued operation while offering continuous power production and cost savings in normal operation through interaction with the grid.

The U.S. Department of Energy sponsored a number of studies and analysis for the Project. A process for identifying critical facilities, surveying power requirements, assessing renewable potential, financing, and developing resilient solar and storage was devised for the City of San Francisco.

This process was tested by gathering data for 19 critical facilities in San Francisco, extrapolating the

results to 67 facilities, and developing financial projections to implement solar and storage within the constraints of city budgeting. The baseline size for the systems (8.5MW of PV and 12.5MW of storage) was estimated considering (i) reliance criteria and (ii) the ability to meet Investment Tax Credit (“ITC”) requirements for the battery charging from solar for 75% of the energy.



Delivery Options and Financial Analysis

Based on planning and design work and on technical and energy market analysis conducted to date, two Project delivery options were assessed:

- design-bid-build (“DBB”) delivery is a conventional delivery method for public works, where risks are mainly borne by the public sector.
- public-private-partnership (“P3”) delivery involves a private developer to deliver and run the Project for a period of time, generally for 20+ years. Project risks are allocated to either the public sponsor or the private developer, considering which is the party best suited to manage them.

The financial analysis assumed that the P3 approach would structure a commercial arrangement between parties in such a way that ITC and accelerated depreciation (“MACRS”) benefits for the entire system could be captured by the developer (e.g., a tax equity investor) and passed on to the City in the form of reduced payments for services provided.

Project Risks	Preliminary Risk Allocation	
	DBB Delivery	P3 Delivery
Design	Designer / City	Developer
Construction	Builder / City	Developer
Operation and Maintenance	City	Developer
Environmental	City	Shared
Financing	City	Developer
Revenue	City	Shared

The results of the financial analysis -in next page- demonstrate that a P3 approach may yield cost savings for the City versus a conventional DBB.

Recommended next steps to move the Project towards implementation are as follows:

- Refine Project design criteria and performance metrics.
- Develop strategy for phasing and roll-out.
- Refine risk allocation & Project responsibilities.
- Conduct a market sounding with service providers.
- Develop roadmap for approvals and stakeholder engagement.

The cash flows for the City will include:

- Capital payments: cash outflows to pay for the sources of capital that will finance and deliver the Project, including up-front capital and development costs. The payments reflect the financing terms and capital structure under each delivery method.
- Operating payments: ongoing running costs for the Project that account for routine operations, energy use, and maintenance/ lifecycle.
- System revenue: cash collected from energy storage and PV/solar generation sold to building owners.

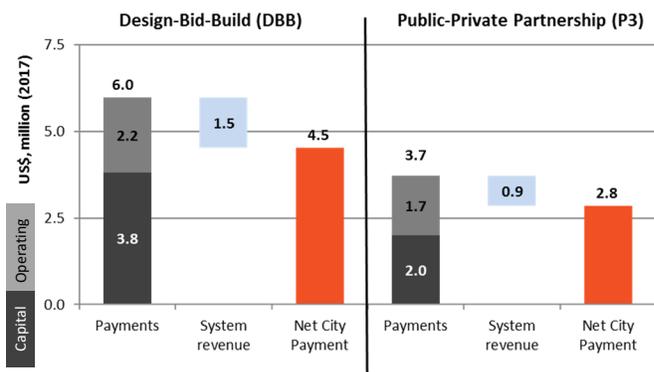
High Value Case Results

The results of the financial analysis show that a P3 approach appears to be a more cost effective delivery model compared to the DBB option, requiring a lower payment requirements for the City -and hence lower budget impact- over the 20-year Project period.

- The cumulative City payments for a P3 delivery over 20 years would be US\$73.6 million, which is 28% less than the net payment of the DBB delivery, estimated at US\$102.6 million.
- Similarly, in the first year of full operation of the Project, the City would incur in a net annual cost of US\$4.5 million if the Project is delivered as a DBB. For a P3 delivery, the City would incur in a net cost of US\$2.8 million or a 37% in savings vis-à-vis the DBB delivery.

This is driven by the full tax benefits (e.g., ITC and accelerated depreciation) captured in a P3 delivery and by engaging dedicated industry players with the ability to optimize long-term operations and the interface between systems (storage & solar) and between systems and the wholesale market.

Net annual cost in the first year of full operation



Low Value Case Results

A low case scenario was defined to test the economics of the ITC benefits, as well as other risk/performance assumptions in a P3 delivery.

The low case assumed that the performance for both construction and operation would be similar under either delivery (DBB or P3) and that a P3 delivery would not benefit from ITC, keeping advantages from accelerated depreciation.

The results of the analysis of this case show that the cumulative City payments for a DBB delivery over 20 years would be US\$88.8 million or 20% less than the net payment under a P3 delivery, estimated at \$97.8 million.

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