

1. Opening Slide:

I'd like to thank the School Energy Coalition and Meagan Poulos and Anna Ferrera for hosting this event and for inviting Mark and me to make this presentation.

2. Objectives:

My objectives today are twofold: to describe to you the content of the Solar Master Plans that KyotoUSA and our team of volunteers developed to assist California public schools in planning for PV systems and,

Secondly, to provide a rationale for why we believe Solar Master Plans can make it possible for every school district in the state to acquire their own renewable energy systems and retain all the benefits these systems provide.

3. Presentation Overview

I'll describe our early experiences that we had with our local school district here in Berkeley that gave us a better sense of what school districts needed before we could expect them to consider adding renewable energy projects to their plans for future construction projects.

And I'll walk through the chapters in the Solar Master Plan that we have found to be the key elements in helping school districts acquire a better understanding of all the issues that should be considered when they begin process of moving toward the purchase of renewable energy generation systems. Mark has already covered Benchmarking. I can only second his encouragement that every school district benchmark now regardless of whether PV is currently being considered. Benchmarking puts energy and water consumption and its costs directly in front of the district management and community.

We will cover aerial assessments of PV appropriate schools, the procurement process for district owned PV systems, and finally, how districts finance their PV projects. We will have 15 minutes at the conclusion of the presentation for your questions.

4. Title Slide – Background

5. What drives the California solar market?

You can see from the laws, regulations, incentives, pricing and the like, that California is taking seriously the need to move to renewable energy electricity production. In my view, this is just the beginning. A Renewable Portfolio Standard of 33% is great, but it is still far short of what we need to achieve to reduce our reliance on electricity produced by fossil fuels.

California will reach its RPS obligations – in my view before 2020 - and will do so, in part because of the amount of new solar installed on the state's public schools.

So, do we know what California public schools can contribute in terms of renewable energy capacity and improved energy efficiencies?

6. Summary of California Schools

I don't think anyone knows what the capacity is for PV on CA school campuses. It was a question that came up during the development of Tom Torlakson's Schools of the Future Initiative – his plan to make school facilities centers of the community, models of sustainability and efficiency, and facilities that enhance the scholastic achievement of all students.

California has ~ 1,000 school districts, nearly 10,000 K-12 schools and 6M students.

As California continues to encourage the development of local sources of clean energy, the state's school districts will take on greater importance in that effort. It is estimated that school districts own about 50% of all the publicly owned buildings and property in a given county, so it makes school districts important players in achieving the state's goal for distributed generation.

7. Hercules/Culver City Schools

When you view schools from above, you can see why so many of them are great sites for solar. Most schools have multiple buildings. The exception can be elementary schools which often have a single large building, but that is not always the case. Single campuses, multiple buildings, unobstructed roofs, and large parking lots are common.

Here we have Hercules Middle/High School which has just had approximately 300 kW of new PV attached to parking structures installed by SunPower Corp. paid for in part by a grant from the Bay Area Air Quality Management District.

Culver City Schools has an elementary, middle, high and adult schools on a single campus. The district is now considering installing PV using parking structures instead of roof tops. Parking structures are usually a little more expensive than the equivalent amount of roof mounted solar, but somewhat easier to meet the requirements of the Division of the State Architect, the permitting agency for public schools.

8. Berkeley Unified: Washington Elementary

What was it that motivated KyotoUSA to develop Solar Master Plans? It was our two year long experience working with Berkeley Unified to get a 103 kW PV system installed on a local elementary school.

When we approached the Superintendent in 2006, she admitted that she had no idea how installing a renewable energy system had anything to do with her responsibility to educate the district's children. Six months later (after many conversations with the school community about the value of installing PV), the Superintendent acknowledged that she felt it was her moral and ethical obligation to see it happen at every Berkeley school. We see that transformation repeatedly, once districts understand that renewable energy has a host of benefits that are all consistent with their missions.

9. Solar Master Plan

The Washington Elementary experience showed us that we had to develop a district-wide approach to PV projects. Districts were just not well equipped to deal with individual construction projects that had not been contemplated or for which funding had not been secured. We realized that we had to incorporate solar projects into a district's overall Facilities Master Plan, if we were going to have any chance of seeing PV installed at a faster pace. Just about every school district has a Facilities Master Plan, which lays out the district's construction activities for the next 5-10 year period and is often used as the basis for seeking funding from the state and local property owners. Bond requests that include so-called "green" components including improved efficiencies and renewable energy have a very high probability of succeeding.

10. Partnership slide

We applied to the US Department of Energy for a Solar America Showcase grant that gave us access to a team of scientists, engineers, and others at the National Renewable Energy Laboratory. We collaborated with Oakland, Berkeley and West Contra Costa Unified School Districts.

11. Chapters in the SMP

The next two slides identify the chapters in the SMP. We'll cover Chapters 4, 6 and 7 today and touch briefly on the others. I encourage those who want to learn more about the Plan and its contents to view or download a copy from our website at heliosproject.org. The chapters were developed from what our school facilities partners identified as areas that would help districts better plan for acquiring PV systems.

12. Chapters in the SMP

13. Data on participating School Districts

The next three slides will give you information on the combined characteristics of our school district partners. This one summarizes the number of schools, students, and total building space, excluding parking areas.

14. Data on participating School Districts

This slide summarizes the number of schools and other buildings that were assessed based on their capacity to host PV. It also summarizes the amount of electricity consumed over a one-year period, and its cost.

15. Data on participating School Districts

This slide summarizes PV capacity, production, and value under two scenarios. Currently, in California, school districts will aim at sizing PV systems to produce about 75% of each school's annual load. The "full scale" scenario is one that we should be aiming at if we want to make a more rapid transition to renewably produced electricity. The state is taking some tentative steps toward that scenario.

16. Title slide - Benchmarking - Mark has done his usual great job of describing benchmarking and its benefits. Now I'll describe how it helped us to make our Solar Master Plans meaningful.

17. Portfolio Manager – all schools

The data provided by Portfolio Manager was essential to making the aerial assessments of each site's PV capacity relevant. You will see why when we get to the section on the Aerial Assessments.

Setting up the Portfolio Manager account is easy. We try to do it in conjunction with high school students in the district as a way of getting them involved too.

18. Portfolio Manager – benefits

The Portfolio Manager tool also helps to address the issue that always comes up about whether to invest in energy efficiencies or PV. If a district is considering where to put its money (in energy efficiency or renewables) we strongly encourage school districts to consider each school on its own merits as many schools – at least those we've had a role in measuring – score relatively high. The thinking that a district should always do efficiency first can be an impediment to getting districts to consider solar, even when self-generation would be a wiser investment. This slide for example might suggest that energy efficiency improvements should be done at John Muir, while Jefferson is likely to be a good candidate for PV.

19. Title Slide – Aerial Assessments –

The Aerial Assessments are a big part of the SMP. We were extremely lucky to receive an offer from SunPower Corp. to do these assessments for us at no cost and at no obligation to any of the school districts. SunPower recognizes that school districts can be great customers for solar and is willing to make an investment in helping to develop that market. I'd like to point out here that SunPower receives no consideration from us when it comes to recommending a vendor. I believe that an open procurement process that invites proposals from all qualified vendors will result in the best possible outcome for a school district.

20. Overview

The next two slides may be a bit hard to read, but again, please download a copy from our website. On this slide we attempted to make clear that we made two separate assessments for each school. The first scenario calculated the maximum PV capacity for that site based on roof and parking lot space. Currently, it makes little economic sense to oversize a PV system – that is to build a system that generates more electricity than you need – because the value of that over-production is so little that it doesn't justify the cost of the additional panels. I believe that this situation will change in the future as we take seriously the need to acquire as much local renewable generation as we can build. I don't think this realization will come from the utility industry, but could be the result of better legislation that can't be manipulated in the California Public Utility Commission, or from the increase in the adoption of Community Choice energy. I'm happy to say more about that in the Q&A segment if anyone is interested.

The second scenario we devised calculates the amount of PV needed to offset 75% of the school's historic load.

Why 75%? Since we can't get a fair credit for the value of the electricity produced but not needed, PV systems are sized to produce enough electricity to offset a school's electricity bill. The value of the electricity generated

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in the summer months when schools are traditionally closed is high. Schools consume a lot of electricity in the months when electricity prices are low, so basically, you want to generate as much high value electricity as you can. The value of that high value electricity is banked which helps to offset the cost of the lower value electricity consumed. Make sense? There is probably a way to say all more clearly, so send me a note if you need further clarification.

The Aerial Assessment calculations include an estimate of the space available for PV, an estimated system cost, a calculation for a rebate based on what was available at the time, and the estimated output of the system. The sidebar includes information on the cost and consumption of electricity at the school, any information we had on the condition of the roof and its scheduled replacement, estimated degree of roof obstructions, the tons of greenhouse gas emissions avoided by the Scenario 2 system and the Renewable Energy Credits generated.

21. Individual school

This slide gives you a little clearer view of the assessment and the information it conveys.

22. Phase II – aerial assessments

We are beginning the second phase of this process and are now offering to do a similar assessment for all school districts in Alameda, Contra Costa, and Solano counties. There 44 school districts in these 3 counties. We've already completed these 3 districts and are working on two more, so we're already on our way. If you represent a school district in any of these 3 counties and would like us to do a similar assessment for you at no cost or obligation, please be sure to contact me.

23. Title Slide – Procurement

24. Procurement – Why Do it?

There are a host of reasons to justify using a public procurement process to acquire a PV system. In fact, I am always surprised when I hear about a district that opts to sole-source a project. Not only are you not likely to get the best value possible, you are also open to claims about lack of transparency, favoritism, and worse.

25. Procurement – District Motivation – COMMENT ON SLIDE info

The best solar PV offer is rarely the one that carries the lowest price tag; rather it is the offer with the best combination of price, output, quality components, performance assurances, and construction management expertise.

We have developed a template for a Design-Build RFP that we hope school districts will consider – at least as a starting point – when a district has decided to move forward on acquiring a PV system.

26. Procurement – Challenges

Here is one of the first responses we get from school districts when asked if they will consider renewable energy systems: "We can't take on any new debt!" is often the first objection we hear to considering PV. All districts are in the same situation, trying to balance ever-shrinking budgets. I try to point out, however, that their utility bills are a form of debt that they will carry as long as the district is in existence. PV systems can reduce or

eliminate that debt. And remember, PV systems carry guarantees for 20 years and are likely to provide significant amounts of electricity for 30 years or more.

27. Procurement – Goals and Challenges reconciled

The message here is that every challenge a district faces can be addressed. Hire experts in financing and procurement- consultants who work for you and not for a vendor – and you will wind up with a PV system that will not disappoint you or those you serve.

28. Title Slide – financing

I have several slides on this subject – it's really the most important issue to school districts. We generally hear statements like "Where is the money going to come from?" "We are not going to assume any new debt!" "We can't afford it."

Districts are being forced to look more closely at their operating budgets and are beginning to realize that the cost of energy and water are significant and growing rapidly. We try to encourage districts to see that their obligation to the local utility is a form of "debt" that they will always be subject to unless they start to use energy more efficiently and begin to generate their own.

29. Financing options – G.O. bonds

While districts can and do enter into agreements with third parties to install and operate PV systems on school property, our belief is that districts can achieve much greater benefits if they are able to purchase and own the systems. In the recent past, a number of districts took advantage of the low or no cost bonds that were made available through the President's stimulus package. For the most part, those opportunities have passed.

At any given time, districts throughout California are preparing and implementing their Facilities Master Plans. This is the document on which school construction projects are planned and financed. Until recently, energy projects of any kind were rarely called out as a separate item in these Plans. Our belief is that the Solar Master Plan is a natural fit for all school districts that are serious about reducing their energy costs.

30. Financing options – other

Of all of these options, the first one is the least likely option. There's not a lot of spare cash in the coffers these days. Nevertheless, many districts that have separate construction funds are finding that they have been able to stretch those dollars because of the economy and bidding that is much more competitive. As a result, some districts have been able to re-direct savings to support PV projects that were not originally contemplated when their Facilities Master Plans were developed.

31. Current financing opportunities

If there are districts on the call who are interested in knowing more about these current opportunities, I'm happy to answer any of your questions. The QECBs are competitive; the QZABs have certain requirements that not all districts will be able to meet, and the CEC has limited funding, but is refreshed as previous loans are repaid.

32. District ownership – direct benefits

The one bullet on this page that may help to make projects more affordable for school districts are Renewable Energy Credits. California has a developing formal market for what are called Tradable RECS or TRECs which could be worth as much as \$0.05-0.10 a kWh. The California Energy Commission is still drafting the rules associated with REC transactions and it is not clear that schools will be eligible to sell their RECs. RECs could make it possible for school districts to install PV systems that result in generating revenue which would help to address the economic situation that our public schools are facing.

33. District ownership - challenges

Most of the challenges are resolvable. Districts should (and do) hire consultants for matters for which they have no expertise. A district may not have current bonding authority, but most of us recognize that we are not going to be able to rely as much on state and federal sources for funding our schools. Much more of it is going to have to come from local sources. Bond measures for improving our schools are inevitable.

34. Success stories

35. Contact information

36. Title Slide - Q&A