

Energy – It's the Key to Begin the Green Process




October 17, 2011

10:45 am – 12:15 pm

Energy – It's the Key to Begin the Green Process

- * Cathy Allen, Senior Director, Facilities & Planning, San Juan Unified School District, C.A.S.H. Chair
- * Joe Dixon, Assistant Superintendent, Facilities & Governmental Relations, Santa Ana Unified School District, C.A.S.H. Vice Chair
- * Steve Newsom, Associate, LPA, Inc., C.A.S.H. Board Member
- * Anna Ferrera, Executive Director, School Energy Coalition



Joe Dixon, Assistant Superintendent
Facilities & Governmental Relations
Santa Ana Unified School District
Vice Chair – C.A.S.H.
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Funding Sources For Greener Schools

- * Existing Expenses
 - * Saving money – taking credit
 - * Performance contracting
- * Buying Renewable NRG
 - * GO Bond
 - * Leveraging projects
 - * Federal Funds
 - * QZAB Option
 - * Other funds
- * PPA
 - * 3rd party ownership

Existing Expenditure = Opportunity

- Annual Cost of Utilities
- Appointment of Conservation Coordinators
- Energy Reduction – Goal Setting
- Targeted Methods to Reduce Consumption
- Conservation Next Steps

Determine Current Expenditures

<i>UTILITY</i>	<i>ANNUAL COST</i>
Electricity	\$ 7,305,000
Natural Gas	\$ 480,000
Water	\$ 925,000
Telephone	\$ 366,900
TOTAL	\$ 9,076,900

Set Up Program

- * School Challenge
- * Changed Behavior
- * Temperature Set Points
- * 10% Annual Reduction Minimum
- * 25% Goal

GO Bonds

- * Interest earned
- * Project savings
- * Leverage (local, P3)

Project Breakdown

- * **Saddleback High School Project**
 - * Solar Photovoltaic System – Measure G
 - * Solar Thermal Heating – Measure G
 - * “Cool” Roofing - ERP
 - * HVAC Replacement – Modernization/ERP

- * **Funding Sources**
 - * Measure G/QSCB: \$5,647,729
 - * Emergency Repair Program: \$4,078,864
 - * Modernization: \$2,526,206

Solar Total: \$5,647,729

Total Project: \$12,252,799



Purchasing Renewable NRG

	Traditional Tax-exempt	Build America Bonds	Qualified Zone Academy Bonds	Qualified School Construction Bonds	Qualified Energy Conservation Bonds	Clean Renewable Energy Bonds
		<i>BABs</i>	<i>QZABs</i>	<i>QSCBs</i>	<i>QECBs</i>	<i>CREBs</i>
Permitted Uses	Any governmental purpose	Governmental capital projects	Various school facility and education needs	School construction, repair, retrofit, etc.	Energy reducing retrofits, mass transit, R&D, etc.	Renewable electricity generation facilities

Federal Funds

- * Qualified Zone Academy Bonds
- * Fix America's Schools Today (FAST) <http://www.21csf.org/csf-home/publications/FixAmericasSchoolsTodayFAST!.pdf>
- * 21st Century School Fund
<http://www.21csf.org/csf-home/default.asp>
- * Building Educational Success Together <http://www.21csf.org/csf-home/Documents/FactSheetPK12PublicSchoolFacilityInfrastructure.pdf>

PPA Option

3rd Party Power Purchase Agreement (PPA)

District acts as host for solar system and buys power from a 3rd Party Owner (Investor) under a long term service contract

The 3rd Party Owner, (Investor) receives all eligible incentives

No debt is incurred by District

PPA provides the District

Nominal reduction in the electrical rate charged to the District by the 3rd party owner, (Investor) if compared to the host

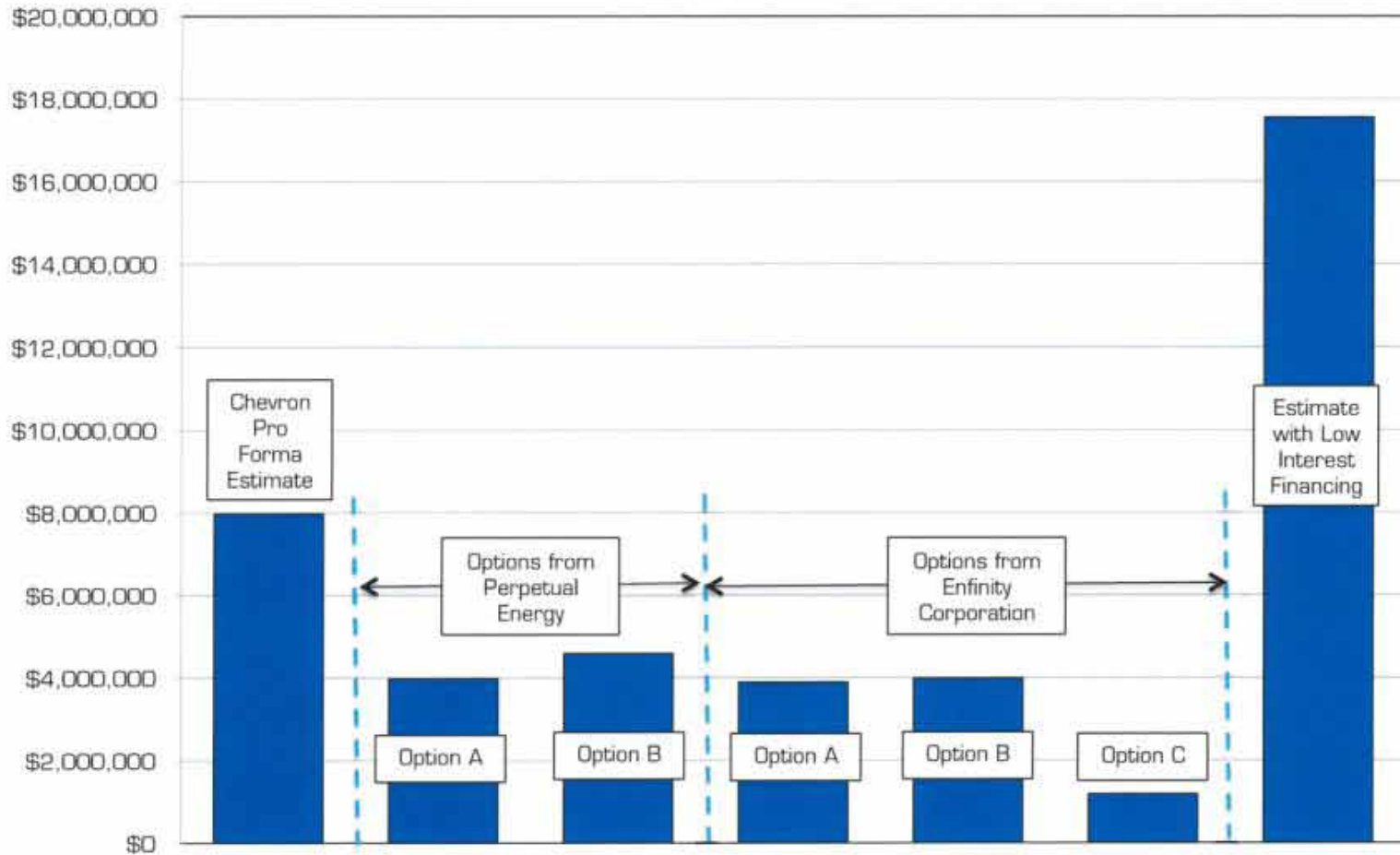
The annual escalation rate “is predetermined for length of PPA contract term”, (15 yrs – 25 yrs.) and ranges from 1% - 4% annually. The average utility escalation rate range, over the last 30 years, for the Investor Owned Utilities in California, (PG&E, SCE, and SDG&E) is 4.5% – 5.5%

System O&M costs are responsibility of 3rd party owner (Investor), for duration of contract

This option is the most risk free of the funding options for the District, however conversely the bulk of the financial benefits of the Solar system go to the 3rd Party Owner (Investor)

NPV Savings

The Responses to the RFP for PPA Services are Estimated to Generate Lower NPV Savings than Originally Estimated, and Much Lower than if the Solar Systems were Purchased with a Low Interest Financing



Note: Net Present Value savings is savings in "today's dollars" assuming a 3% discount rate for inflation and that Southern California Edison electricity costs escalate at 5.50% annually (per Chevron's pro forma).

Summary

- * Create an energy efficient district
- * Buy renewable energy
- * Look for funding – be resourceful

Energy Generation Case Studies



Steve Newsom, AIA, LEED BD+C

LPA

October 17, 2011

Outline

Davis Joint Unified School District

Davis, California

*Solar Photovoltaic (PV) Power Purchase
Agreement (PPA)*

Environmental Nature Center

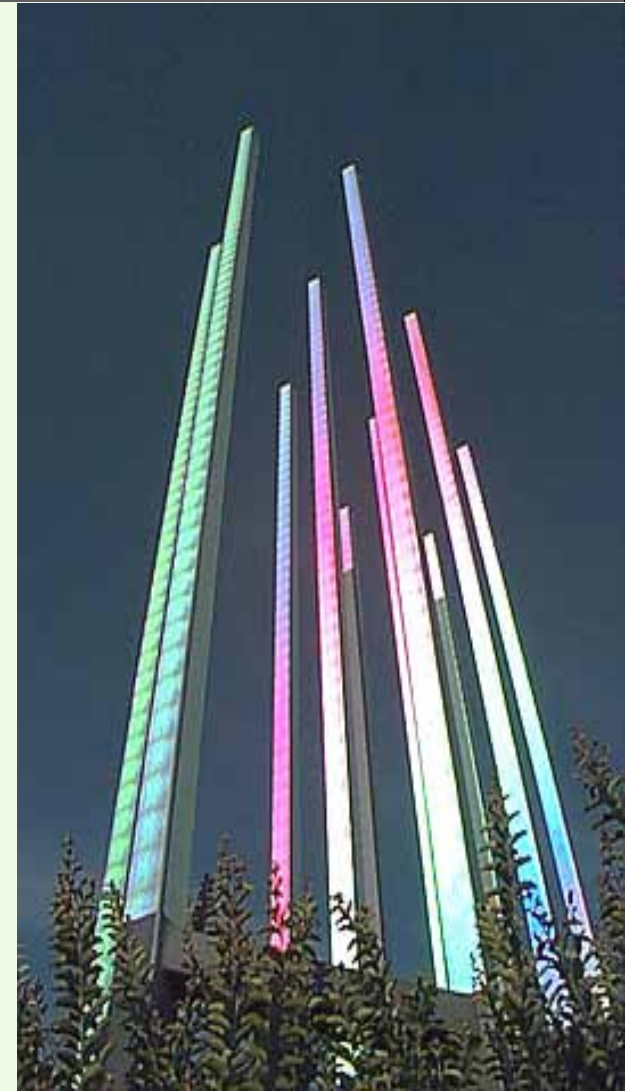
Newport Beach, California

Net Zero Energy Design Approach

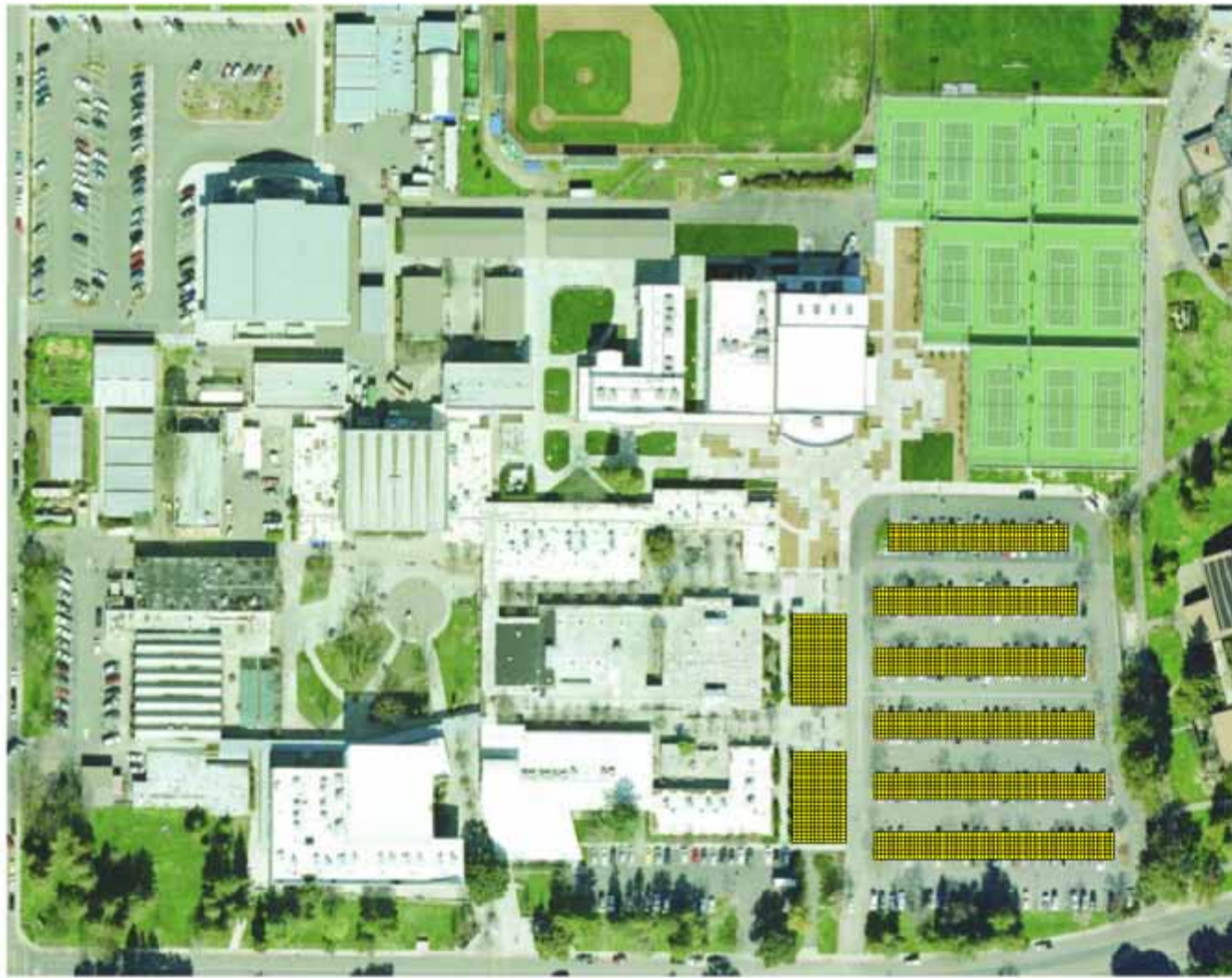


Davis JUSD Background

- *District approached by power purchase agreement (PPA) provider*
- *Long term cost implications of solar PPA unclear*
- *LPA analysis shows that PPA terms are unfavorable vs. business as usual PG&E purchases; recommends competitive bid*
- *LPA develops RFP and contract with DJUSD for PPA*
- *Lifecycle cost analysis used to analyze bids. Selected bid calculated to save 16 times more \$ to DJUSD vs. initial PPA bid*



Davis Senior High School PV Layout



DAVIS SENIOR H.S.
315 W. 14TH STREET
DAVIS, CA

LEGEND



POSSIBLE SOLAR
PANEL LAYOUT
AT ACCEPTABLE
LOCATIONS.
(PROPOSED LAYOUT
MAY DIFFER.)

NOTE: WORK MAY REQUIRE
REMOVAL OF EXISTING PARKING
LOT LIGHTS. NEW WORK SHALL
INCLUDE LIGHTING TO PROVIDE
MIN 1 F.C. OF LIGHT AT PARKING
SURFACE. NO COMPONENT SHALL
EXTEND INTO DRIVE AISLES OR
FIRE LANES.



*Areas for solar providers are defined, leading to more comparable bids.
Annual electrical usage offset with PV ~ 44%*

Harper Middle School PV Layout



**FRANCES ELLEN
WATKINS HARPER
JUNIOR H.S.**
4000 EAST COVELL BOULEVARD
DAVIS, CA

LEGEND

 POSSIBLE SOLAR
PANEL LAYOUT
AT ACCEPTABLE
LOCATIONS.
(PROPOSED LAYOUT
MAY DIFFER.)

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Annual electrical usage offset with PV ~ 67%

Korematsu Elementary School PV Layout



FRED T. KOREMATSU E.S.
3188 LOYOLA DRIVE
DAVIS, CA

LEGEND



POSSIBLE SOLAR
PANEL LAYOUT
AT ACCEPTABLE
LOCATIONS.
(PROPOSED LAYOUT
MAY DIFFER.)

NOTE: WORK MAY REQUIRE
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SURFACE. NO COMPONENT SHALL
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FIRE LANES.



Annual electrical usage offset with PV ~ 71%

CORROSION-RESISTANT
FINISH ON ALL SURFACES



NOTE: GROUND MOUNT MAY
REQUIRE FENCING. NO
VEGETATION WILL BE
ALLOWED WITHIN 5'
OF
STRUCTURE.

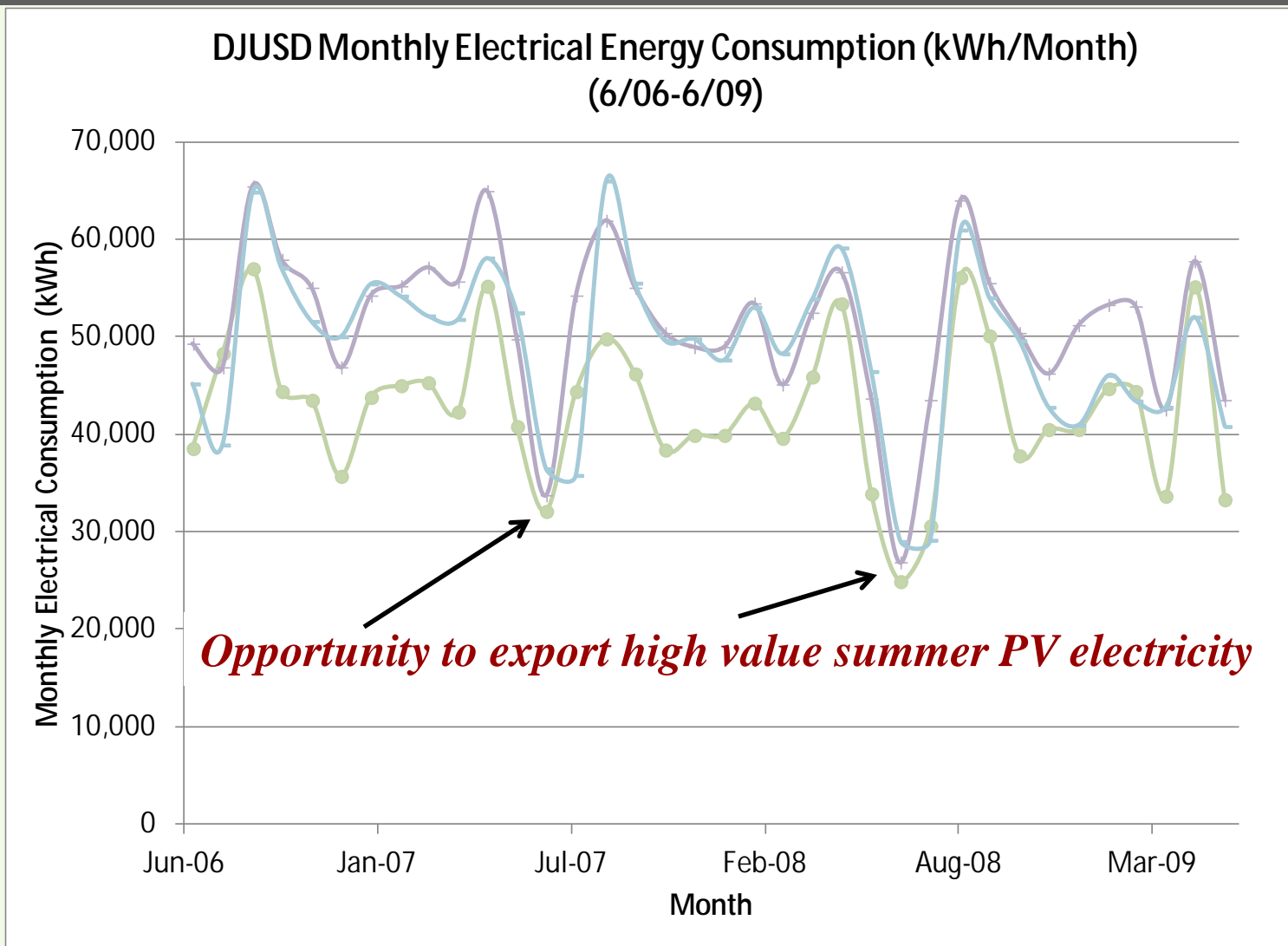
Bid Requirements

EXAMPLE OF NEW LIGHTING



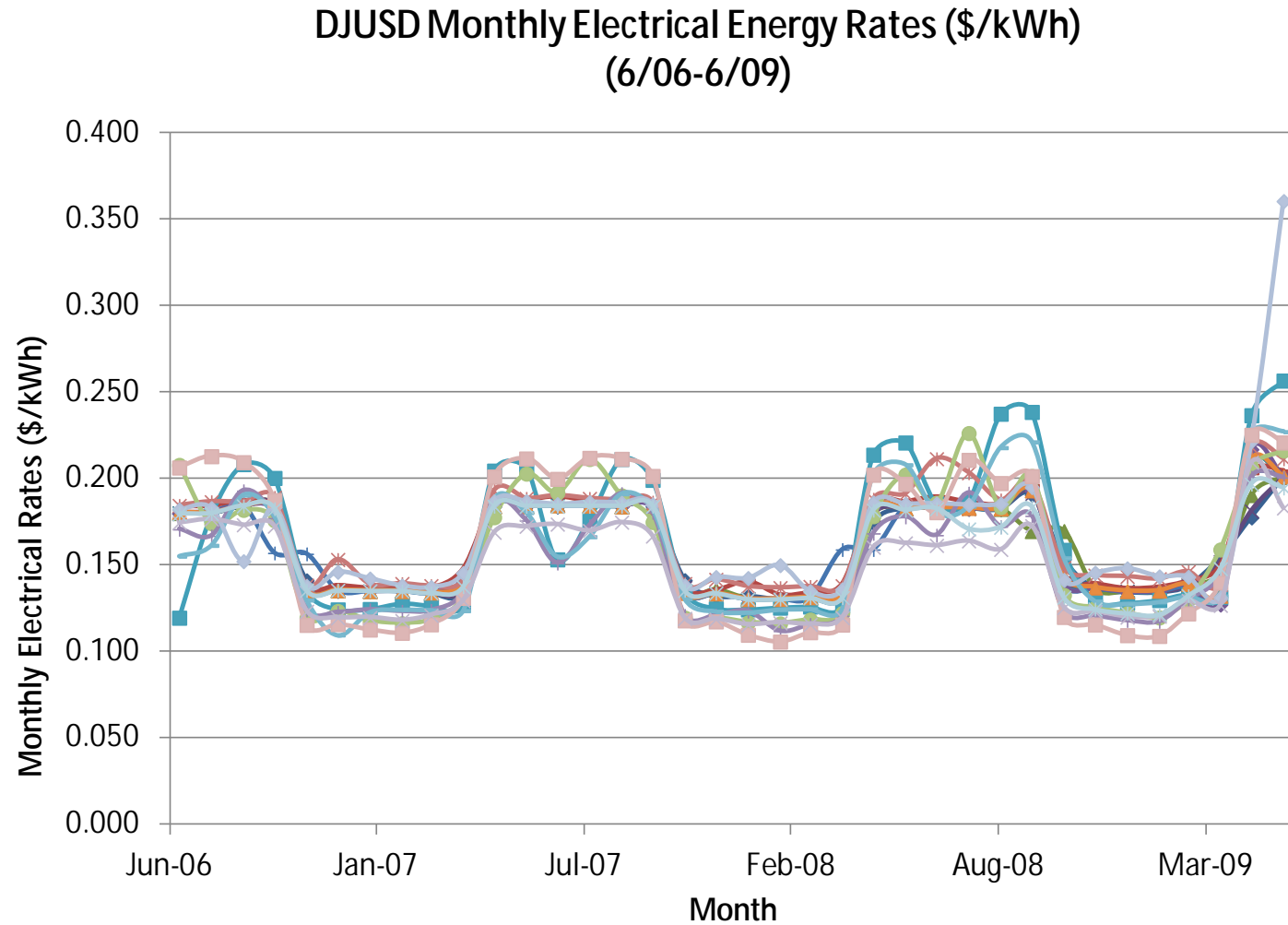
PANEL INSTALLATION
SHALL NOT REDUCE
PARKING OR PROVIDE
COLUMNS ALONG SIDES
OF PARKED CARS.

Historic DJUSD Electricity Consumption



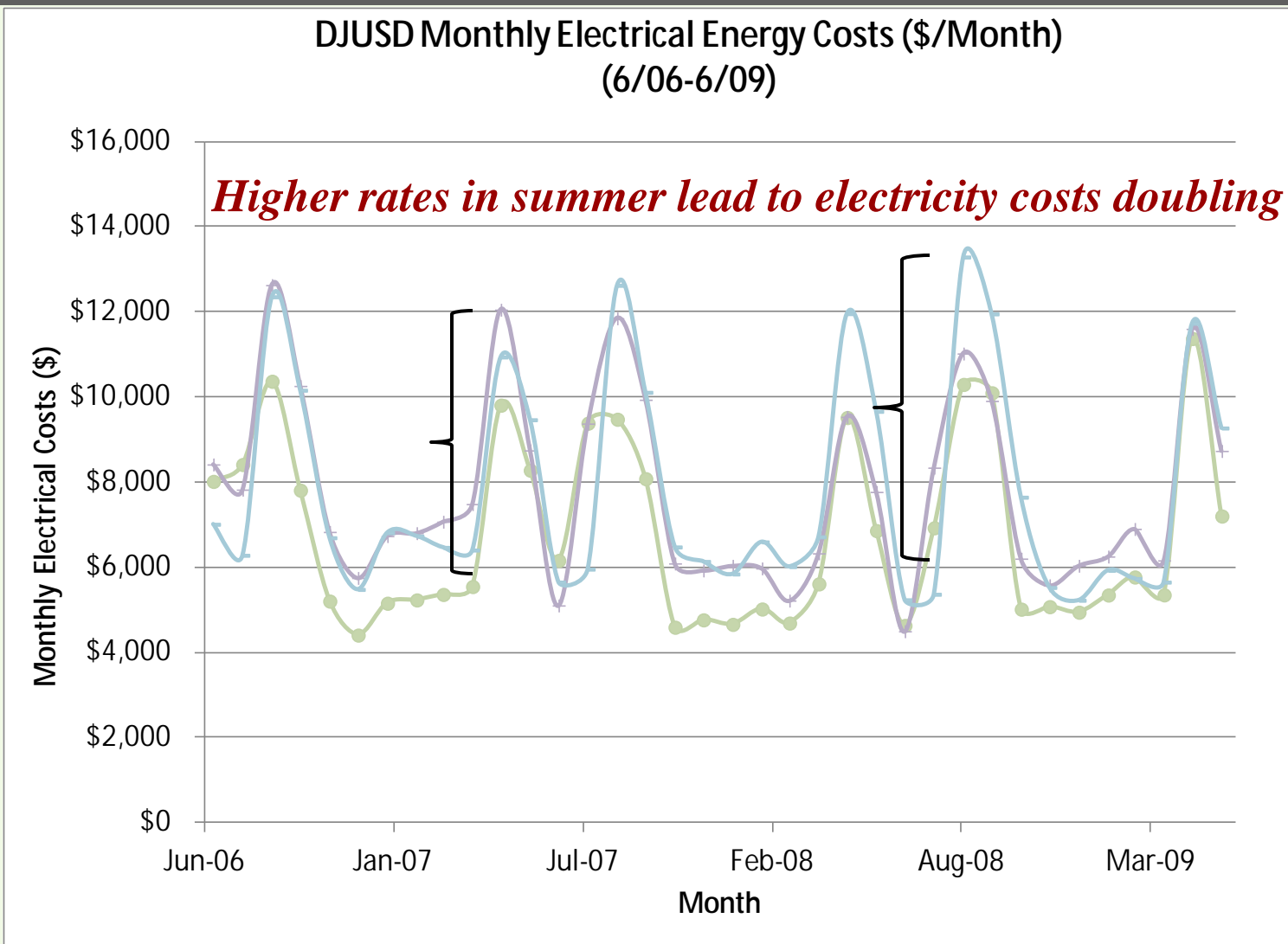
Use dips in some of the summer months, providing a unique opportunity for DJUSD to export power

Historic DJUSD Electricity Rates



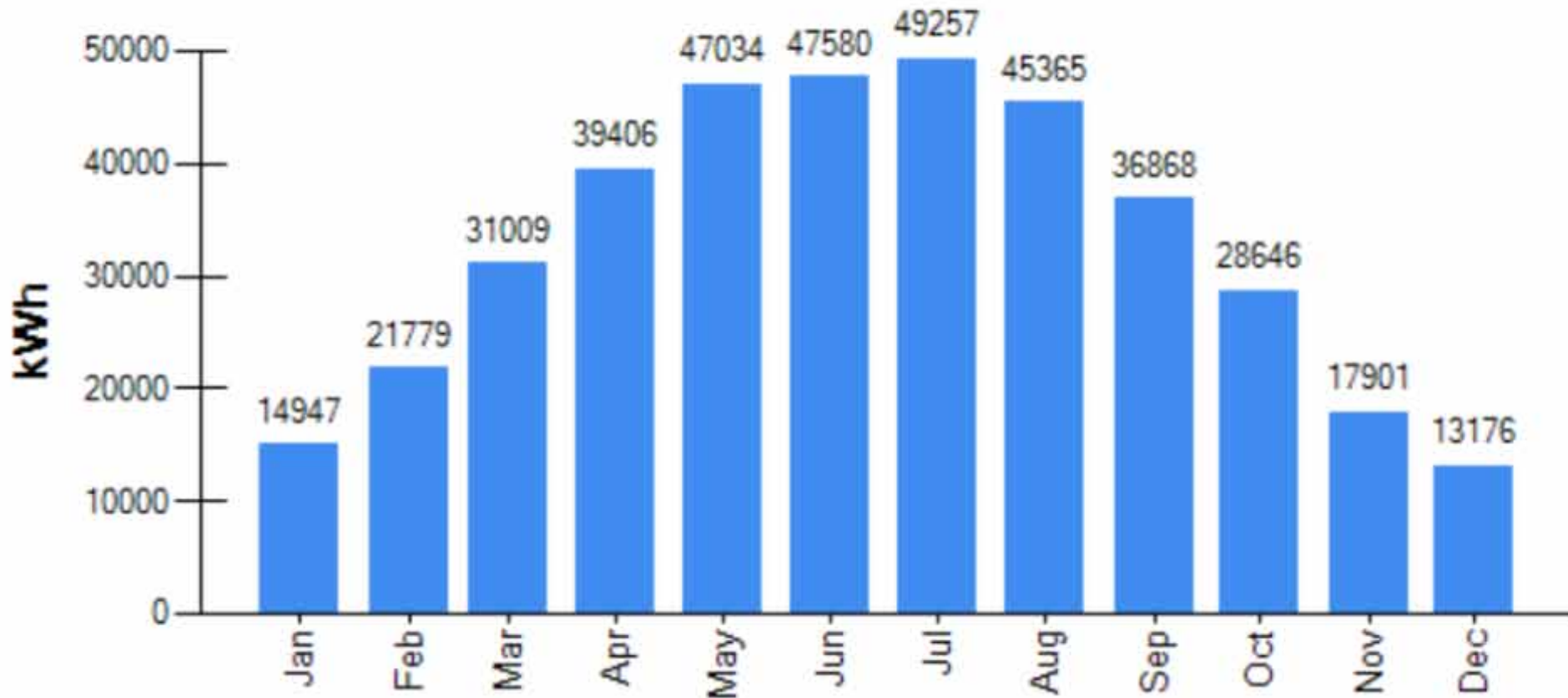
Electricity rates are highest in summer and during midday. Solar PV output is highest during these times, avoiding highest cost electricity

Historic DJUSD Electricity Costs



Higher summer rates can lead to electricity bills double those seen during non-summer months

Solar PV Output by Month



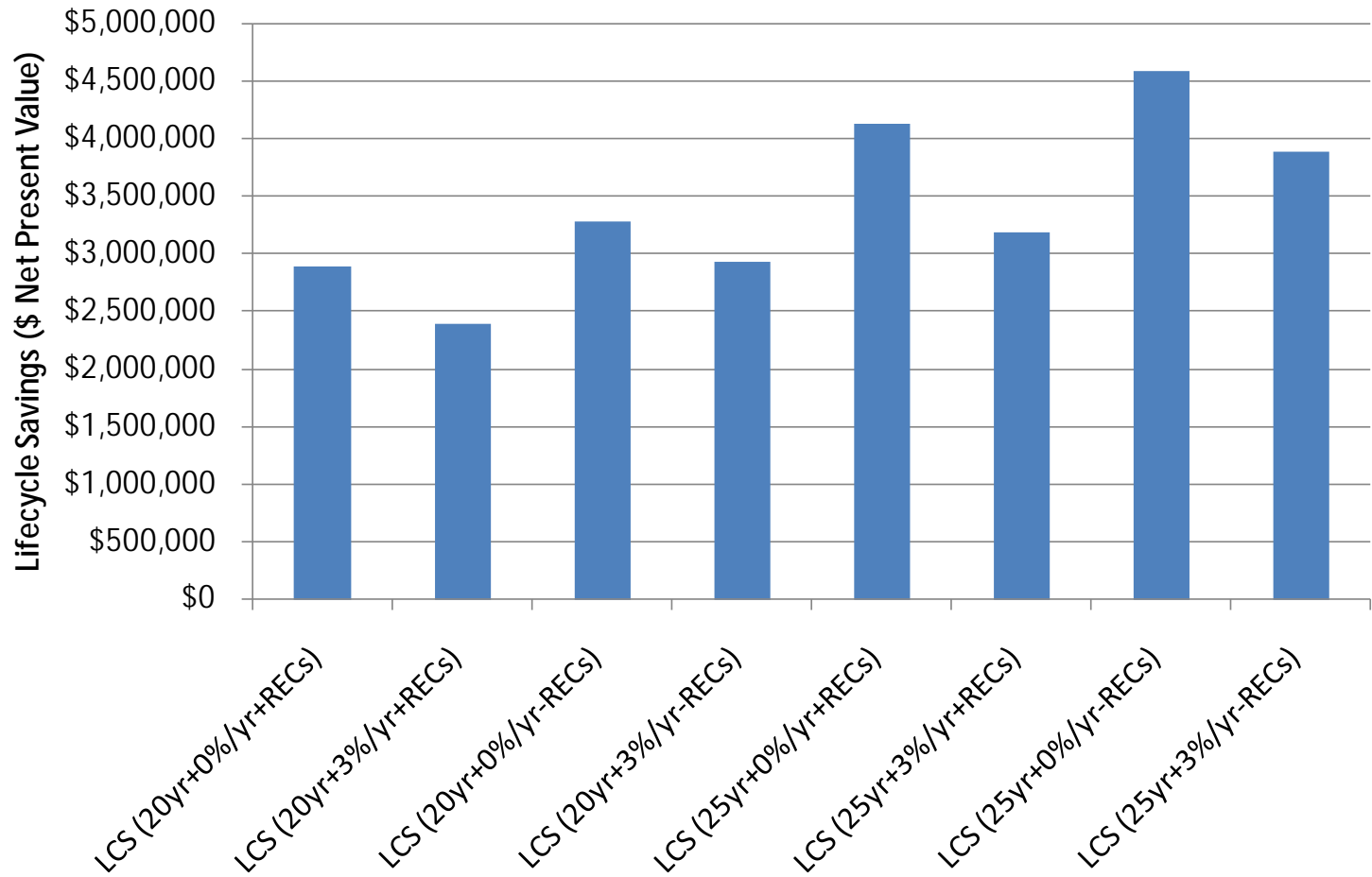
Solar PV output peaks in the summer months, allowing District to effectively sell high and buy low when net-metering

PV Feasibility & PPA RFP Process

- 1. Determine historic electrical meter usage*
- 2. Size PV systems to meet 80% of the usage*
- 3. Determine appropriate system type & locations*
- 4. Fine tune RFP and contract requirements*
- 5. Issue RFP, conduct RFI and site visits*
- 6. Lifecycle analysis of economic and energy performance of bids*
- 7. Short list bidders and interviews*
- 8. Final selection*

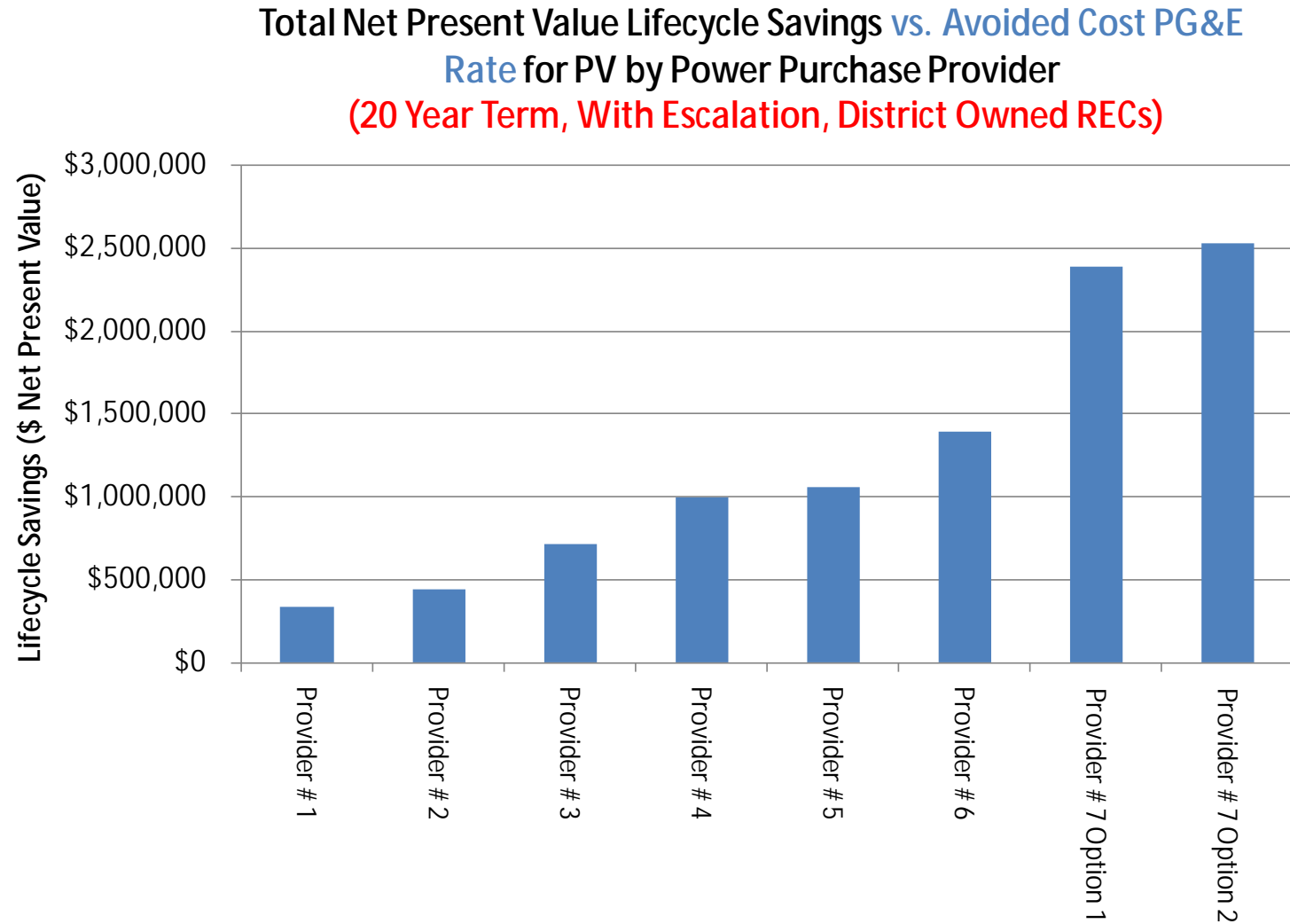
Davis JUSD Lifecycle Savings by Bid Case

Total Net Present Value Lifecycle Savings vs. Avoided Cost PG&E Rate for PV by Provider Contract Conditions



Lifecycle savings for 8 bid options were compared (single provider)

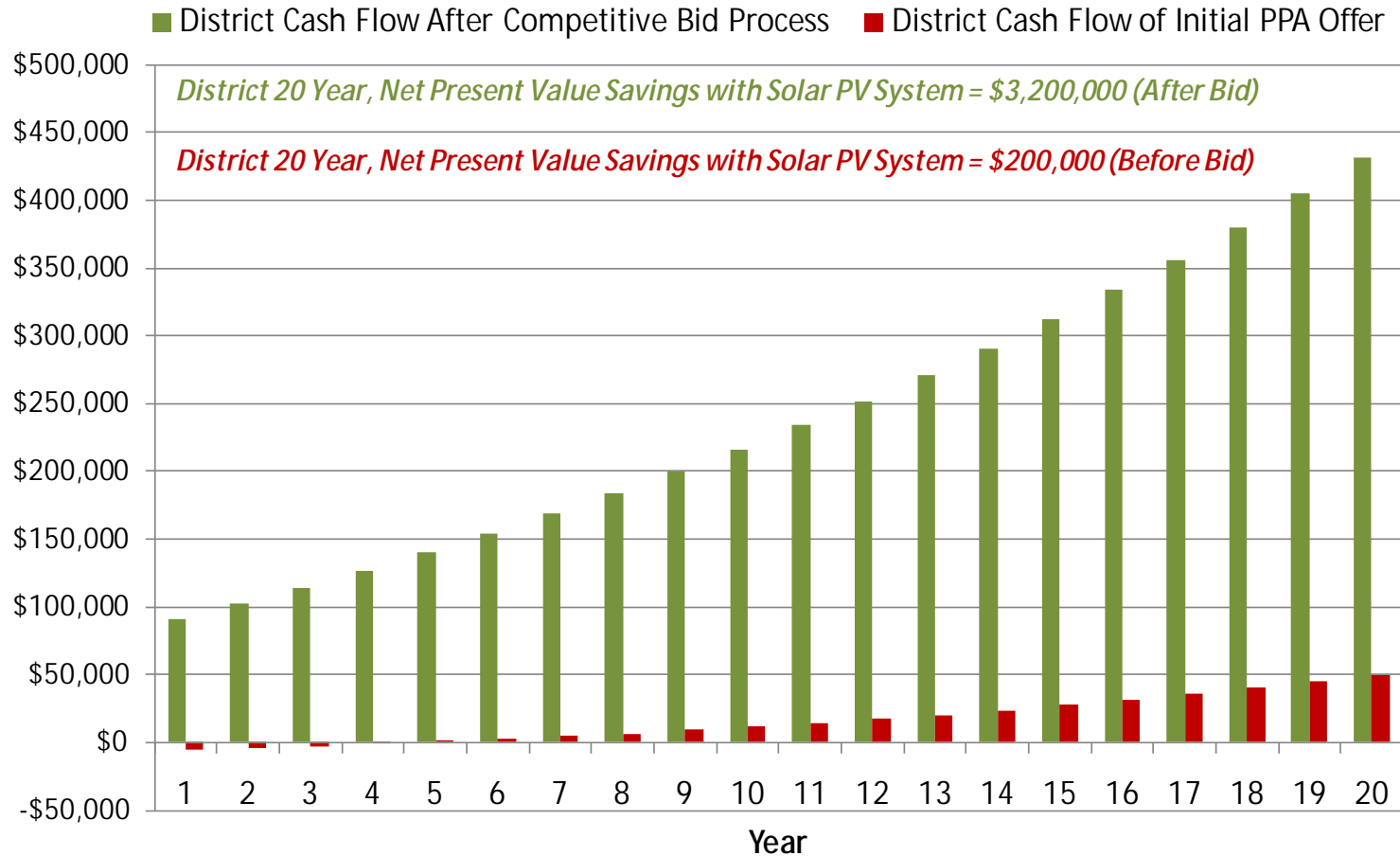
Davis JUSD Lifecycle Savings by Provider



20 year lifecycle savings from each provider were compared for each bid option

Davis JUSD PPA Cash Flow

LPA Analysis of Annual Cash Flow for 20 Year Solar Photovoltaic Power Purchase Agreement vs. Avoided Cost 2009 PG&E rates



The District is expected to save 16 times more \$ after the public bid!

Korematsu Elementary School



119 kW carport PV array at DJUSD

Harper Middle School



233 kW ground mount PV array at DJUSD

Environmental Nature Center-Background

- *10,000 SF educational nature center in Newport Beach, Ca.*
- *LEED Platinum design-built in 2008*
- *Optimized energy efficient design first, followed by inclusion of solar PV (direct purchase)*
- *LPA has documented that the building has achieved net zero energy use for every year of operation*



Environmental Nature Center-Site Plan





Architecture

building location

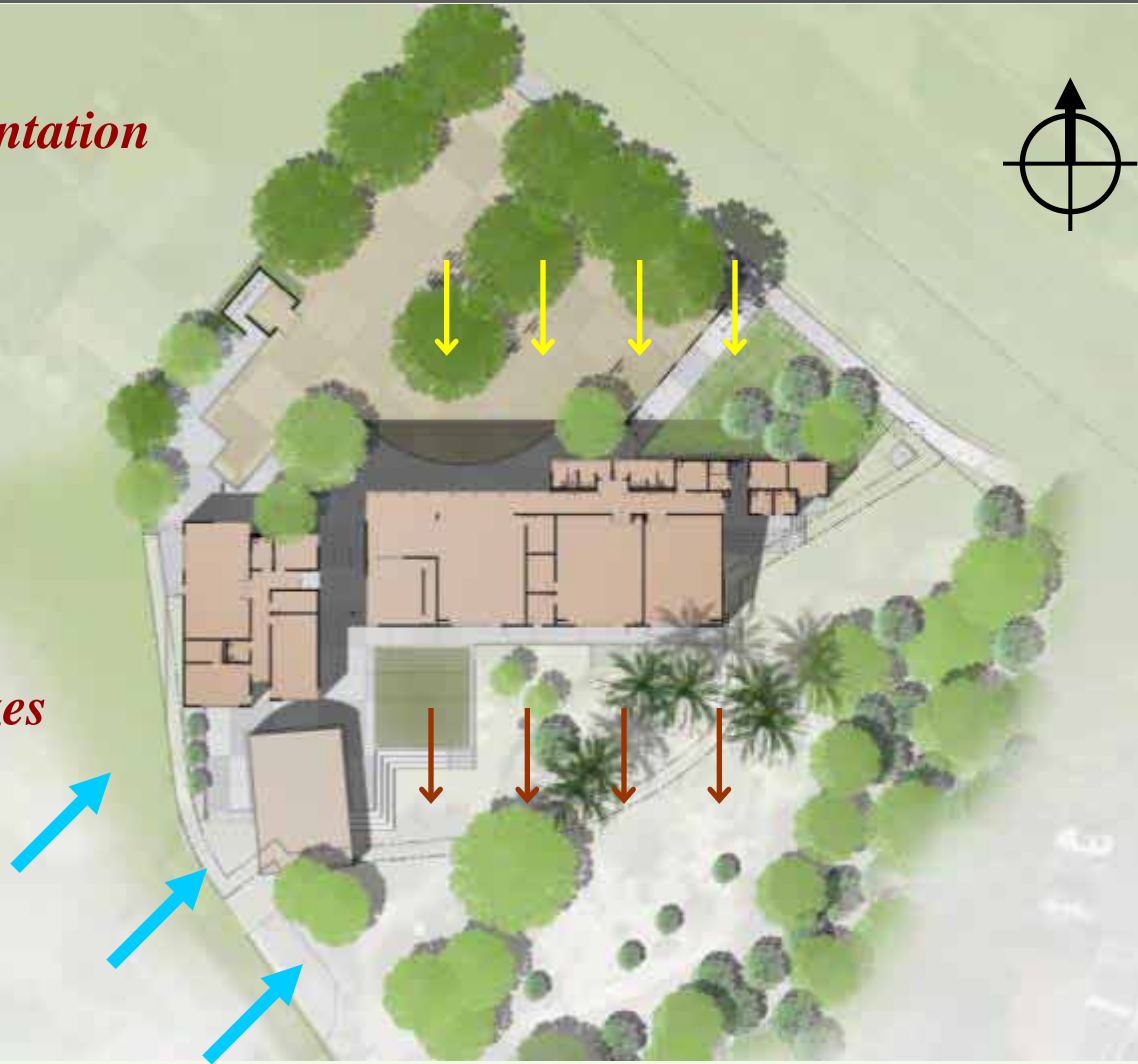
1 *Optimized building orientation*

2 *Optimized north light*

3 *Optimized views*

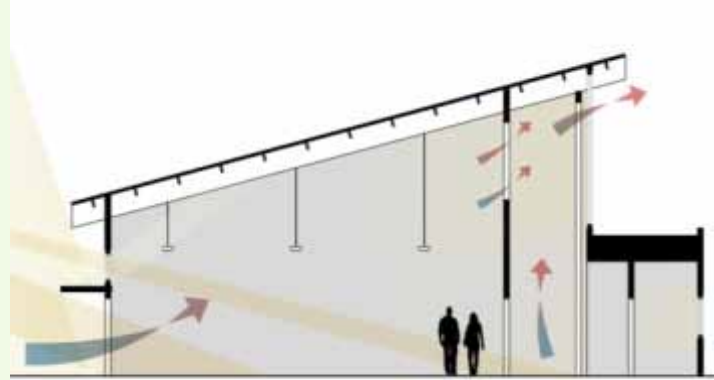
4 *Optimized natural breezes*

5 *Optimized open space*



Energy Efficiency Strategies

- *Optimized building solar orientation and tilt angle of roof to maximize utility cost offset with solar PV*
- *Natural ventilation, thermal mass and high insulation allowed for elimination of HVAC system (no gas connection)*
- *North daylighting allowed for low lighting power density*
- *Solar PV system meets all lighting and plug loads on an annual basis-making the facility net zero*
- *Energy costs = \$240/yr vs. \$22,060/yr for average Ca. building of same size and type*



ENC Finished Product



Conclusions

- *The U.S. Dept. of Energy estimates that “Over the life of a school building, the cost of O&M is 10 times the cost of construction”*
- *Efficient design and operation usually allows the greatest cost savings opportunity to Districts, without impacting educational quality*
- *Renewable energy systems can also provide positive cash flow*
- *There are various ways to procure and various locations to install renewable power systems to create a successful energy project*



*Thank
You*



Anna Ferrera

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Why School Involvement in Energy Policy is Important

- * Policymakers do not always think of schools when developing energy proposals
- * Federal Recovery Act Dollars Went to CEC and Directly to Municipalities
- * State Public Goods Charge: New Discussion at CPUC
- * State and Federal Legislation



2011 Federal Proposals for School Construction

- * The American Jobs Bill – President Obama’s Proposal

H.R. 12 (Larson) and S 1549 (Reid) Renovated facilities, science labs, and internet ready classrooms. \$25 billion for K-12 and \$5 billion for community colleges to create jobs and renovate at least 35,000 classrooms.

- * Qualified School Construction (QSCB) & Qualified Zone Academy Bonds (QZAB)

H.R. 2394 (Rangel) and S. 796 (Rockefeller) will extend the Qualified School Construction Bond (QSCB) and Qualified Zone Academy Bond (QZAB) programs that give school districts bonding authority to build and modernize schools.

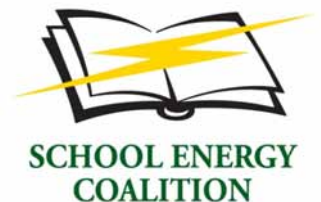
2011 Federal Proposals for School Construction

* Emergency Jobs to Restore the American Dream Act

H.R. 2914 (Shakowsky) Includes School Improvement Corps to create 400,000 construction and 250,000 maintenance jobs by funding positions created by public school districts to do needed school rehabilitation improvements.

* Fix America's Schools Today (FAST!)

H.R. 2948 (De Lauro) and S. 1597 (Brown) A \$50 billion school renovation program that would employ 500,000 workers. The money could be disbursed through existing federal formulas to all 16,000 public school districts.



State Legislation Related to Energy and Schools

Signed into Law by Governor Brown

- * SB 585 (Kehoe) - to restore funding for the California Solar Initiative (CSI) Rebate Program, including school district projects. Authorizes a budget increase of for the CSI, for installation of 3,000 megawatts of rooftop solar by 2016.
- * AB 1150 (M Perez) - Extends the Self-Generation Incentive Program, which provides rebates for wind, fuel cells and other technologies that can generate electricity on-site where the electricity will be consumed through 12/31/14.

Opposed By School Energy Coalition (SEC)

- * SB 136 (Yee) defines private power purchase agreement contracts between schools and energy companies as public projects subject to prevailing wage.



Other State Bills of Interest: Energy and Schools

Signed into Law by Governor Brown

* SB 226 (Simitian) CEQA Requirements for Solar Energy Projects

This bill would, among other things, exempt from the requirements of CEQA the installation of a solar energy system, including associated equipment, on the roof of an existing building or an existing parking lot meeting specified conditions.

* SB 679 (Pavley) Reallocation of Energy Conservation Assistance Funds

This bill would make an appropriation \$25 million to the Energy Conservation Assistance Account to provide loans to eligible institutions, including schools.

* AB 462 (Lowenthal): Natural Gas Infrastructure and Vehicles by School Districts

Authorizes air pollution control districts to use the last \$2 of an already authorized fee to fund programs to replace onboard natural gas tanks on school buses owned by a school district that are 14 years or older.

QUESTIONS?

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**SCHOOL ENERGY
COALITION**