

MEMORANDUM

TO: La Norris Blake, Sweetwater Union High School District
 Jaime Ortiz, Sweetwater Union High School District

FROM: Mark Crowdis, Think Energy, Inc.
 Helen Tocco, Think Energy, Inc.

DELIVERABLE: Final Recommendations for Solar Photovoltaic Systems

DATE: March 10, 2011

Project Background and Current Status

The Sweetwater Union High School District (SUHSD) is in the process of considering installing solar photovoltaics at a number of its schools. SUHSD received a first round of proposals from six bidders on January 7, 2011. The proposed prices in this round ranged from \$0.1660 to \$0.2780 per kWh, and the proposals included between 13 and 23 schools. In the first round of proposals, it was mandatory for bidders to include all nine of the sites that are pursuing Leadership in Energy and Environmental Design (LEED) Certification. Of the original six bidders, SUHSD chose to short-list three. These included SunEdison, LLC (SunEdison), SunPower Corporation (SunPower), and Swinerton, Inc. (Swinerton). The three short-listed bidders were invited to present their proposals to the review team on February 7, 2011.

After the short-list presentations, the review team felt that SunPower and Swinerton offered strong proposals. However, the pricing offered by these two firms was still well above SUHSD's current utility rates, so it was necessary to identify ways to drive the prices down. SunPower and Swinerton were asked to modify their proposals by reallocating the solar systems to the schools that would yield the lowest cost of energy. Bidders were allowed to exclude the LEED schools, and were asked to provide both 20- and 25-year pricing using a 3% PPA escalator. Bidders were also invited to recommend any additional methods for reducing energy costs to SUHSD.

Final presentations for SunPower and Swinerton were held on March 2, 2011, and March 4, 2011, respectively. SunPower provided two scenarios, and the pricing for both of these was significantly lower than that offered by Swinerton. SunPower's two options are as follows:

Scenario 1: Proposal and Site Summary

School	Total Annual Usage (kWh)	Total Annual Utility Bill	2010 All-In Cost per kWh	PPA 20 Year Cost per kWh	PPA 25 Year Cost per kWh	PV System Size (kW)	PV System Output (kWh)	% of Main Meter Usage
Bonita Vista High School	1,253,685	\$257,455	\$0.2054	\$0.14898	\$0.13668	778.24	1,252,951	99.94%
Castle Park High School	1,003,014	\$174,557	\$0.1740			629.76	1,014,374	101.13%
Montgomery High School	1,139,830	\$95,885	\$0.0841			998.76	1,631,826	143.16%
Olympian High School	1,481,700	\$259,124	\$0.1749			1,128.96	1,821,546	122.94%
Otay Ranch High School	927,345	\$153,697	\$0.1657			1,123.92	1,813,167	117.05%
	621,723	\$120,105	\$0.1932					
Southwest High School	1,408,751	\$265,995	\$0.1888			814.08	1,254,372	89.04%
Total			\$0.1694	\$0.14898	\$0.13668	5,473.72	8,788,236	N/A

Scenario 2: Proposal and Site Summary

School	Total Annual Usage (kWh)	Total Annual Utility Bill	2010 All-In Cost per kWh	PPA 20 Year Cost per kWh	PPA 25 Year Cost per kWh	PV System Size (kW)	PV System Output (kWh)	% of Main Meter Usage
Bonita Vista High School	1,253,685	\$257,455	\$0.2054	\$0.15194	\$0.13953	778.24	1,252,951	99.94%
Castle Park High School	1,003,014	\$174,557	\$0.1740			629.76	1,014,374	101.13%
Chula Vista High School	999,000	\$203,018	\$0.2032			266.32	406,696	40.71%
Hilltop High School	722,400	\$136,990	\$0.1896			199.84	333,233	46.13%
Montgomery High School	1,139,830	\$95,885	\$0.0841			998.76	1,631,826	143.16%
Olympian High School	1,481,700	\$259,124	\$0.1749			609.26	985,254	66.49%
Otay Ranch High School	927,345	\$153,697	\$0.1657			1,123.92	1,813,167	117.05%
	621,723	\$120,105	\$0.1932					
Southwest High School	1,408,751	\$265,995	\$0.1888			476.16	733,688	52.08%
Sweetwater Union High School	423,529	\$79,572	\$0.1879			253.44	422,428	99.74%
	362,496	\$23,299	\$0.0643					
	305,700	\$59,753	\$0.1955					
Total			\$0.1689	\$0.15194	\$0.13953	5,335.7	8,593,617	N/A

Scenario 1 includes two LEED campuses (Montgomery High School and Southwest High School), while Scenario 2 includes five LEED campuses (additionally Chula Vista High School, Hilltop High School, and Sweetwater High School were added). It is important to note that the “All-in Cost” listed in both tables includes both demand (kW) and energy (kWh) charges. The PV system will only offset the energy charges, and a very small portion of the demand charges for each site. Also, these all-in costs were based on 2009-2010 data and would be 4% higher for each year up to 2012. Therefore, the 2012 all-in cost would be \$0.1832 for Scenario 1 and \$0.1827 for Scenario 2.

Expected Project Savings

Think Energy, Inc. (Think Energy) has been retained by SUHSD throughout the project to guide the process, provide recommendations, and assist in the verification and calculation of lifecycle savings for the proposals. There are many variables that affect the analysis of savings for any project. For example, we have assumed that utility rates will escalate at about 4% per year over the term of the contract. This is supported by over twenty years of historical data for utility rates in California; however, natural disasters, wars, the development of new technologies, and other factors can greatly affect utility rates. It is also impossible to predict the exact output of the PV systems, and exactly when that output will occur, because these predictions are dependent on weather conditions. We have based our estimates on 30 years of historical data and the PV module manufacturer’s performance guaranty, but system output may still fluctuate by up to 10% per year over the first ten years of the contract, and up to 20% per year over the second ten years of the contract. Consequently, the estimated savings below may fluctuate.

However, in spite of the variability, it appears that both Scenarios 1 and 2 will save the District a considerable amount of money over time, especially in the later years when the PPA rate is far below the utility rate (which continues to climb at 4% per year while the PPA rate escalates at only 3%).

Furthermore, a switch to the Distributed Generation Rate (DG-R) from the current ALTOU rates through San Diego Gas and Electric (SDG&E) yields a modest savings to the majority of the sites excluding the PV system, and an even greater savings when the PV system is taken into consideration.

Below are two tables that show the difference in projected billings under the ALTOU and DG-R rates. This is how the bills would look if solar was not installed at the sites.

Scenario 1: ALTOU vs. DG-R

Campus	System Size	Original Usage (kWh)*	Solar Production (kWh)	% of Energy Usage Offset by Solar	Original Usage ALTOU (\$)	Original Usage DG-R (\$)
Bonita Vista High School	778.24 kWp	1,132,359	1,252,951	110.60%	\$ 202,541	\$186,277
Castle Park High School	629.76 kWp	959,195	1,014,374	105.80%	\$151,111	\$148,279
Montgomery HS	736.29 kWp	1,116,600	1,234,433	110.60%	\$189,547	\$181,016
Olympian HS	1,048.30 kWp	1,467,600	1,703,466	116.10%	\$ 255,224	\$232,566
Otay Ranch HS	606.30 kWp	935,824	978,179	104.50%	\$139,757	\$141,304
Southwest High School	814.08 kWp	1,346,243	1,254,372	93.20%	\$217,745	\$210,992
Totals	4,612.96 kWp	6,957,821	7,437,775	106.90%	\$1,155,923	\$1,100,434

Scenario 2: ALTOU vs. DG-R

Campus	System Size	Original Usage (kWh)*	Solar Production (kWh)	% of Energy Usage Offset by Solar	Original Usage ALTOU(\$)	Original Usage DG-R(\$)
Bonita Vista High School	778.24 kWp	1,132,359	1,252,951	110.60%	\$202,541	\$186,277
Castle Park High School	629.76 kWp	959,195	1,014,374	105.80%	\$151,111	\$148,279
Montgomery HS	736.29 kWp	1,116,600	1,234,433	110.60%	\$189,547	\$181,016
Olympian HS	609.28 kWp	1,467,600	985,254	67.10%	\$255,224	\$232,566
Otay Ranch HS	606.30 kWp	935,824	978,179	104.50%	\$139,757	\$141,304
Southwest High School	476.16 kWp	1,346,243	733,688	54.50%	\$217,745	\$210,992
Hilltop HS	199.68 kWp	790,727	333,233	42.10%	\$142,196	\$128,752
Sweetwater HS	253.44 kWp	400,591	422,428	105.50%	\$68,538	\$65,615
Chula Vista HS	266.24 kWp	1,109,136	406,695	36.70%	\$210,868	\$182,531
Totals	4,555.38 kWp	9,258,276	7,361,235	79.51%	\$1,577,524	\$1,477,333

*Note that slight differences in original building usage exist between the various analyses that have been performed for the schools because some were performed over different timeframes of historical usage. Likewise there is some variation in historical billings.

On the next page are tables showing the expected savings from the solar projects. Both of these assume a 20-year term. Think Energy recommends a 20-year term instead of a 25-year term because SUHSD has expressed repeated concerns about the longevity of the roofs. A 25-year term would likely extend past the useful life of the current rooftop systems. The Year 1 savings from Scenarios 1 and 2 are very close. The annual savings are conservatively based upon 2010 rates, so these will be at least 4% higher by 2012. Furthermore, the savings shown below are based on the largest meters on each campus only. As smaller meters will also be included, the savings will increase, because smaller meters are typically on higher rate schedules.

Financial Scenario #1: Year 1 Savings

Campus	System Size	Original Usage (kWh)	Solar Production (kWh)	% of Energy Usage Offset by Solar	Original ALTOU Bill (\$)	Solar Bill (\$)	After Solar Electric Bill (\$)	Total Bill After Solar (\$)	2010 Savings (\$)
Bonita Vista High School	778.24 kWp	1,132,359	1,252,951	110.6%	\$ 202,541	\$ 186,665	\$ 774	\$ 187,439	\$ 15,102
Castle Park High School	629.76 kWp	959,195	1,014,374	105.8%	\$ 151,111	\$ 151,121	\$ 1,393	\$ 152,514	\$ (1,403)
Montgomery HS*	736.29 kWp	1,116,600	1,234,433	110.6%	\$ 189,547	\$ 183,906	\$ -	\$ 183,906	\$ 5,641
Olympian HS*	1,048.30 kWp	1,467,600	1,703,466	116.1%	\$ 255,224	\$ 253,782	\$ -	\$ 253,782	\$ 1,441
Otay Ranch HS*	606.30 kWp	935,824	978,179	104.5%	\$ 139,757	\$ 145,729	\$ -	\$ 145,729	\$ (5,972)
Southwest High School	814.08 kWp	1,346,243	1,254,372	93.2%	\$ 217,745	\$ 186,876	\$ 26,630	\$ 213,506	\$ 4,239
Totals	4,612.96 kWp	6,957,821	7,437,775	106.90%	\$ 1,155,923	\$ 1,108,080	\$ 28,796	\$ 1,136,876	\$ 19,047

Financial Scenario #2: Year 1 Savings

Campus	System Size	Original Usage (kWh)	Solar Production (kWh)	% of Energy Usage Offset by Solar	Original ALTOU Bill (\$)	Solar Bill (\$)	After Solar Electric Bill (\$)	Total Bill After Solar (\$)	2010 Savings (\$)
Bonita Vista High School	778.24 kWp	1,132,359	1,252,951	110.6%	\$ 202,541	\$ 190,373	\$ 774	\$ 191,147	\$ 11,393
Castle Park High School	629.76 kWp	959,195	1,014,374	105.8%	\$ 151,111	\$ 154,124	\$ 1,393	\$ 155,517	\$ (4,406)
Montgomery HS*	736.29 kWp	1,116,600	1,234,433	110.6%	\$ 189,547	\$ 187,560	\$ -	\$ 187,560	\$ 1,987
Olympian HS	609.26 kWp	1,467,600	985,254	67.1%	\$ 255,224	\$ 149,700	\$ 97,879	\$ 247,579	\$ 7,645
Otay Ranch HS*	606.30 kWp	935,824	978,179	104.5%	\$ 139,757	\$ 148,624	\$ -	\$ 148,624	\$ (8,867)
Southwest High School	476.16 kWp	1,346,243	733,688	54.5%	\$ 217,745	\$ 111,477	\$ 100,246	\$ 211,722	\$ 6,022
Chula Vista HS	266.32 kWp	1,109,136	406,695	36.7%	\$ 210,868	\$ 61,793	\$ 126,052	\$ 187,845	\$ 23,022
Hilltop HS	199.84 kWp	790,727	333,233	42.1%	\$ 142,196	\$ 50,631	\$ 83,592	\$ 134,223	\$ 7,973
Sweetwater HS	253.44 kWp	400,591	422,428	105.5%	\$ 68,538	\$ 64,184	\$ 5,232	\$ 69,416	\$ (878)
Totals	4,555.60 kWp	9,258,276	7,361,235	79.51%	\$ 1,577,524	\$ 1,118,466	\$ 415,168	\$ 1,533,634	\$ 43,891

The savings for both scenarios are very similar. Because of the additional benefit of the three extra LEED campuses, Think Energy recommends Scenario 2. The lifetime savings for Scenario 1 would be roughly \$7,200,000 over 20 years, while the savings for Scenario 2 would be roughly \$8,100,000.

If you have any questions or comments regarding this memo, please feel free to contact Helen Tocco at (301) 351-9057 or by email at htocco@thinkenergy.net.