Solar Master Plan

WEST CONTRA COSTA UNIFIED SCHOOL DISTRICT (WCCUSD)

Chapter 1

Benchmarking with ENERGY STAR's Portfolio Manager

Benchmarking with ENERGY STAR's Portfolio Manager

Every school district should know how much energy it is consuming and what its associated costs are. Energy benchmarking is especially important if a district is interested in becoming more energy efficient and should be standard policy for all school districts regardless of whether PV systems are currently contemplated. Knowing where the district is consuming energy and how much this energy costs are the first steps in improving energy efficiency and encouraging energy-conserving behaviors.

Fortunately, the U.S. Environmental Protection Agency and the U.S. Department of Energy offer a free, easy-to-use program from ENERGY STAR called Portfolio Manager.

Portfolio Manager allows a district to track its energy consumption and costs and provides a variety of reports that will help the district to measure the results of its efforts to reduce energy consumption. Getting started with Portfolio Manager is easy enough that an environmental class at a district high school could do it as a project. The major California utilities also offer trainings on Portfolio Manager. To get started, see, www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

California's major energy utilities provide monthly automated data to Portfolio Manager subscribers, so a participating district will always have up to date information on its energy use. Portfolio Manager can also track water consumption. Although few water utilities currently have the ability to report water data automatically, efforts are underway to encourage them to offer this service in the future.

This chapter shows a Portfolio Manager screen-shot of all district facilities that have been benchmarked. The ENERGY STAR rating accurately reflects the status of K-12 facilities only. Non K-12 facilities, e.g. adult schools, administrative offices, are included in this report so the district has a comprehensive assessment of energy consumption and costs for all its buildings.

Also included in this chapter are the data required to enroll K-12 schools and other building types, and Portfolio Manager's Quick Reference Guide.

Portfolio Averages	
Baseline Rating: 90 Facilities Included: 57	**Current Rating: 87** Facilities Included: 57
Change from Baseline: Portfolio Adjusted Percent Energy Use (%): 39.7% Facilities Included: 57	
Averages are weighted by Total Floor Space. More about Baselines More about Change from Baseline: Adjusted Energy Use	

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All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Facility Name	Current Rating (1-100)	Change from Baseline: Adjusted Energy Use (%)	Total Floor Space (Sq. Ft.)	Energy Use Alerts	Current Energy Period Ending Date	Eligibility for the ENERGY STAR	Last Modified
Administration--Bissell	58	34.1	28,705		07/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/22/2011
ALVARADO Adult Ed	97	-10.5	28,976		07/31/2011	Apply for the ENERGY STAR	10/14/2011
Bayview Elementary	83	-0.2	54,415		08/31/2011	Apply for the ENERGY STAR	10/20/2011
Cesar E Chavez Elem.	90	32.0	46,059		08/31/2011	Apply for the ENERGY STAR	10/20/2011
Collins Elementary	83	-1.2	63,575		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Coronado Elementary	95	4.1	38,776		08/31/2011	Apply for the ENERGY STAR	10/22/2011
Crespi Middle School	72	274.5	125,037		08/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/14/2011
De Anza / Delta	99	-22.1	210,000		09/30/2011	Apply for the ENERGY STAR	10/14/2011
Dover Elementary	100	-5.4	68,000	Data > 120 days old	04/30/2011	Not Eligible: Current period ending over 120 days (ENERGY STAR Eligibility Rules)	10/20/2011
Edward M Downer Elem.	100	-5.1	80,389		08/31/2011	Apply for the ENERGY STAR	10/14/2011

El Cerrito High	100	-38.3	204,961		08/31/2011	Apply for the ENERGY STAR	10/22/2011
Ellerhorst Elementary	95	2.0	40,030		07/31/2011	Apply for the ENERGY STAR	09/17/2011
Facilities Ops Center	12	33.3	9,832		08/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/22/2011
Fairmont Elementary	85	31.0	31,591		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Ford Elementary	100	-7.6	60,329	Data > 120 days old	02/28/2009	Not Eligible: Current period ending over 120 days (ENERGY STAR Eligibility Rules)	09/17/2011
Gompers Continuation High	100	-71.6	115,440	Data > 120 days old	05/31/2010	Not Eligible: Current period ending over 120 days (ENERGY STAR Eligibility Rules)	10/14/2011
Grant Elementary	90	-26.3	40,000		07/31/2011	Apply for the ENERGY STAR	10/14/2011
Hanna Ranch Elementary	96	19.8	37,172		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Harding Elementary	89	-20.7	53,966		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Helms Middle School	95	-12.3	120,000	Data > 120 days old	08/31/2010	Not Eligible: Current period ending over 120 days (ENERGY STAR Eligibility Rules)	09/17/2011
Hercules Middle/High	77	-9.5	165,626		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Highland Elementary	94	37.2	49,116		09/30/2011	Apply for the ENERGY STAR	10/20/2011
Kennedy High	73	26.6	209,217		07/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/14/2011
Kensington Elementary	72	-20.7	42,810		08/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	09/17/2011
King Elementary	94	-10.2	55,951	Data > 120 days old	05/31/2011	Not Eligible: Current period ending over 120 days (ENERGY STAR Eligibility Rules)	10/14/2011
Lake Elementary	79	-8.7	41,695		08/31/2011	Apply for the ENERGY STAR	10/20/2011
Lincoln Elementary	89	3.1	56,277		08/31/2011	Apply for the ENERGY STAR	10/22/2011
Lovonya Dejean Middle	66	9.7	116,531		07/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/14/2011
Lupine Hills	97	-7.6	49,133		09/30/2011	Apply for the ENERGY STAR	10/14/2011
Madera Elementary	83	247.3	37,955		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Mira Vista Elementary	73	244.0	41,644		09/30/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/14/2011
Montalvin Manor Elem.	95	7.1	43,666		08/31/2011	Apply for the ENERGY STAR	10/14/2011

Murphy Elementary	87	44.7	36,477		09/30/2011	Apply for the ENERGY STAR	10/14/2011
North Campus	96	8.2	39,501		08/31/2011	Apply for the ENERGY STAR	09/17/2011
Nutrition Center	2	10.7	34,763		08/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/14/2011
Nystrom Elementary	92	12.6	114,698	Data > 120 days old	02/28/2010	Not Eligible: Current period ending over 120 days (ENERGY STAR Eligibility Rules)	10/22/2011
Ohlone Elementary	98	6.4	43,306		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Olinda Elementary	92	30.2	31,468		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Peres Elementary	81	761.0	59,210		08/31/2011	Apply for the ENERGY STAR	10/22/2011
Pinole Middle School	100	26.2	62,966	Data > 120 days old	08/31/2010	Not Eligible: Current period ending over 120 days (ENERGY STAR Eligibility Rules)	10/14/2011
Pinole Valley High	93	229.0	167,083		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Portola Middle	100	-70.9	133,416		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Richmond College Prep	84	33.7	5,000		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Richmond High	89	-6.4	220,747		07/31/2011	Apply for the ENERGY STAR	10/14/2011
Riverside Elementary	43	-28.6	40,061		08/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/14/2011
Serra Adult Education	85	-11.2	23,206		07/31/2011	Apply for the ENERGY STAR	10/14/2011
Shannon Elementary	82	24.1	26,558		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Sheldon Elementary	91	111.0	40,676		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Stege Elementary	98	-11.3	44,731		07/31/2011	Apply for the ENERGY STAR	10/14/2011
Stewart Elementary	91	60.7	39,868		08/31/2011	Apply for the ENERGY STAR	10/14/2011

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All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

The rating is calculated by using the last day of the latest full calendar month where all meters in the facility have meter entries; the Period Ending date reflects that particular date.

Portfolio Averages	
Baseline Rating: 90 Facilities Included: 57	**Current Rating: 87** Facilities Included: 57
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All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Facility Name	Current Rating (1-100)	Change from Baseline: Adjusted Energy Use (%)	Total Floor Space (Sq. Ft.)	Energy Use Alerts	Current Energy Period Ending Date	Eligibility for the ENERGY STAR	Last Modified
Tara Hills Elementary	88	168.2	45,573		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Valley View Elementary	60	28.5	19,448		08/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/14/2011
Verde Elementary	85	16.6	40,880		09/30/2011	Apply for the ENERGY STAR	10/14/2011
Vista Hills High School	97	216.9	47,828		08/31/2011	Apply for the ENERGY STAR	10/20/2011
Warehouse (600 OHIO AVE)	65	21.7	46,243		08/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/22/2011
Washington Elementary	83	185.1	36,718		08/31/2011	Apply for the ENERGY STAR	10/14/2011
Wilson Elementary	59	31.1	36,287		08/31/2011	Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	10/20/2011
ZZZ meters at unknown addresses	N/A	N/A	5,000			Not Eligible: Rating must be 75 or above (ENERGY STAR Eligibility Rules)	02/03/2010

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Search Facility Name: Search

All # A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

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Solar Master Plan

WEST CONTRA COSTA UNIFIED SCHOOL DISTRICT (WCCUSD)

Chapter 4

Aerial Assessments of Selected Sites

Aerial Assessments of Selected Sites

Aerial Assessments were prepared for each individual district to allow each to integrate renewable energy systems into its Facilities Master Plan. The aerial assessments provide:

- an inventory of solar appropriate schools and facilities
- total annual electricity consumption and cost for the district
- each individual school's electricity annual consumption and cost
- gross and net space available for PV systems
- the maximum PV capacity for each school and the size of the PV systems that will meet 75% of a school's annual electricity consumption (reducing the school's electricity bill to the minimum)
- PV system cost estimates
- estimated rebates and savings from avoided electricity costs
- greenhouse gas emissions avoided and Renewable Energy Credits (RECs) earned

The above assessments will prepare school districts to seek local General Obligation bonds from their constituencies for financing the installation of renewable energy systems in conjunction with other school construction or modernization work.

In addition, when a district identifies the best locations for solar installations and their energy characteristics, it is prepared to take advantage of funding opportunities that may arise, such as low-interest federal bonds, low-interest state loans, or grants from regional agencies to reduce energy consumption and/or greenhouse gas emissions. As the need for renewable energy increases, other opportunities are sure to emerge. Districts that plan and assess their schools and facilities for renewable energy will be in a good position to take advantage of future funding opportunities.

SunPower Corporation, Richmond CA prepared the aerial assessments in consultation with the individual school districts. KyotoUSA volunteers assembled the electricity consumption and cost information from data provided by PG&E via Energy Star's Portfolio Manager.

The aerial assessment information in this chapter is specific to the school district for which this individual Solar Master Plan was prepared.

West Contra Costa Unified School District
Solar Site Assessments

October 2011

El Cerrito High

540 Ashbury Avenue, El Cerrito

- In the summer of 2008, the district contracted for the installation of a 132 kW "thin film" PV system. Thin film is generally less expensive than crystalline PV panels, however, thin film panels are significantly less efficient in converting sunlight to electricity than crystalline panels. The existing PV system may be producing about 158,000 kWh per year. The school consumes about 1M additional kWh of electricity each year.
- The PV system produces enough electricity to avoid about 40 metric tons of greenhouse gases each year and generates 158 Renewable Energy Credits (RECs).

SECTION ONE

- Assumptions and Benefits
- Roof Utilization Factors
- System Cost
- Scenario 1: Installing Maximum Capacity
- Scenario 2: Offsetting Electricity Costs Only

Assumptions and Benefits

Assumptions

All information is preliminary and intended to provide WCCUSD with estimates of PV system sizes, siting possibilities, production values, incentives, avoided electricity costs, and installation costs.

1. Annual electricity consumption and cost were provided by PG&E via Portfolio Manager. Twelve month periods vary slightly – ending in either May or June 2011.

2. Assumed PG&E Electric Rate A6 yielding year 1 solar savings = $0.19/kWh.

3. CSI incentive assumed at Tier 9 at $0.12 per kWh for all schools. De Anza High and Hercules Middle/High CSI applications are awaiting review and should qualify for Step 8 rebate at $0.15 per kWh. CSI incentives for Step 9 may be slightly lower than $0.12 per kWh depending on the final language of SB 585 (Kehoe) that replenishes the CSI rebates. The CSI rebates from PG&E are likely to be exhausted by the end of 2011/early 2012.

4. **Scenario 1** "Installing Maximum Capacity" Based on aerial assessments done by SunPower Corporation which shows how much solar each site is capable of hosting. Assumes a total cost per Wp as indicated in the System Pricing chart on page 6. System pricing is based on the use of SunPower's 230 high efficiency solar panels and estimated based on industry pricing in February 2011.

   Scenario 2 "Offsets Electricity Costs Only" Based on estimated PV system size that would eliminate electricity bill. (PV systems are typically designed to produce 75% of consumption, thus "zeroing out" a building's electricity expense.) Assumes a total cost per Wp as indicated in the System Pricing chart on page 6. System pricing is based on the use of SunPower's 230 high efficiency solar panels and estimated based on industry pricing in February 2011.

5. Year one electric yield = 1,350 kWh per kWp. (This is a conservative estimate. Newer panels may provide a higher yield, making it possible to increase production values.)

6. Size and location of PV systems may vary significantly after design completion.

7. Electricity costs and consumption are combined for all electric meters at each site and shown as a single total value. Further analysis is needed to evaluate impact of PV system on electric meter(s) where PV system will be connected.

Benefits

If the District installs PV systems as described in Scenario 2 (Offset Only), the following estimated benefits will accrue:

- Annual savings: $1,971,291
- Annual electricity production: 10,533,216 kWh
- Annual greenhouse gases avoided: 2,554 metric tons*
- Annual Renewable Energy Credits (RECs) earned: 10,055

*Avoided greenhouse gases were calculated by multiplying the number of kWh produced by the PV system by PG&E's estimated emissions factor for electricity for 2010–2011.

kWh x 0.000254

Roof Utilization Factors

Methodology

To determine how much electricity can be generated from a school rooftop or from a structure in a parking lot, it is necessary to determine how much usable space is available. Solar panel efficiency is affected by shadows cast by surrounding hills, buildings, trees, flagpoles, other obstructions, as well as equipment, conduit, walls, or structures placed on a roof. When a solar project is contemplated, it is important to determine if the roof or parking lot is free of shadow casting obstructions, making it possible to install a renewable energy system that will produce enough electricity to make the project viable. A school district does not have to make this determination on its own. A district can hire its own consultant to evaluate roof and parking lot conditions before soliciting bids for a renewable energy project or it can simply leave that determination to the Design-Build Request for Proposal process described elsewhere in this document.

For our aerial assessments shown here, SunPower Corporation used Google Map images of all district schools and facilities. District officials then reviewed the aerial photos with SunPower staff to determine which schools should be assessed. In some cases, schools were slated for closure, in other cases the schools were being razed and a new facility was planned, and in several cases, the orientation of the roof, its height, or the amount of equipment on it, made it an unlikely candidate for the installation of solar panels.

Once the appropriate schools and facilities were identified, SunPower Corporation used a web tool to outline the most appropriate sites. This tool is able to estimate the amount of square feet available (gross) on a roof or parking lot. Then technicians applied the "roof utilization factors" in the chart on the right to estimate how much of the total space could be used (net) for solar panel arrays. Once this calculation was made, it was possible to determine how many panels could be installed and what their estimated output would be.

SunPower Corporation used conservative estimates for the "roof utilization factors" which means that it may be possible to install more PV than is described here. It is also the case that once a physical inspection of a roof or parking area is made, the district may find that there is less space for a PV installation. It is important to keep in mind that these calculations presented here are estimates based on an assessment of aerial imagery. The information included here is intended to be a guide for the district and should be relied on in that context only.

ROOF UTILIZATION FACTORS	
Clear	75%
Minimal	63%
Moderate	50%
Significant	38%

System Cost

The turn-key cost of a PV system is frequently described as the cost per Watt peak or "$/Wp." The primary factors that make up that cost are: equipment, design, permitting, installation, labor costs, commissioning, warranties, guarantees, and maintenance services. Other products may be included in the $/Wp, e.g. educational component, or provided as a separate cost.

Roof mounted systems are generally less expensive than carport or shade structures.

The size of the PV project is also a factor in its cost. Generally, the larger the PV system, the lower the $/watt cost. This means that a district should benefit by aggregating its PV projects rather than doing them invididually.

See the chapter on the "Design-Build Contract for Photovoltaic Systems Installation" for a fuller description of the elements that make up the turn-key cost of a PV system.

SYSTEM SIZE	FEBRUARY 2011 COST ($/Wp)
Roof (100-250 kWp)	$6.20
Roof (250-500 kWp)	$5.77
Roof (500-750 kWp)	$5.52
Roof (750-1000 kWp)	$5.22
Carport (100-250 kWp)	$7.78
Carport (250-500 kWp)	$7.08

Please see Appendix C for updated pricing information (October 2011).

Scenarios

These tables summarize the data described in the individual school and facility assessments that follow. Scenario 1 demonstrates the total estimated potential PV capacity for the district. Scenario 2 demonstrates the estimated PV capacity when the PV system is sized to produce 75% of the school's consumption — an amount that brings the school's electricity cost close to $0.

SCENARIO 1 INSTALLING MAXIMUM CAPACITY	
Estimated Gross Available Area (ft^2)	1,382,744
Net Available Area (ft^2)	930,701
Potential PV Capacity (kWp)	16,020
Estimated PV Production (Annual kWh)	21,627,000
Estimated Year 1 Savings	$4,109,130
Estimated Cost	$96,099,900
Estimated CSI Rebate	$12,847,087

SCENARIO 2 OFFSETS ELECTRICITY COSTS ONLY	
Estimated Gross Available Area (ft^2)	1,382,744
Net Available Area (ft^2)	930,701
Potential PV Capacity (kWp)	7,817
Estimated PV Production (Annual kWh)	10,533,216
Estimated Year 1 Savings	$1,971,291
Estimated Cost	$46,308,231
Estimated CSI Rebate	$6,163,189

**Based on aerial assessments done by SunPower Corporation which shows how much solar each site is capable of hosting.*

Scenario 1:
Installing Maximum Capacity

SCHOOL	ESTIMATED PV CAPACITY (FULL SCALE) (kWp)	ESTIMATED PV PRODUCTION (kWh)	ANNUAL USAGE OFFSET BY SOLAR	ESTIMATED COST OF FULL SCALE PV SYSTEM	ESTIMATED REBATE (STEP 9)	NET COST
Administration–Bissell	200	270,000	63%	$1,334,800	$160,388	$1,174,412
Alvarado Adult Ed	520	702,000	1057%	$3,584,800	$417,009	$3,167,791
Bayview Elementary	170	229,500	84%	$1,054,000	$136,330	$917,670
Cesar E. Chavez Elementary	190	256,500	104%	$1,178,000	$152,369	$1,025,631
Collins Elementary	290	391,500	257%	$1,673,300	$232,563	$1,440,737
Crespi Middle School	620	837,000	161%	$3,422,400	$497,203	$2,925,197
*De Anza High School	*	*	*	*	*	*
Edward M. Downer Elementary	320	432,000	218%	$2,173,600	$256,621	$1,916,979
**El Cerrito High School	**	**	**	**	**	**
Ellerhorst Elementary	480	648,000	298%	$2,970,600	$384,931	$2,585,669
Fairmont Elementary	270	364,500	274%	$1,557,900	$216,524	$1,341,376
Grant Elementary	370	499,500	237%	$2,134,900	$296,718	$1,838,182
Harding Elementary	170	229,500	107%	$1,054,000	$136,330	$917,670
Hercules Middle/High	1240	1,674,000	132%	$8,333,800	$994,406	$7,339,394
Highland Elementary	320	432,000	235%	$1,846,400	$256,621	$1,589,779

Installing Maximum Capacity = estimated PV capacity at each school based on available roof space and parking lots.

*De Anza High School is being rebuilt. A 350 kW PV system will be installed in 2012.
**El Cerrito High School has an existing 132 kW "thin film" PV system.

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Scenario 1:
Installing Maximum Capacity *continued*

SCHOOL	ESTIMATED PV CAPACITY (FULL SCALE) (kWp)	ESTIMATED PV PRODUCTION (kWh)	ANNUAL USAGE OFFSET BY SOLAR	ESTIMATED COST OF FULL SCALE PV SYSTEM	ESTIMATED REBATE (STEP 9)	NET COST
Kennedy High	1490	2,011,500	119%	$8,428,800	$1,194,891	$7,233,909
Kensington Elementary	210	283,500	117%	$1,302,000	$168,408	$1,133,593
Lake Elementary	190	256,500	125%	$1,178,000	$152,369	$1,025,631
Lincoln Elementary	470	634,500	252%	$2,953,100	$376,912	$2,576,188
Lovonya Dejean Middle	460	621,000	76%	$3,016,000	$368,893	$2,647,107
Lupine Hills	170	229,500	104%	$1,054,000	$136,330	$917,670
Madera Elementary	190	256,500	133%	$1,178,000	$152,369	$1,025,631
Mira Vista Elementary	530	715,500	387%	$2,925,600	$425,028	$2,500,572
Murphy Elementary	350	472,500	257%	$2,019,500	$280,679	$1,738,821
North Campus	420	567,000	272%	$2,704,800	$336,815	$2,367,985
Nutrition Center	150	202,500	29%	$930,000	$120,291	$809,709
Nystrom Elementary	250	337,500	199%	$1,442,500	$200,485	$1,242,015
Ohlone Elementary	480	648,000	330%	$2,769,600	$384,931	$2,384,669
Olinda Elementary	160	216,000	169%	$992,000	$128,310	$863,690
Peres Elementary	490	661,500	236%	$2,827,300	$392,951	$2,434,349
Pinole Middle School	720	972,000	1379%	$3,974,400	$577,397	$3,397,003

Installing Maximum Capacity = estimated PV capacity at each school based on available roof space and parking lots.

<CONTINUED>

Scenario 1:
Installing Maximum Capacity *continued*

SCHOOL	ESTIMATED PV CAPACITY (FULL SCALE) (kWp)	ESTIMATED PV PRODUCTION (kWh)	ANNUAL USAGE OFFSET BY SOLAR	ESTIMATED COST OF FULL SCALE PV SYSTEM	ESTIMATED REBATE (STEP 9)	NET COST
Pinole Valley High	920	1,242,000	129%	$4,802,400	$737,785	$4,064,615
Richmond High	490	661,500	42%	$2,827,300	$392,951	$2,434,349
Riverside Elementary	170	229,500	106%	$1,054,000	$136,330	$917,670
Serra Adult Education	380	513,000	885%	$2,640,400	$304,737	$2,335,663
Shannon Elementary	200	270,000	197%	$1,240,000	$160,388	$1,079,612
Sheldon Elementary	40	54,000	28%	$248,000	$32,078	$215,922
Stege Elementary	310	418,500	305%	$1,788,700	$248,602	$1,540,098
Stewart Elementary	90	121,500	46%	$558,000	$72,175	$485,825
Tara Hills Elementary	430	580,500	253%	$2,481,100	$344,834	$2,136,266
Valley View Elementary	260	351,000	250%	$1,500,200	$208,505	$1,291,695
Verde Elementary	300	405,000	158%	$1,731,000	$240,582	$1,490,418
Vista Hills High School	130	175,500	80%	$806,000	$104,252	$701,748
Washington Elementary	100	135,000	61%	$620,000	$80,194	$539,806
Wilson Elementary	310	418,500	216%	$1,788,700	$248,602	$1,540,098
Total	**16,020**	**21,627,000**	**132%**	**$96,099,900**	**$12,847,087**	**$83,252,813**

Installing Maximum Capacity = estimated PV capacity at each school based on available roof space and parking lots.

Scenario 2:
Offsetting Electricity Costs Only

SCHOOL	RECOMMENDED PV CAPACITY (OFFSET ONLY) (kWp)	ESTIMATED PV PRODUCTION TO MATCH ANNUAL COST (kWh)	ANNUAL USAGE OFFSET BY SOLAR	ESTIMATED COST OF "OFFSET ONLY" PV SYSTEM	ESTIMATED REBATE (STEP 9)	NET COST
*Administration–Bissell	200	270,000	63%	$1,334,800	$160,388	$1,174,412
Alvarado Adult Ed	37	49,824	75%	$228,821	$29,597	$199,224
Bayview Elementary	153	205,875	75%	$945,500	$122,296	$823,204
Cesar E Chavez Elementary	136	184,200	75%	$845,956	$109,420	$736,535
Collins Elementary	85	114,390	75%	$525,347	$67,951	$457,396
Crespi Middle School	288	388,890	75%	$1,662,145	$231,012	$1,431,132
**De Anza High School	**350	**472,500	**87%	$2,019,500	$280,679	$1,738,821
Edward M Downer Elementary	110	148,560	75%	$682,276	$88,249	$594,026
***El Cerrito High School	***132	158,000	***	***	***	***
Ellerhorst Elementary	121	163,350	75%	$750,200	$97,035	$653,165
Fairmont Elementary	74	99,600	75%	$457,422	$59,165	$398,257
Grant Elementary	117	158,063	75%	$725,917	$93,894	$632,023
Harding Elementary	119	160,800	75%	$738,489	$95,520	$642,969
Hercules Middle/High	704	950,595	75%	$4,539,943	$564,682	$3,975,261
Highland Elementary	102	137,760	75%	$632,676	$81,834	$550,842

Offsetting Electricity Costs Only = estimated PV capacity at each school based on current energy consumption.

* This facility may not have the physical capacity to site a PV system of the size needed to offset the cost of the building's consumption. The chart reflects a PV system size for this building that is consistent with the available space. See "Contextual Data" in the sidebar for the PV system size that would offset the building's current electricity consumption.

** De Anza High School is being rebuilt. A 350 kWp system will be installed in 2012. All values shown here are estimates.

*** El Cerrito High School has an existing 132 kW "thin film" PV system.

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Scenario 2:
Offsetting Electricity Costs Only *continued*

SCHOOL	RECOMMENDED PV CAPACITY (OFFSET ONLY) (kWp)	ESTIMATED PV PRODUCTION TO MATCH ANNUAL COST (kWh)	ANNUAL USAGE OFFSET BY SOLAR	ESTIMATED COST OF "OFFSET ONLY" PV SYSTEM	ESTIMATED REBATE (STEP 9)	NET COST
Kennedy High	938	1,266,230	75%	$4,896,090	$752,179	$4,143,912
Kensington Elementary	135	181,575	75%	$833,900	$107,861	$726,039
Lake Elementary	114	154,170	75%	$708,040	$91,582	$616,458
Lincoln Elementary	140	188,640	75%	$866,347	$112,058	$754,289
Lovonya Dejean Middle	456	615,825	75%	$2,986,177	$365,819	$2,620,358
Lupine Hills	123	165,960	75%	$762,187	$98,585	$663,601
Madera Elementary	107	144,360	75%	$662,987	$85,754	$577,232
Mira Vista Elementary	103	138,825	75%	$637,567	$82,466	$555,100
Murphy Elementary	102	137,880	75%	$633,227	$81,905	$551,322
North Campus	116	156,600	75%	$719,200	$93,025	$626,175
*Nutrition Center	150	202,500	29%	$930,000	$120,291	$809,709
Nystrom Elementary	94	127,080	75%	$583,627	$75,489	$508,137
Ohlone Elementary	109	147,060	75%	$675,387	$87,358	$588,029
Olinda Elementary	71	95,760	75%	$439,787	$56,884	$382,902
Peres Elementary	156	210,120	75%	$964,996	$124,818	$840,178
Pinole Middle School	39	52,850	75%	$242,720	$31,395	$211,325

Offsetting Electricity Costs Only = estimated PV capacity at each school based on current energy consumption.

* This facility may not have the physical capacity to site a PV system of the size needed to offset the cost of the building's consumption. The chart reflects a PV system size for this building that is consistent with the available space. See "Contextual Data" in the sidebar for the PV system size that would offset the building's current electricity consumption.

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Scenario 2:
Offsetting Electricity Costs Only *continued*

SCHOOL	RECOMMENDED PV CAPACITY (OFFSET ONLY) (kWp)	ESTIMATED PV PRODUCTION TO MATCH ANNUAL COST (kWh)	ANNUAL USAGE OFFSET BY SOLAR	ESTIMATED COST OF "OFFSET ONLY" PV SYSTEM	ESTIMATED REBATE (STEP 9)	NET COST
Pinole Valley High	535	721,934	75%	$2,951,906	$428,850	$2,523,056
*Richmond High	490	661,500	42%	$2,827,300	$392,951	$2,434,349
Riverside Elementary	121	162,990	75%	$748,547	$96,821	$651,726
Serra Adult Education	32	43,499	75%	$199,771	$25,839	$173,931
Shannon Elementary	76	102,660	75%	$471,476	$60,983	$410,492
*Sheldon Elementary	40	54,000	28%	$248,000	$32,078	$215,922
Stege Elementary	76	103,011	75%	$473,088	$61,192	$411,896
*Stewart Elementary	90	121,500	46%	$558,000	$72,175	$485,825
Tara Hills Elementary	128	172,125	75%	$790,500	$102,247	$688,253
Valley View Elementary	78	105,240	75%	$483,324	$62,516	$420,809
Verde Elementary	142	191,700	75%	$880,400	$113,876	$766,524
Vista Hills High School	122	164,753	75%	$756,645	$97,868	$658,776
*Washington Elementary	100	135,000	61%	$620,000	$80,194	$539,806
Wilson Elementary	108	145,463	75%	$668,050	$86,409	$581,641
Total	**7,817**	**10,533,216**	**69%**	**$46,308,231**	**$6,163,189**	**$40,145,041**

Offsetting Electricity Costs Only = estimated PV capacity at each school based on current energy consumption.

* These schools may not have the physical capacity to site a PV system of the size needed to offset the cost of the school's consumption. The chart reflects the PV system sizes for these schools that are consistent with the available space. See "Contextual Data" in the sidebars for the PV system size that would offset the school's current electricity consumption.

SECTION TWO

- **PV Capacity and Cost Breakdown by Individual School**

Key to Presentation of Data

SOLAR AMERICA SHOWCASE REPORT
West Contra Costa Unified School District

Alvarado Adult School

5625 Sutter Avenue, Richmond

Annual Electricity Cost and Consumption
Cost:
$11,457
Consumption:
66,432 kWh

Contextual Data
- Are there roof structural concerns?
- Roof obstructions: *clear*

Greenhouse Gases Avoided Annually:
13 metric tons

Renewable Energy Credits Generated Annually:
50

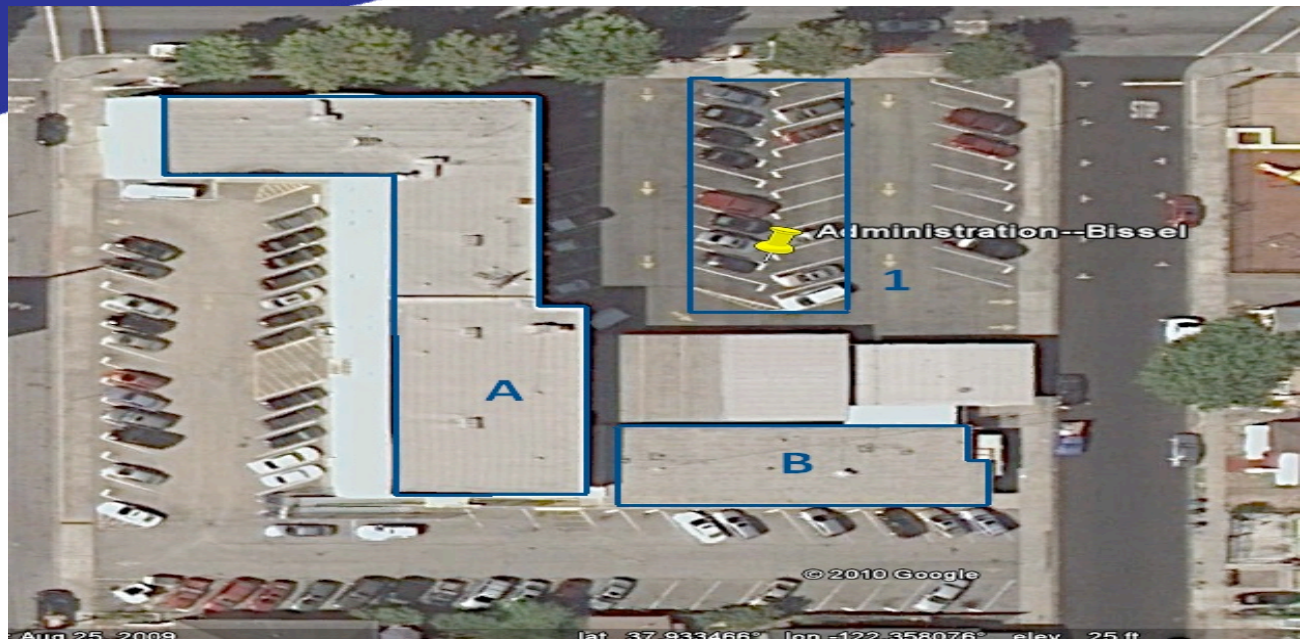
LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	3,900	50		50				
Roof B	2,720	30		30				
Roof C	2,500	30		30				
Parking	24,000		410	410				
Totals	33,120	110	410	520	$3,584,800	$417,009	702,000	1057%
System size and pricing to meet current electricity demand				37	$228,821	$29,597	49,824	75%

Data for Scenario 1: Installing Maximum Capacity

Data for Scenario 2: Offsetting Electricity Costs Only

WCCUSD Administration Bissell Building

1108 Bissell Avenue, Richmond



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	9,523	100		100				
Roof B	2,835	40		40				
Parking	3,815		60	60				
Totals	**16,173**	**140**	**60**	**200**	**$1,334,800**	**$160,388**	**270,000**	**63%**
System size and pricing to meet current electricity demand				*	*	*	*	*

*Estimated PV capacity is not enough to offset current electricity consumption.

Annual Electricity Cost and Consumption

Cost:
$68,538
Consumption:
431,163 kWh

Contextual Data

- Are there roof structural concerns?
- Roof obstructions: ***clear–minimal***
- A system size of ~240 kWp would produce ~ 75% of the school's load.

Greenhouse Gases Avoided Annually:
69 metric tons

Renewable Energy Credits Generated Annually:
270

Alvarado Adult School

5625 Sutter Avenue, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	3,900	50		50				
Roof B	2,720	30		30				
Roof C	2,500	30		30				
Parking	24,000		410	410				
Totals	**33,120**	**110**	**410**	**520**	**$3,584,800**	**$417,009**	**702,000**	**1057%**
System size and pricing to meet current electricity demand				**37**	**$228,821**	**$29,597**	**49,824**	**75%**

Annual Electricity Cost and Consumption

Cost:
$11,457
Consumption:
66,432 kWh

Contextual Data

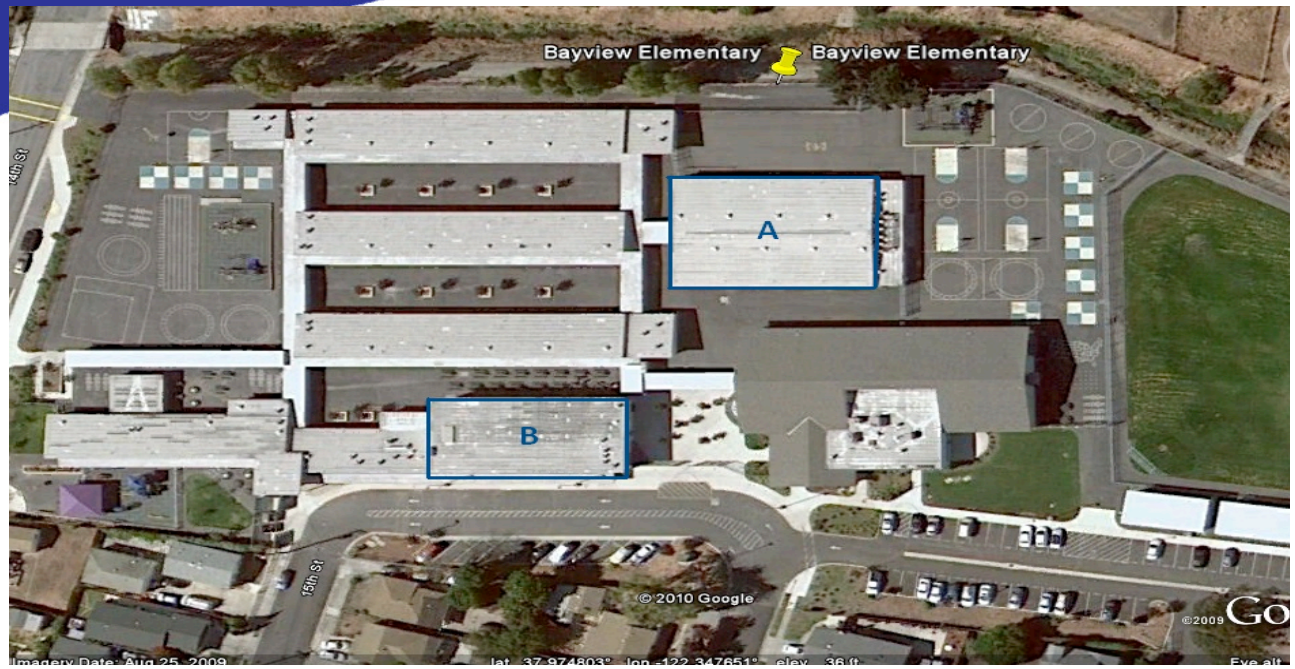
- Are there roof structural concerns?
- Roof obstructions: ***clear***

Greenhouse Gases Avoided Annually:
13 metric tons

Renewable Energy Credits Generated Annually:
50

Bayview Elementary

3001 16th Street, Richmond



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	9,200	100		100				
Roof B	6,160	70		70				
Totals	**15,360**	**170**	**0**	**170**	**$1,054,000**	**$136,330**	**229,500**	**84%**
System size and pricing to meet current electricity demand				**153**	**$945,500**	**$122,296**	**205,875**	**75%**

Annual Electricity Cost and Consumption

Cost:
$47,218
Consumption:
274,500 kWh

Contextual Data

- Roof was replaced in 2005.
- Are there roof structural concerns?
- Roof obstructions: ***minimal***

Greenhouse Gases Avoided Annually:
52 metric tons

Renewable Energy Credits Generated Annually:
206

Cesar E. Chavez Elementary

960 17th Street, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	12,104	130		130				
Roof B	5,400	60		60				
Totals	**17,504**	**190**	**0**	**190**	**$1,178,000**	**$152,369**	**256,500**	**104%**
System size and pricing to meet current electricity demand				**136**	**$845,956**	**$109,420**	**184,200**	**75%**

Annual Electricity Cost and Consumption

Cost:
$39,528
Consumption:
245,600 kWh

Contextual Data

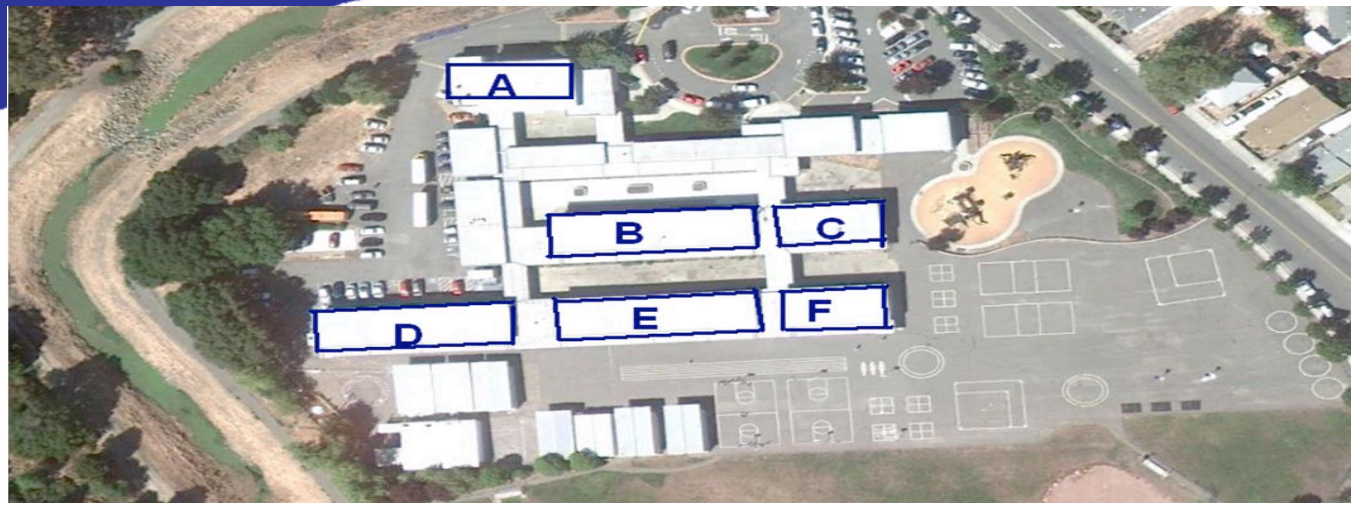
- Roof was replaced in 1995 and may be ready for replacement.
- Are there roof structural concerns?
- Roof obstructions: ***minimal***

Greenhouse Gases Avoided Annually:
47 metric tons

Renewable Energy Credits Generated Annually:
184

Collins Elementary

1224 Pinole Valley Road, Pinole



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	3,564	50		50				
Roof B	4,860	60		60				
Roof C	2,520	30		30				
Roof D	4,860	60		60				
Roof E	4,860	60		60				
Roof F	2,520	30		30				
Totals	**23,184**	**290**	**0**	**290**	**$1,673,300**	**$232,563**	**391,500**	**257%**
System size and pricing to meet current electricity demand				**85**	**$525,347**	**$67,951**	**114,390**	**75%**

Annual Electricity Cost and Consumption

Cost:
$30,075
Consumption:
152,520 kWh

Contextual Data

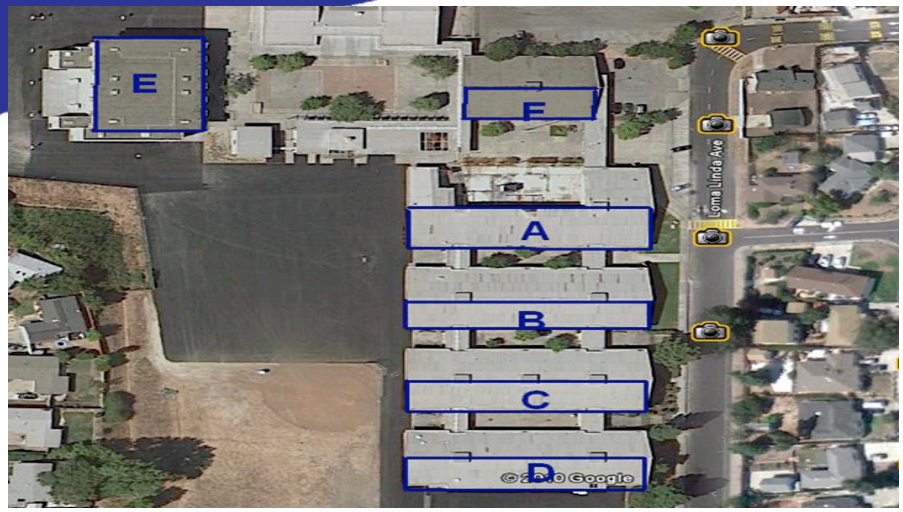
- Roof was replaced in 2007.
- Are there roof structural concerns?
- Roof obstructions: ***clear***

Greenhouse Gases Avoided Annually:
29 metric tons

Renewable Energy Credits Generated Annually:
114

Crespi Middle School

1121 Allview Avenue, El Sobrante



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	10,000	130		130				
Roof B	7,000	90		90				
Roof C	7,000	90		90				
Roof D	7,000	90		90				
Roof E	12,240	160		160				
Roof F	4,400	60		60				
Totals	**47,640**	**620**	**0**	**620**	**$3,422,400**	**$497,203**	**837,000**	**161%**
System size and pricing to meet current electricity demand				**288**	**$1,662,145**	**$231,012**	**388,890**	**75%**

Annual Electricity Cost and Consumption

Cost:
$81,193
Consumption:
518,520 kWh

Contextual Data

- Roofs were replaced in 2005 and 2011.
- Are there roof structural concerns?
- Roof obstructions: ***clear***

Greenhouse Gases Avoided Annually:
99 metric tons

Renewable Energy Credits Generated Annually:
389

De Anza High

5000 Valley View Road, Richmond

Annual Electricity Cost and Consumption (Historical)
Cost:
$92,492
Consumption:
541,778 kWh

Contextual Data

- De Anza High School is being demolished and replaced.
- The new facility will be open in 2012 and will host a 350 kW PV system.

Greenhouse Gases Avoided Annually:
120 metric tons

Renewable Energy Credits Generated Annually:
473

Edward M. Downer Elementary

1777 Sanford Avenue, San Pablo

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	6,250	80		80				
Roof B	4,470	60		60				
Roof C	4,400	60		60				
Parking 1	3,706		60	60				
Parking 2	3,706		60	60				
Totals	**22,532**	**200**	**120**	**320**	**$2,173,600**	**$256,621**	**432,000**	**218%**
System size and pricing to meet current electricity demand				**110**	**$682,276**	**$88,249**	**148,560**	**75%**

Annual Electricity Cost and Consumption

Cost:
$35,555
Consumption:
198,080 kWh

Contextual Data

- Roof was replaced in 2005.
- Are there roof structural concerns?
- Roof obstructions: ***clear***

Greenhouse Gases Avoided Annually:
38 metric tons

Renewable Energy Credits Generated Annually:
149

Ellerhorst Elementary

3501 Pinole Valley Road, Pinole

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	9,515	80		80				
Roof B	17,250	150		150				
Roof C	17,250	150		150				
Parking	6,125		100	100				
Totals	**44,015**	**380**	**100**	**480**	**$2,970,600**	**$384,931**	**648,000**	**298%**
System size and pricing to meet current electricity demand				**121**	**$750,200**	**$97,035**	**163,350**	**75%**

Annual Electricity Cost and Consumption

Cost:
$37,508
Consumption:
217,800 kWh

Contextual Data

- Roof needs replacement.
- Are there roof structural concerns?
- Roof obstructions: ***moderate***

Greenhouse Gases Avoided Annually:
41 metric tons

Renewable Energy Credits Generated Annually:
163

Fairmont Elementary

724 Kearney Street, El Cerrito

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	9,000	100		100				
Roof B	9,000	100		100				
Roof C	6,120	70		70				
Totals	**24,120**	**270**	**0**	**270**	**$1,557,900**	**$216,524**	**364,500**	**274%**
System size and pricing to meet current electricity demand				**74**	**$457,422**	**$59,165**	**99,600**	**75%**

Annual Electricity Cost and Consumption

Cost:
$25,742
Consumption:
132,800 kWh

Contextual Data

- School is scheduled to be replaced.
- Are there roof structural concerns?
- Roof obstructions: ***minimal***

Greenhouse Gases Avoided Annually:
25 metric tons

Renewable Energy Credits Generated Annually:
100

Grant Elementary

2400 Downer Avenue, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	3,400	40		40				
Roof B	9,700	100		100				
Roof C	26,600	230		230				
Totals	**39,700**	**370**	**0**	**370**	**$2,134,900**	**$296,718**	**499,500**	**237%**
System size and pricing to meet current electricity demand				**117**	**$725,917**	**$93,894**	**158,063**	**75%**

Annual Electricity Cost and Consumption

Cost:
$36,012
Consumption:
210,750 kWh

Contextual Data

- Roof was replaced in 2005.
- Are there roof structural concerns?
- Roof obstructions: ***clear–moderate***

Greenhouse Gases Avoided Annually:
40 metric tons

Renewable Energy Credits Generated Annually:
158

Harding Elementary

7230 Fairmount Avenue, El Cerrito

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	9,010	80		80				
Roof B	8,000	90		90				
Totals	**17,010**	**170**	**0**	**170**	**$1,054,000**	**$136,330**	**229,500**	**107%**
System size and pricing to meet current electricity demand				**119**	**$738,489**	**$95,520**	**160,800**	**75%**

Annual Electricity Cost and Consumption

Cost:
$34,821
Consumption:
214,400 kWh

Contextual Data

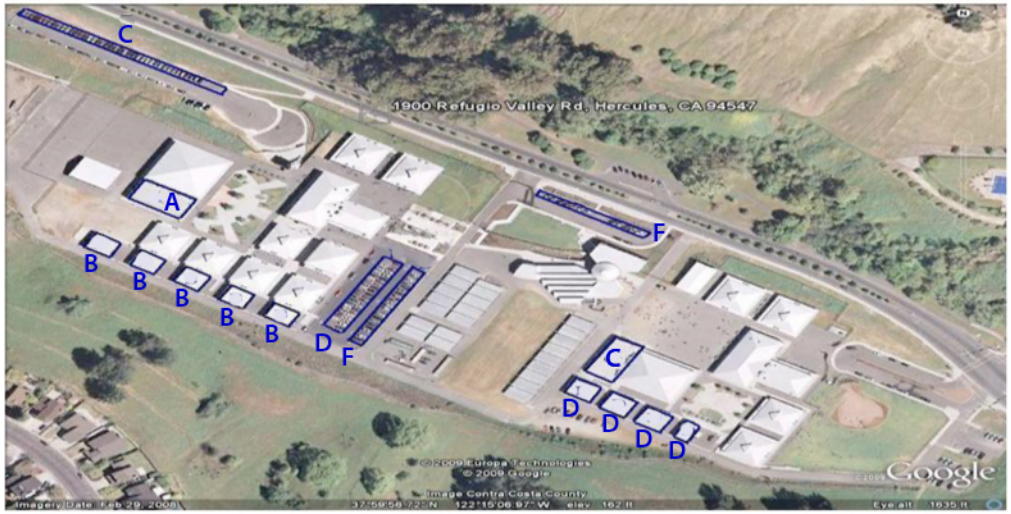
- Roof was replaced in 2004.
- Are there roof structural concerns?
- Roof obstructions: ***minimal–moderate***

Greenhouse Gases Avoided Annually:
41 metric tons

Renewable Energy Credits Generated Annually:
161

Hercules Middle School & High School

1900 Refugio Valley Road, Hercules



<PLEASE SEE NEXT PAGE FOR DETAILS>

Annual Electricity Cost and Consumption

Cost:
$213,366
Consumption:
1,267,460 kWh

Contextual Data

- Roof was replaced in 2000.
- A 350 kWp PV system is being installed in the Fall of 2011 by SunPower Corporation and paid for, in part, by a grant from the Bay Area Air Quality Management District.
- Are there roof structural concerns?
- Roof obstructions: ***clear–minimal***

Greenhouse Gases Avoided Annually:
120 metric tons*

Renewable Energy Credits Generated Annually:
473*
***based on the 350 kW system now being installed**

Hercules Middle School & High School *continued*

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	5,200	60		60				
Roof B	9,660	120		120				
Roof C	5,200	60		60				
Roof D	7,470	100		100				
Parking A	12,600		210	210				
Parking B	18,450		310	310				
Parking C	7,380		130	130				
Parking D	7,056		120	120				
Parking E	3,924		70	70				
Parking F	3,780		60	60				
Totals	**80,720**	**340**	**900**	**1240**	**$8,333,800**	**$994,406**	**1,674,000**	**132%**
System size and pricing to meet current electricity demand				**704**	**$4,539,943**	**$564,682**	**950,595**	**75%**

Highland Elementary

2829 Moyers Road, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	12,475	130		130				
Roof B	6,400	80		80				
Roof C	4,800	60		60				
Roof D	4,128	50		50				
Totals	**27,803**	**320**	**0**	**320**	**$1,846,400**	**$256,621**	**432,000**	**235%**
System size and pricing to meet current electricity demand				**102**	**$632,676**	**$81,834**	**137,760**	**75%**

Annual Electricity Cost and Consumption

Cost:
$34,287
Consumption:
183,680 kWh

Contextual Data

- School is scheduled to be replaced.
- Are there roof structural concerns?
- Roof obstructions: ***clear–minimal***

Greenhouse Gases Avoided Annually:
35 metric tons

Renewable Energy Credits Generated Annually:
138

Kennedy High

4300 Cutting Boulevard, Richmond

<PLEASE SEE NEXT PAGE FOR DETAILS>

Annual Electricity Cost and Consumption

Cost:
$246,883
Consumption:
1,688,307 kWh

Contextual Data

- Roof was replaced in 1998 and may be ready for replacement.
- Are there roof structural concerns?
- Shading issues for rooftops B, C, D and parking lots?
- Roof obstructions: ***minimal–significant***

Greenhouse Gases Avoided Annually:
322 metric tons

Renewable Energy Credits Generated Annually:
1266

Kennedy High *continued*

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	23,850	150		150				
Roof B	8,400	50		50				
Roof C	8,400	50		50				
Roof D	21,072	230		230				
Roof E	16,700	180		180				
Roof F	16,700	110		110				
Roof G	34,364	370		370				
Parking 1	5,810		100	100				
Parking 2	5,810		100	100				
Parking 3	5,810		100	100				
Parking 4	3,162		50	50				
Totals	**150,078**	**1140**	**350**	**1490**	**$8,428,800**	**$1,194,891**	**2,011,500**	**119%**
System size and pricing to meet current electricity demand				**938**	**$4,896,090**	**$752,179**	**1,266,230**	**75%**

Kensington Elementary

90 Highland Boulevard, Kensington

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	8,575	90		90				
Roof B	4,480	60		60				
Roof C	5,700	60		60				
Totals	**18,755**	**210**	**0**	**210**	**$1,302,000**	**$168,408**	**283,500**	**117%**
System size and pricing to meet current electricity demand				**135**	**$833,900**	**$107,861**	**181,575**	**75%**

Annual Electricity Cost and Consumption

Cost:
$41,227
Consumption:
242,100 kWh

Contextual Data

- One roof is new; another building's roof has been recoated.
- Are there roof structural concerns?
- Roof obstructions: ***clear–minimal***

Greenhouse Gases Avoided Annually:
46 metric tons

Renewable Energy Credits Generated Annually:
182

Lake Elementary

2700 11th Street, San Pablo

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	6,840	90		90				
Roof B	3,542	50		50				
Roof C	4,320	50		50				
Totals	**14,702**	**190**	**0**	**190**	**$1,178,000**	**$152,369**	**256,500**	**125%**
System size and pricing to meet current electricity demand				**114**	**$708,040**	**$91,582**	**154,170**	**75%**

Annual Electricity Cost and Consumption

Cost:
$37,004
Consumption:
205,560 kWh

Contextual Data

- Roofs need replacement.
- Are there roof structural concerns?
- Roof obstructions: ***clear–minimal***

Greenhouse Gases Avoided Annually:
39 metric tons

Renewable Energy Credits Generated Annually:
154

Lincoln Elementary

29 6th Street, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	16,500	210		210				
Roof B	6,000	60		60				
Roof C	2,400	30		30				
Roof D	5,080	50		50				
Parking 1	3,280		60	60				
Parking 2	3,280		60	60				
Totals	**33,260**	**350**	**120**	**470**	**$2,953,100**	**$376,912**	**634,500**	**252%**
System size and pricing to meet current electricity demand				**140**	**$866,347**	**$112,058**	**188,640**	**75%**

Annual Electricity Cost and Consumption

Cost:
$38,862
Consumption:
251,520 kWh

Contextual Data

- New buildings in 2004.
- Are there roof structural concerns?
- Shading issues for parking lots?
- Roof obstructions: ***clear–minimal***

Greenhouse Gases Avoided Annually:
48 metric tons

Renewable Energy Credits Generated Annually:
189

Lovonya Dejean Middle School

3400 Macdonald Avenue, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	5,400	60		60				
Roof B	5,400	60		60				
Roof C	5,400	60		60				
Roof D	8,960	100		100				
Parking 1	5,270		90	90				
Parking 2	5,270		90	90				
Totals	**35,700**	**280**	**180**	**460**	**$3,016,000**	**$368,893**	**621,000**	**76%**
System size and pricing to meet current electricity demand				**456**	**$2,986,177**	**$365,819**	**615,825**	**75%**

Annual Electricity Cost and Consumption

Cost:
$120,133
Consumption:
821,100 kWh

Contextual Data

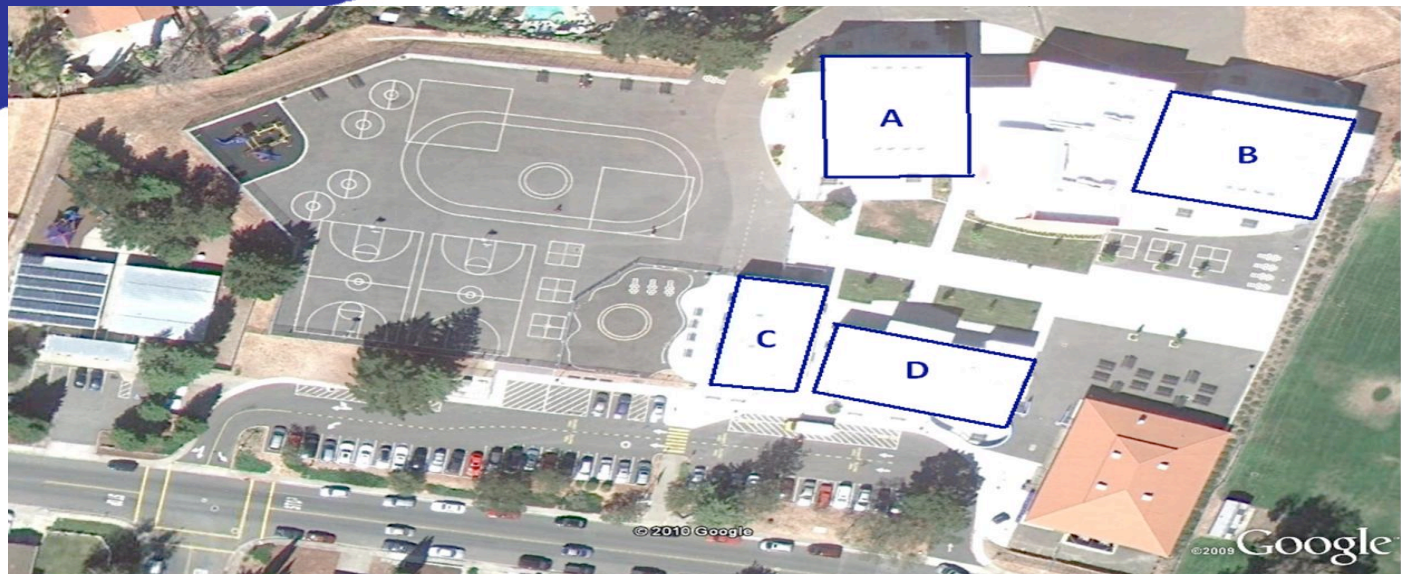
- Roof was replaced in 2002.
- Are there roof structural concerns?
- Shading issues for rooftops A, B, C, D or parking lots?
- Roof obstructions: ***minimal***

Greenhouse Gases Avoided Annually:
156 metric tons

Renewable Energy Credits Generated Annually:
616

Lupine Hills

1919 Lupine Road, Hercules



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	5,525	50		50				
Roof B	5,525	50		50				
Roof C	3,200	30		30				
Roof D	4,900	40		40				
Totals	**19,150**	**170**	**0**	**170**	**$1,054,000**	**$136,330**	**229,500**	**104%**
System size and pricing to meet current electricity demand				**123**	**$762,187**	**$98,585**	**165,960**	**75%**

Annual Electricity Cost and Consumption

Cost:
$41,125
Consumption:
221,280 kWh

Contextual Data

- Roof was replaced in 2004.
- Are there roof structural concerns?
- Roof obstructions: ***moderate***

Greenhouse Gases Avoided Annually:
42 metric tons

Renewable Energy Credits Generated Annually:
166

Madera Elementary

8500 Madera Drive, El Cerrito

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	9,075	120		120				
Roof B	4,000	40		40				
Roof C	2,250	30		30				
Totals	**15,325**	**190**	**0**	**190**	**$1,178,000**	**$152,369**	**256,500**	**133%**
System size and pricing to meet current electricity demand				**107**	**$662,987**	**$85,754**	**144,360**	**75%**

Annual Electricity Cost and Consumption

Cost:
$30,056
Consumption:
192,480 kWh

Contextual Data

- Roof was replaced in 2004.
- Are there roof structural concerns?
- Roof obstructions: ***clear–minimal***

Greenhouse Gases Avoided Annually:
37 metric tons

Renewable Energy Credits Generated Annually:
144

Mira Vista Elementary

6397 Hazel Avenue, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	11,440	150		150				
Roof B	11,440	150		150				
Roof C	11,440	150		150				
Roof D	6,400	80		80				
Totals	**40,720**	**530**	**0**	**530**	**$2,925,600**	**$425,028**	**715,500**	**387%**
System size and pricing to meet current electricity demand				**103**	**$637,567**	**$82,466**	**138,825**	**75%**

Annual Electricity Cost and Consumption

Cost:
$31,524
Consumption:
185,100 kWh

Contextual Data

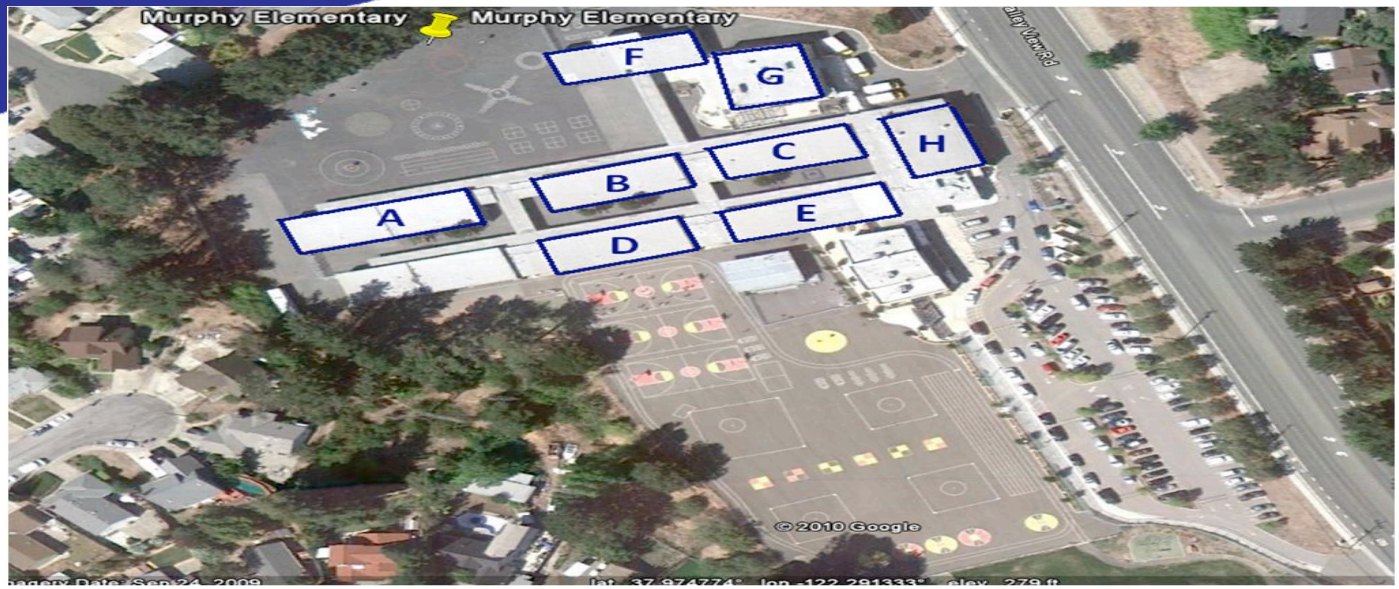
- Roof was replaced in 2005.
- Are there roof structural concerns?
- Roof obstructions: ***clear***

Greenhouse Gases Avoided Annually:
35 metric tons

Renewable Energy Credits Generated Annually:
139

Murphy Elementary

4350 Valley View Road, San Pablo



<PLEASE SEE NEXT PAGE FOR DETAILS>

Annual Electricity Cost and Consumption

Cost:
$31,634
Consumption:
183,840 kWh

Contextual Data

- New building in 2005; older roof recoated in 2005.
- Are there roof structural concerns?
- Roof obstructions: ***clear–minimal***

Greenhouse Gases Avoided Annually:
35 metric tons

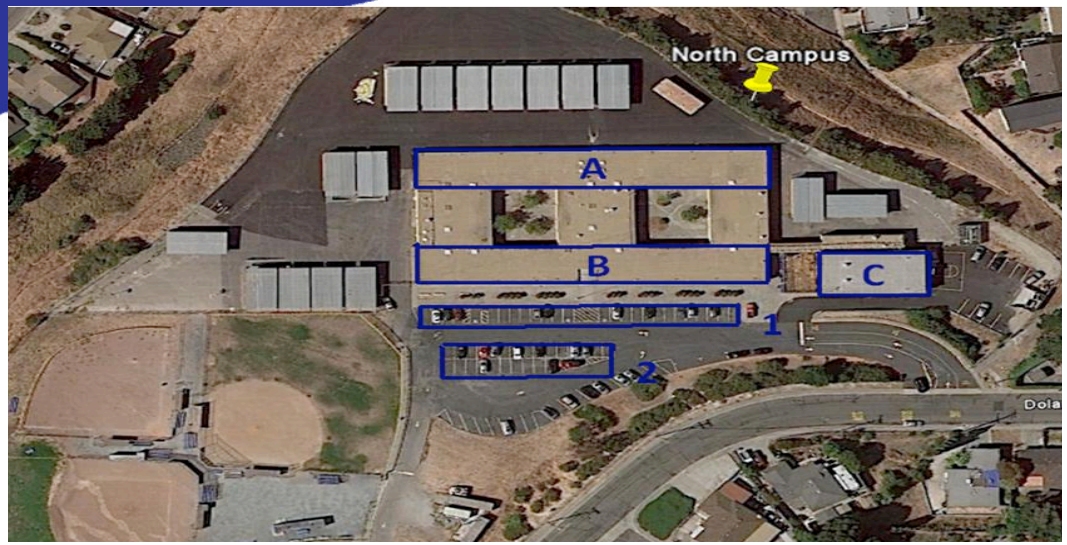
Renewable Energy Credits Generated Annually:
138

Murphy Elementary *continued*

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	4,440	60		60				
Roof B	3,330	40		40				
Roof C	3,885	50		50				
Roof D	3,330	40		40				
Roof E	3,885	50		50				
Roof F	3,150	30		30				
Roof G	3,330	40		40				
Roof H	3,300	40		40				
Totals	**28,650**	**350**	**0**	**350**	**$2,019,500**	**$280,679**	**472,500**	**257%**
System size and pricing to meet current electricity demand				**102**	**$633,227**	**$81,905**	**137,880**	**75%**

North Campus

4350 Valley View Road, San Pablo



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	11,000	120		120				
Roof B	11,000	120		120				
Roof C	3,600	40		40				
Parking 1	4,250		70	70				
Parking 2	4,352		70	70				
Totals	**34,202**	**280**	**140**	**420**	**$2,704,800**	**$336,815**	**567,000**	**272%**
System size and pricing to meet current electricity demand				**116**	**$719,200**	**$93,025**	**156,600**	**75%**

Annual Electricity Cost and Consumption

Cost:
$35,357
Consumption:
208,800 kWh

Contextual Data

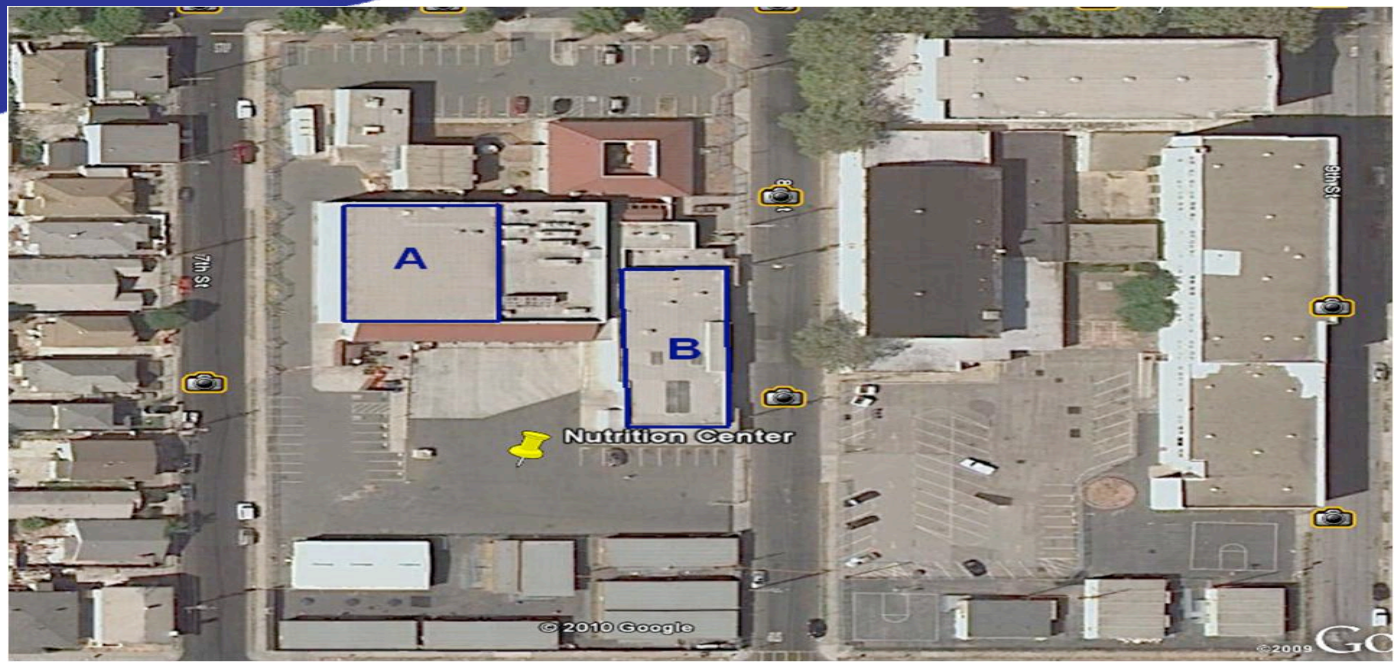
- Roof was replaced in 2000.
- Are there roof structural concerns?
- Roof obstructions: ***minimal***

Greenhouse Gases Avoided Annually:
40 metric tons

Renewable Energy Credits Generated Annually:
157

Nutrition Center

750 Bissell Avenue, Richmond



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	7,300	90		90				
Roof B	5,850	60		60				
Totals	**13,150**	**150**	**0**	**150**	**$930,000**	**$120,291**	**202,500**	**29%**
System size and pricing to meet current electricity demand				*	*	*	*	*

*Estimated PV capacity is not enough to offset current electricity consumption.

Annual Electricity Cost and Consumption

Cost:
$104,573
Consumption:
700,480 kWh

Contextual Data

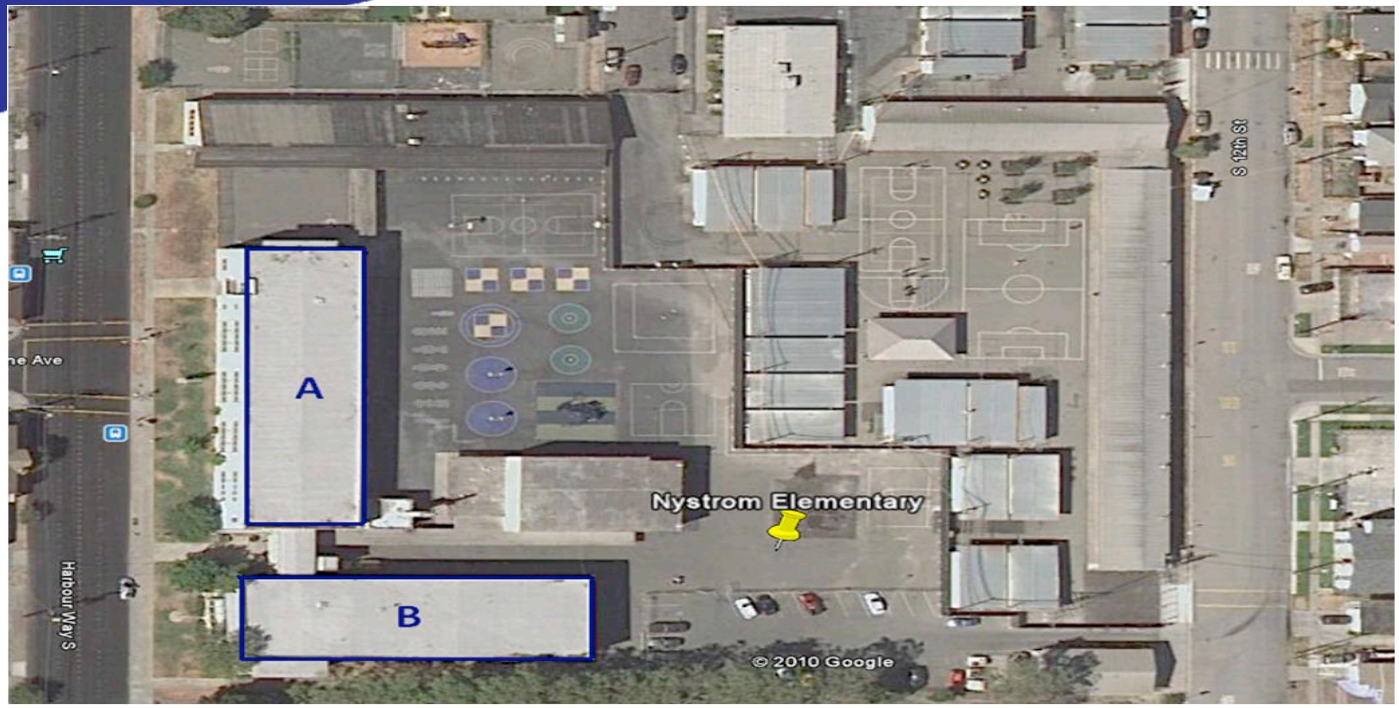
- Are there roof structural concerns?
- Roof obstructions: ***clear–minimal***
- A system size of ~389 kWp would produce ~75% of the school's load.

Greenhouse Gases Avoided Annually:
51 metric tons

Renewable Energy Credits Generated Annually:
203

Nystrom Elementary

230 Harbour Way South, Richmond



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	10,450	130		130				
Roof B	9,625	120		120				
Totals	**20,075**	**250**	**0**	**250**	**$1,442,500**	**$200,485**	**337,500**	**199%**
System size and pricing to meet current electricity demand				**94**	**$583,627**	**$75,489**	**127,080**	**75%**

Annual Electricity Cost and Consumption

Cost:
$29,225
Consumption:
169,440 kWh

Contextual Data

- Roof scheduled for replacement in 2012.
- Are there roof structural concerns?
- Shading issues for Building B?
- Roof obstructions: ***clear–minimal***

Greenhouse Gases Avoided Annually:
32 metric tons

Renewable Energy Credits Generated Annually:
127

Ohlone Elementary

1616 Pheasant Drive, Hercules

<PLEASE SEE NEXT PAGE FOR DETAILS>

Annual Electricity Cost and Consumption

Cost:
$37,736
Consumption:
196,080 kWh

Contextual Data

- School is scheduled to be replaced.
- The roof structure has not been analyzed as of the date of this report.
- Are there roof structural concerns?
- Roof obstructions: ***clear***

Greenhouse Gases Avoided Annually:
37 metric tons

Renewable Energy Credits Generated Annually:
147

Ohlone Elementary *continued*

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	5,400	70		70				
Roof B	5,400	70		70				
Roof C	5,400	70		70				
Roof D	5,400	70		70				
Roof E	5,400	70		70				
Roof F	5,400	70		70				
Roof G	4,500	60		60				
Totals	**36,900**	**480**	**0**	**480**	**$2,769,600**	**$384,931**	**648,000**	**330%**
System size and pricing to meet current electricity demand				**109**	**$675,387**	**$87,358**	**147,060**	**75%**

Olinda Elementary

5855 Olinda Road, El Sobrante

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	9,375	100		100				
Roof B	4,720	60		60				
Totals	**14,095**	**160**	**0**	**160**	**$992,000**	**$128,310**	**216,000**	**169%**
System size and pricing to meet current electricity demand				**71**	**$439,787**	**$56,884**	**95,760**	**75%**

Annual Electricity Cost and Consumption

Cost:
$24,567
Consumption:
127,680 kWh

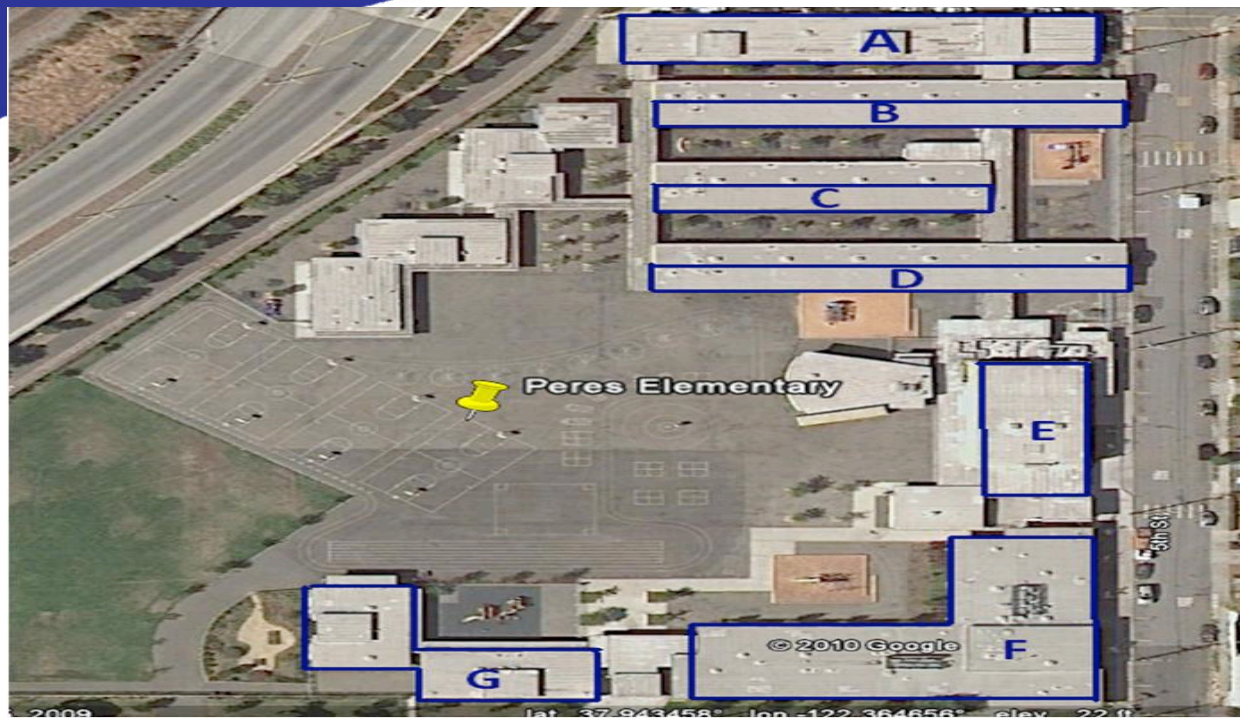
Contextual Data

- Roof is old.
- Are there roof structural concerns?
- Roof obstructions: ***clear–minimal***

Greenhouse Gases Avoided Annually:
24 metric tons

Renewable Energy Credits Generated Annually:
96

Peres Elementary
719 5th Street, Richmond



<PLEASE SEE NEXT PAGE FOR DETAILS>

Annual Electricity Cost and Consumption
Cost:
$46,990
Consumption:
280,160 kWh

Contextual Data
- Roofs are new and/or recoated.
- Are there roof structural concerns?
- Roof obstructions: ***clear–significant***

Greenhouse Gases Avoided Annually:
53 metric tons

Renewable Energy Credits Generated Annually:
210

Peres Elementary *continued*

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	7,420	80		80				
Roof B	4,200	50		50				
Roof C	3,000	40		40				
Roof D	4,240	50		50				
Roof E	7,705	80		80				
Roof F	14,094	150		150				
Roof G	6,880	40		40				
Totals	**47,539**	**490**	**0**	**490**	**$2,827,300**	**$392,951**	**661,500**	**236%**
System size and pricing to meet current electricity demand				**156**	**$964,996**	**$124,818**	**210,120**	**75%**

Pinole Middle

1575 Mann Drive, Pinole

Annual Electricity Cost and Consumption
Cost:
$11,804
Consumption:
70,467 kWh

Contextual Data

- Roofs were replaced in 2009 and 2011.
- Are there roof structural concerns?
- Roof obstructions: ***clear–moderate***

Greenhouse Gases Avoided Annually:
13 metric tons

Renewable Energy Credits Generated Annually:
53

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	40,400	430		430				
Roof B	20,200	170		170				
Roof C	9,450	120		120				
Totals	**70,050**	**720**	**0**	**720**	**$3,974,400**	**$577,397**	**972,000**	**1379%**
System size and pricing to meet current electricity demand				**39**	**$242,720**	**$31,395**	**52,850**	**75%**

Pinole Valley High

2900 Pinole Valley Road, Pinole

<PLEASE SEE NEXT PAGE FOR DETAILS>

Annual Electricity Cost and Consumption

Cost:
$159,154
Consumption:
962,578 kWh

Contextual Data

- School is scheduled to be replaced.
- Are there roof structural concerns?
- Shading issues for Building E?
- Roof obstructions: ***clear–moderate***

Greenhouse Gases Avoided Annually:
183 metric tons

Renewable Energy Credits Generated Annually:
722

Pinole Valley High *continued*

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	19,600	170		170				
Roof B	13,500	110		110				
Roof C	10,450	90		90				
Roof D	6,600	80		80				
Roof E	22,240	190		190				
Roof F	16,500	180		180				
Roof G	6,600	70		70				
Roof H	3,000	30		30				
Totals	**98,490**	**920**	**0**	**920**	**$4,802,400**	**$737,785**	**1,242,000**	**129%**
System size and pricing to meet current electricity demand				**535**	**$2,951,906**	**$428,850**	**721,934**	**75%**

Richmond High

1250 23rd Street, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	24,800	270		270				
Roof B	8,700	90		90				
Roof C	11,856	130		130				
Totals	**45,356**	**490**	**0**	**490**	**$2,827,300**	**$392,951**	**661,500**	**42%**
System size and pricing to meet current electricity demand				*	*	*	*	*

*Estimated PV capacity is not enough to offset current electricity consumption.

Annual Electricity Cost and Consumption

Cost:
$249,892
Consumption:
1,564,968 kWh

Contextual Data

- Roof was replaced in ~2001 and recoated in 2010.
- Are there roof structural concerns?
- What is height of structures on Building A?
- Roof obstructions: ***minimal***
- A system size of ~870 kWp would produce ~75% of the school's load.

Greenhouse Gases Avoided Annually:
168 metric tons

Renewable Energy Credits Generated Annually:
662

Riverside Elementary

1300 Amador Street, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	11,700	130		130				
Roof B	3,760	40		40				
Totals	**15,460**	**170**	**0**	**170**	**$1,054,000**	**$136,330**	**229,500**	**106%**
System size and pricing to meet current electricity demand				**121**	**$748,547**	**$96,821**	**162,990**	**75%**

Annual Electricity Cost and Consumption

Cost:
$36,363
Consumption:
217,320 kWh

Contextual Data

- Roof was replaced in 2005.
- Are there roof structural concerns?
- Roof obstructions: ***minimal***

Greenhouse Gases Avoided Annually:
41 metric tons

Renewable Energy Credits Generated Annually:
163

Serra Adult Education

6028 Ralston Avenue, Richmond

<PLEASE SEE NEXT PAGE FOR DETAILS>

Annual Electricity Cost and Consumption

Cost:
$10,388
Consumption:
57,998 kWh

Contextual Data

- Are there roof structural concerns?
- Roof obstructions: ***clear***

Greenhouse Gases Avoided Annually:
11 metric tons

Renewable Energy Credits Generated Annually:
43

Serra Adult Education *continued*

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	3,600	50		50				
Roof B	12,000	150		150				
Parking 1	3,744		60	60				
Parking 2	2,700		50	50				
Parking 3	4,140		70	70				
Totals	**26,184**	**200**	**180**	**380**	**$2,640,400**	**$304,737**	**513,000**	**885%**
System size and pricing to meet current electricity demand				**32**	**$199,771**	**$25,839**	**43,499**	**75%**

Shannon Elementary

685 Marlesta Road, Pinole

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	13,360	140		140				
Roof B	5,265	60		60				
Totals	**18,625**	**200**	**0**	**200**	**$1,240,000**	**$160,388**	**270,000**	**197%**
System size and pricing to meet current electricity demand				**76**	**$471,476**	**$60,983**	**102,660**	**75%**

Annual Electricity Cost and Consumption

Cost:
$26,439
Consumption:
136,880 kWh

Contextual Data

- District may close this school.
- Roof obstructions: ***minimal***

Greenhouse Gases Avoided Annually:
26 metric tons

Renewable Energy Credits Generated Annually:
103

Sheldon Elementary

2601 May Road, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	4,200	40		40				
Totals	**4,200**	**40**	**0**	**40**	**$248,000**	**$32,078**	**54,000**	**28%**
System size and pricing to meet current electricity demand				*	*	*	*	*

*Estimated PV capacity is not enough to offset current electricity consumption.

Annual Electricity Cost and Consumption

Cost:
$33,564
Consumption:
192,960 kWh

Contextual Data

- Roof was replaced in 2005.
- Are there roof structural concerns?
- Roof obstructions: ***minimal***
- A system size of ~107 kWp would produce ~75% of the school's load.

Greenhouse Gases Avoided Annually:
14 metric tons

Renewable Energy Credits Generated Annually:
54

Stege Elementary

4949 Cypress Avenue, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	19,500	250		250				
Roof B	1,114	10		10				
Roof C	3,618	50		50				
Totals	**24,232**	**310**	**0**	**310**	**$1,788,700**	**$248,602**	**418,500**	**305%**
System size and pricing to meet current electricity demand				**76**	**$473,088**	**$61,192**	**103,011**	**75%**

Annual Electricity Cost and Consumption

Cost:
$24,289
Consumption:
137,348 kWh

Contextual Data

- School is scheduled to be replaced.
- Are there roof structural concerns?
- Roof obstructions: ***clear***

Greenhouse Gases Avoided Annually:
26 metric tons

Renewable Energy Credits Generated Annually:
103

Stewart Elementary

2040 Hoke Drive, Pinole

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	3,375	40		40				
Roof B	4,250	50		50				
Totals	**7,625**	**90**	**0**	**90**	**$558,000**	**$72,175**	**121,500**	**46%**
System size and pricing to meet current electricity demand				*	*	*	*	*

*Estimated PV capacity is not enough to offset current electricity consumption.

Annual Electricity Cost and Consumption

Cost:
$48,525
Consumption:
265,280 kWh

Contextual Data

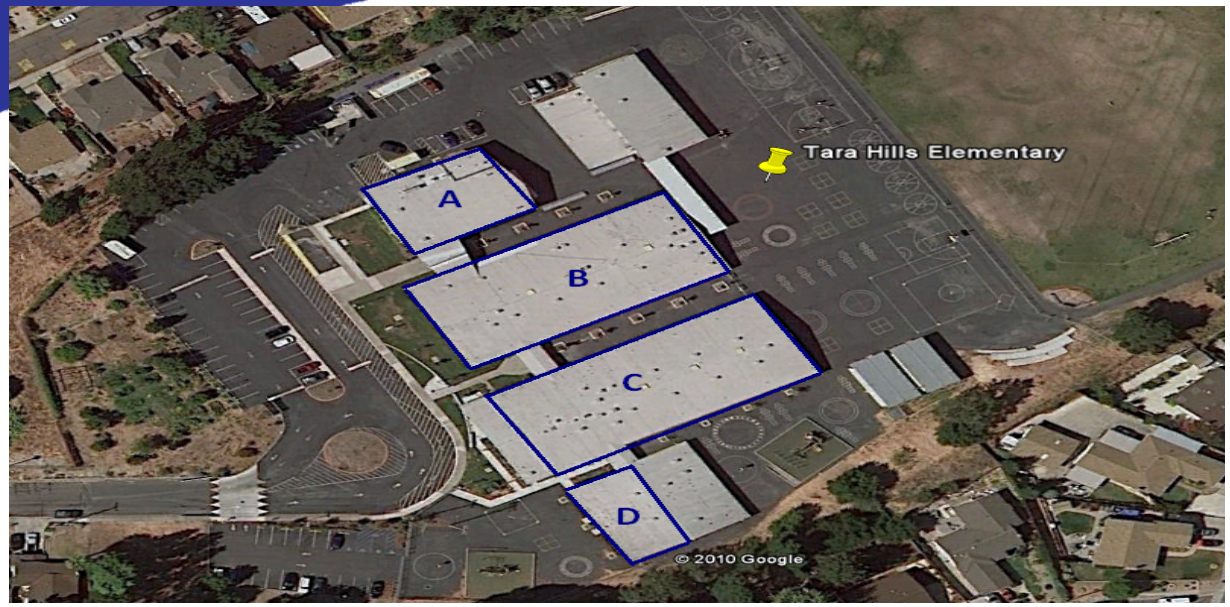
- Roof was replaced in 2005.
- Are there roof structural concerns?
- Roof obstructions: ***minimal***
- A system size of ~147 kWp would produce ~75% of the school's load.

Greenhouse Gases Avoided Annually:
31 metric tons

Renewable Energy Credits Generated Annually:
122

Tara Hills Elementary

2300 Dolan Way, San Pablo



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	5,525	60		60				
Roof B	15,725	170		170				
Roof C	15,725	170		170				
Roof D	3,200	30		30				
Totals	**40,175**	**430**	**0**	**430**	**$2,481,100**	**$344,834**	**580,500**	**253%**
System size and pricing to meet current electricity demand				**128**	**$790,500**	**$102,247**	**172,125**	**75%**

Annual Electricity Cost and Consumption

Cost:
$39,789
Consumption:
229,500 kWh

Contextual Data

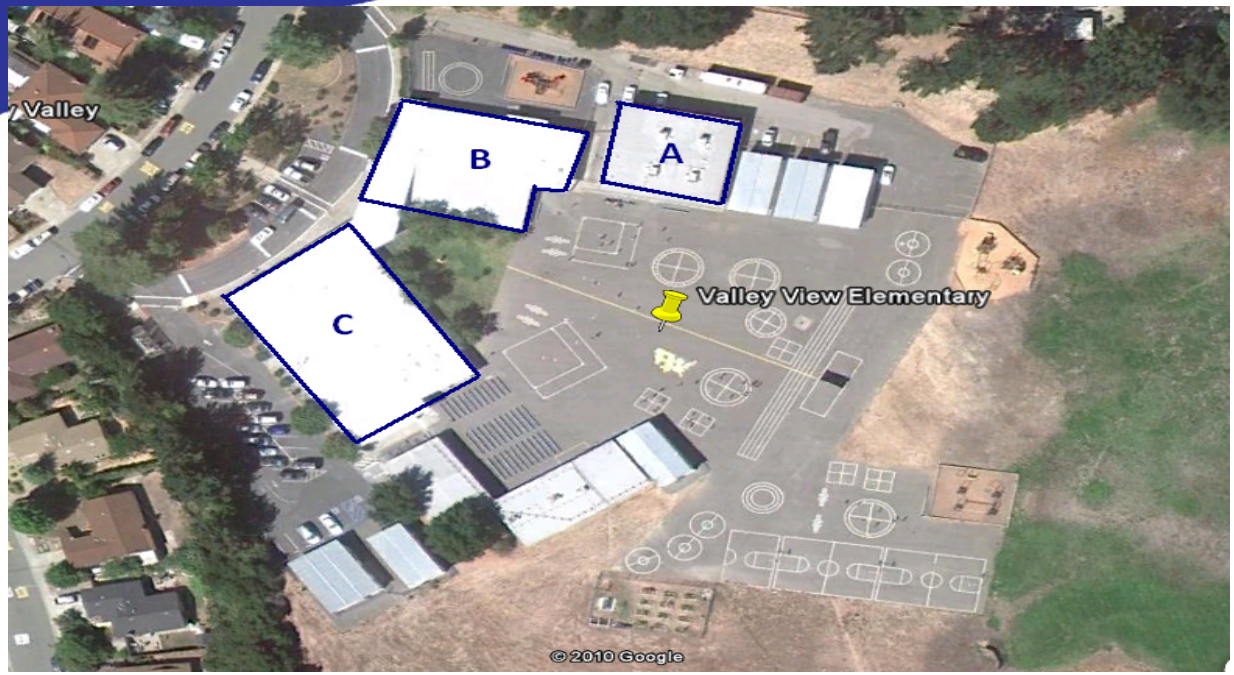
- Roof is old; was recoated in 2005.
- Are there roof structural concerns?
- Roof obstructions: ***minimal***

Greenhouse Gases Avoided Annually:
44 metric tons

Renewable Energy Credits Generated Annually:
172

Valley View Elementary

3416 Maywood Drive, Richmond



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	4,900	50		50				
Roof B	7,650	80		80				
Roof C	12,600	130		130				
Totals	**25,150**	**260**	**0**	**260**	**$1,500,200**	**$208,505**	**351,000**	**250%**
System size and pricing to meet current electricity demand				**78**	**$483,324**	**$62,516**	**105,240**	**75%**

Annual Electricity Cost and Consumption

Cost:
$27,206
Consumption:
140,320 kWh

Contextual Data

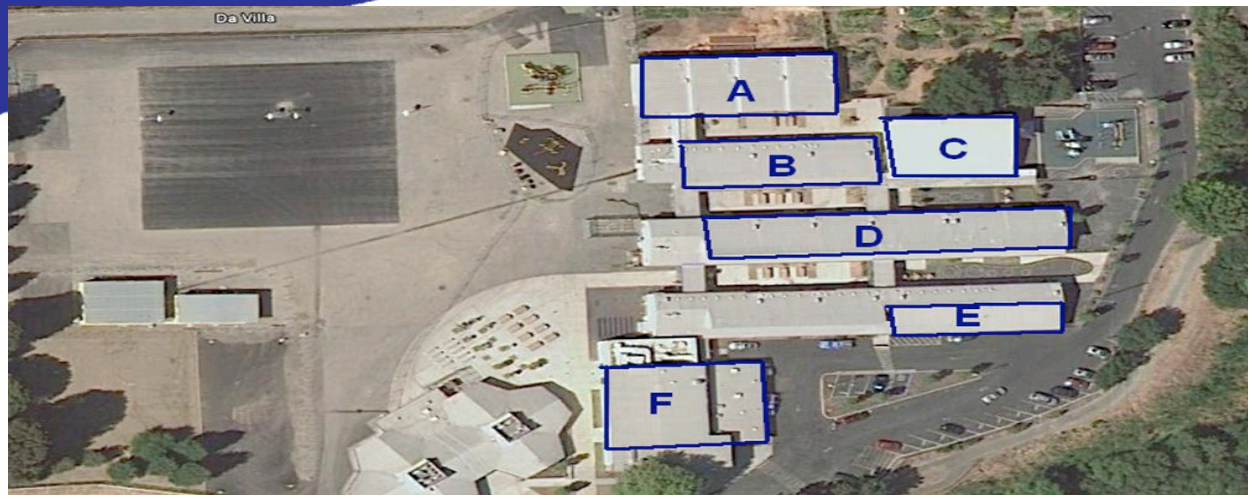
- School is scheduled to be replaced.
- Are there roof structural concerns?
- Roof obstructions: ***minimal***

Greenhouse Gases Avoided Annually:
27 metric tons

Renewable Energy Credits Generated Annually:
105

Verde Elementary

2000 Giaramita Street, Richmond



LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	4,950	50		50				
Roof B	3,300	40		40				
Roof C	3,375	40		40				
Roof D	6,300	70		70				
Roof E	2,625	30		30				
Roof F	6,300	70		70				
Totals	**26,850**	**300**	**0**	**300**	**$1,731,000**	**$240,582**	**405,000**	**158%**
System size and pricing to meet current electricity demand				**142**	**$880,400**	**$113,876**	**191,700**	**75%**

Annual Electricity Cost and Consumption

Cost:
$44,199
Consumption:
255,600 kWh

Contextual Data

- Roof was replaced in 2004.
- Are there roof structural concerns?
- Roof obstructions: ***clear–minimal***

Greenhouse Gases Avoided Annually:
49 metric tons

Renewable Energy Credits Generated Annually:
192

Vista Hills High School

2625 Barnard Street, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	9,990	130		130				
Totals	**9,990**	**130**	**0**	**130**	**$806,000**	**$104,252**	**175,500**	**80%**
System size and pricing to meet current electricity demand				**122**	**$756,645**	**$97,868**	**164,753**	**75%**

Annual Electricity Cost and Consumption

Cost:
$37,845
Consumption:
219,671 kWh

Contextual Data

- Roof was replaced in 2006.
- Are there roof structural concerns?
- Roof obstructions: ***clear***

Greenhouse Gases Avoided Annually:
42 metric tons

Renewable Energy Credits Generated Annually:
165

Washington Elementary

565 Wine Street, Richmond

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	6,205	40		40				
Roof B	4,450	30		30				
Roof C	4,150	30		30				
Totals	**14,805**	**100**	**0**	**100**	**$620,000**	**$80,194**	**135,000**	**61%**
System size and pricing to meet current electricity demand				*	*	*	*	*

*Estimated PV capacity is not enough to offset current electricity consumption.

Annual Electricity Cost and Consumption

Cost:
$36,359
Consumption:
220,200 kWh

Contextual Data

- Roof was replaced in 2005.
- Are there roof structural concerns?
- Roof obstructions: ***significant***
- A system size of ~122 kWp would produce ~ 75% of the school's load.

Greenhouse Gases Avoided Annually:
34 metric tons

Renewable Energy Credits Generated Annually:
135

Wilson Elementary

629 42nd Street, Richmond

<PLEASE SEE NEXT PAGE FOR DETAILS>

Annual Electricity Cost and Consumption

Cost:
$36,403
Consumption:
193,950 kWh

Contextual Data

- School is scheduled to be replaced.
- Are there roof structural concerns?
- Roof obstructions: ***clear***

Greenhouse Gases Avoided Annually:
37 metric tons

Renewable Energy Credits Generated Annually:
145

Wilson Elementary *continued*

LOCATION	GROSS AVAILABLE AREA (FT^2)	ESTIMATED PV CAPACITY (kWp)			ESTIMATED SYSTEM COST	CSI REBATE (STEP 9)	ESTIMATED OUTPUT OF PV SYSTEM (kWh)	% USAGE OFFSET BY PV
		ROOFTOP	PARKING	=TOTAL				
Roof A	3,900	50		50				
Roof B	3,900	50		50				
Roof C	3,900	50		50				
Roof D	3,960	50		50				
Roof E	3,960	50		50				
Roof F	2,375	30		30				
Roof G	2,375	30		30				
Totals	**24,370**	**310**	**0**	**310**	**$1,788,700**	**$248,602**	**418,500**	**216%**
System size and pricing to meet current electricity demand				**108**	**$668,050**	**$86,409**	**145,463**	**75%**

APPENDICES

- **Appendix A—Schools and Facilities Not Assessed**
- **Appendix B—Annual Cost and Consumption**
- **Appendix C—System Cost, October 2011**

APPENDIX A

Schools and Facilities Not Assessed

The following schools and other WCCUSD facilities were not assessed for PV for one or more of the following reasons: roof orientation, ease of access, roof type, presence of obstructions and/or shading.

Coronado Elementary – 2001 Virginia Avenue, Richmond
Dover Elementary – 1871 21st Street, San Pablo
Facilities Ops Center – 1300 Potrero Avenue, Richmond
Ford Elementary – 2711 Maricopa Avenue, Richmond
Gompers Continuation High – 157 9th Street, Richmond
Hanna Ranch Elementary – 2482 Refugio Valley Road, Hercules
Helms Middle School – 2500 Road 20, San Pablo
King Elementary – 234 S 39th Street, Richmond
Montalvin Manor Elementary – 300 Christine Drive, San Pablo
Portola Middle – 1021 Navellier Street, El Cerrito
Richmond College Prep – 217 South 11th Street, Richmond
Warehouse – 600 Ohio Avenue, Richmond

The energy consumption and cost for these facilities have been benchmarked using Energy Star's Portfolio Manager.

APPENDIX B

Annual Cost and Consumption: Electricity

WCCUSD FACILITY	ANNUAL kWh	ANNUAL COST	% OF TOTAL kWh	% OF TOTAL $	COMMENTS
Administration—Bissell	431,163	$68,538	2.27%	2.18%	greater than 2% of total consumption
ALVARADO Adult Ed	66,432	$11,457	0.35%	0.36%	
Bayview Elementary	274,500	$47,218	1.45%	1.50%	
Cesar E Chavez Elem.	245,600	$39,528	1.29%	1.26%	
Collins Elementary	152,520	$30,075	0.80%	0.96%	
Coronado Elementary	174,701	$37,277	0.92%	1.18%	
Crespi Middle School	518,520	$81,193	2.73%	2.58%	greater than 2% of total consumption
De Anza High School	541,778	$92,492	2.86%	2.94%	greater than 2% of total consumption
Dover Elementary	168,769	$31,352	0.89%	1.00%	
Edward M Downer Elem.	198,080	$35,555	1.04%	1.13%	
El Cerrito High School	1,148,800	$196,963	6.06%	6.26%	greater than 6% of total consumption
Ellerhorst Elementary	217,800	$37,508	1.15%	1.19%	
Facilities Ops Center	157,960	$26,972	0.83%	0.86%	
Fairmont Elementary	132,800	$25,742	0.70%	0.82%	
Ford Elementary	118,461	$19,779	0.62%	0.63%	
Gompers Continuation High	99,228	$17,819	0.52%	0.57%	
Grant Elementary	210,750	$36,012	1.11%	1.14%	
Hanna Ranch Elementary	206,000	$35,850	1.09%	1.14%	

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APPENDIX B *continued*

Annual Cost and Consumption: Electricity

WCCUSD FACILITY	ANNUAL kWh	ANNUAL COST	% OF TOTAL kWh	% OF TOTAL $	COMMENTS
Harding Elementary	214,400	$34,821	1.13%	1.11%	
Helms Middle School	1,050,759	$162,422	5.54%	5.16%	greater than 4% of total consumption
Hercules Middle/High	1,267,460	$213,366	6.68%	6.78%	greater than 6% of total consumption
Highland Elementary	183,680	$34,287	0.97%	1.09%	
Kennedy High	1,688,307	$246,883	8.90%	7.84%	greater than 8% of total consumption
Kensington Elementary	242,100	$41,227	1.28%	1.31%	
King Elementary	187,600	$31,332	0.99%	1.00%	
Lake Elementary	205,560	$37,004	1.08%	1.18%	
Lincoln Elementary	251,520	$38,862	1.33%	1.23%	
Lovonya Dejean Middle	821,100	$120,133	4.33%	3.82%	greater than 4% of total consumption
Lupine Hills	221,280	$41,125	1.17%	1.31%	
Madera Elementary	192,480	$30,056	1.01%	0.95%	
Mira Vista Elementary	185,100	$31,524	0.98%	1.00%	
Montalvin Manor Elem.	171,200	$31,718	0.90%	1.01%	
Murphy Elementary	183,840	$31,634	0.97%	1.00%	
North Campus	208,800	$35,357	1.10%	1.12%	
Nutrition Center	700,480	$104,573	3.69%	3.32%	greater than 2% of total consumption
Nystrom Elementary	169,440	$29,225	0.89%	0.93%	

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APPENDIX B *continued*

Annual Cost and Consumption: Electricity

WCCUSD FACILITY	ANNUAL kWh	ANNUAL COST	% OF TOTAL kWh	% OF TOTAL $	COMMENTS
Ohlone Elementary	196,080	$37,736	1.03%	1.20%	
Olinda Elementary	127,680	$24,567	0.67%	0.78%	
Peres Elementary	280,160	$46,990	1.48%	1.49%	
Pinole Middle School	70,467	$11,804	0.37%	0.37%	
Pinole Valley High	962,578	$159,154	5.08%	5.06%	greater than 4% of total consumption
Portola Middle	90,140	$15,115	0.48%	0.48%	
Richmond College Prep	47,560	$8,181	0.25%	0.26%	
Richmond High	1,564,968	$249,892	8.25%	7.94%	greater than 8% of total consumption
Riverside Elementary	217,320	$36,363	1.15%	1.16%	
Serra Adult Education	57,998	$10,388	0.31%	0.33%	
Shannon Elementary	136,880	$26,439	0.72%	0.84%	
Sheldon Elementary	192,960	$33,564	1.02%	1.07%	
Stege Elementary	137,348	$24,289	0.72%	0.77%	
Stewart Elementary	265,280	$48,525	1.40%	1.54%	
Tara Hills Elementary	229,500	$39,789	1.21%	1.26%	
Valley View Elementary	140,320	$27,206	0.74%	0.86%	
Verde Elementary	255,600	$44,199	1.35%	1.40%	

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APPENDIX B *continued*

Annual Cost and Consumption: Electricity

WCCUSD FACILITY	ANNUAL kWh	ANNUAL COST	% OF TOTAL kWh	% OF TOTAL $	COMMENTS
Vista Hills High School	219,671	$37,845	1.16%	1.20%	
Warehouse (600 Ohio Ave.)	150,040	$26,175	0.79%	0.83%	
Washington Elementary	220,200	$36,359	1.16%	1.16%	
Wilson Elementary	193,950	$36,403	1.02%	1.16%	
Totals	**18,965,668**	**$3,147,862**	**100%**	**100%**	

APPENDIX C

System Cost, October 2011

SunPower Corporation provided updated pricing information just before publication of this document. The last column in the table reflects a 3% to 5% decrease in the pricing since February 2011. This decrease is not reflected in the estimated pricing shown in other sections of this document. All estimated costs are based on February 2011 pricing.

SunPower Corporation's pricing is fairly conservative and reflects the higher end of current industry costs. The cost of the systems are driven by a variety of factors including mounting type, system size, location of the tie-in respect to the array, number of arrays, etc. In the case of urban school districts, it may be the case that a relatively small PV system is spread across a number of roofs and/or parking lots, which might require several points of interconnection or long DC/AC trenching that can elevate the cost.

These prices are meant to provide the district with an indication of what a quality PV system will cost. Actual pricing could be higher or lower depending on the complexity of the installation and the equipment used. Best pricing and best system value will be achieved by using a publicly bid design-build process.

SYSTEM SIZE	PREVIOUS COST ($/Wp)	FEBRUARY 2011 COST ($/Wp)	OCTOBER 2011 COST ($/Wp)
Roof (100-250 kWp)	$6.75	$6.20	$6.00
Roof (250-500 kWp)	$6.42	$5.77	$5.60
Roof (500-750 kWp)	$6.08	$5.52	$5.35
Roof (750-1000 kWp)	$5.75	$5.22	$5.00
Carport (100-250 kWp)	N/A	$7.78	$7.45
Carport (250-500 kWp)	N/A	$7.08	$6.75