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CALIFORNIA'S  
COALITION  
for ADEQUATE  
SCHOOL HOUSING

## Paying for Your Green School

### **Green California School Summit**

Wednesday, December 9, 2009

9:00 am – 11:30 am

Pasadena, CA

## WELCOME AND INTRODUCTIONS

- **Tom Duffy**  
*C.A.S.H., Legislative Director*
- **Bill Orr, Executive Director**  
*Collaborative for High Performance Schools (CHPS)*
- **Steve Newsom**  
*LPA, Inc., C.A.S.H. Board Member*
- **Frazer Thompson**  
*Pasadena Unified School District*

## Genesis of the High Performing School Building Concept and How it is Funded Under the State Program

- **1999 California Energy Commission**
  - *PG&E*
  - *Semper Energy*
  - *Southern California Edison*

*CEC question: How to improve energy performance of California Schools?*
- **Collaborative for High Performing Schools (CHPS) was born.**

## Funding and Approval Process

**California School Funding and Approval Process**

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graph TD
    SD[School District] --> CDE[CDE]
    CDE --> DSA[DSA]
    DSA --> OPSC[OPSC]
    OPSC --> SAB[SAB]
  
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<div style="border: 1px solid black; background-color: #e0f2f1; padding: 5px; width: fit-content; margin-bottom: 5px;">School District</div> <div style="text-align: center; margin-bottom: 5px;">↓</div> <div style="border: 1px solid black; background-color: #e0f2f1; padding: 5px; width: fit-content; margin-bottom: 5px;">CDE</div> <div style="text-align: center; margin-bottom: 5px;">↓</div> <div style="border: 1px solid black; background-color: #e0f2f1; padding: 5px; width: fit-content; margin-bottom: 5px;">DSA</div> <div style="text-align: center; margin-bottom: 5px;">↓</div> <div style="border: 1px solid black; background-color: #e0f2f1; padding: 5px; width: fit-content; margin-bottom: 5px;">OPSC</div> <div style="text-align: center; margin-bottom: 5px;">↓</div> <div style="border: 1px solid black; background-color: #e0f2f1; padding: 5px; width: fit-content;">SAB</div>	<p>Districts originate construction process hire architects and provide local matching funds</p> <p>California Department of Education (CDE) verifies minimum education specifications and coordinates with DTSC on site approval</p> <p>Division of the State Architect (DSA) approves school plans verifies plans meet all applicable codes. DSA is the building department for schools.</p> <p>The Office of Public School Construction (OPSC) recommends specific funding to SAB.</p> <p>The State Allocation Board (SAB) apportions the state matching share of funding.</p>
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Volume I - Planning

## To Qualify for Funding DSA Reviews High Performance Criteria

- District submits complete set of plans to the DSA Regional Office in San Diego, Sacramento or Oakland for approval of Structural, Fire Life Safety & Access Compliance with a warrant to pay fees.
- Districts submit a 2<sup>nd</sup> set of complete plans to DSA headquarters in Sacramento with an additional fee to pay for the high performance review.
- Each set of plans is checked by the respective office and sent to district architect for corrections.
- Corrected plans are back checked again by each office.

## Funding and Approval Process

<b>2006 CHPS Criteria Edition</b>				
	New Schools		Major Modernizations & New Buildings on Existing Campuses	
	CHPS	Proposition 1D	CHPS	Proposition 1D
<b>Minimum Points for Participation</b>	<b>32</b>	<b>27</b>	<b>25</b>	<b>20</b>
<b>Prerequisites</b>	All prerequisites required	Prerequisite S86.0: Schools as Learning Tools is not required.	Prerequisites required based on the scope of the project (see 2006 CHPS Criteria Page V).	Prerequisite S86.0: Schools as a Learning Tool is not required. Prerequisites required based on the scope of the project (see 2006 CHPS Criteria Page V).
<b>Additional Requirements for New Schools, Major Modernizations, &amp; New Buildings on Existing Campuses</b>				
	<b>CHPS</b>		<b>Proposition 1D</b>	
<b>Energy Category</b>	A minimum of 2 points must be obtained from the Energy Category.		A minimum of 4 points must be obtained from either exceeding minimum energy efficiency requirements (EE-1.0) or providing renewable energy (RE-1.1). Additional points are offered for providing renewable energy (RE-1.1). 1 point is allowed for each 5% of a site's power coming from onsite renewable sources. Earn credit up to 30%, for a maximum of 7 possible points. (CHPS only gives credit up to 15%)	
<b>Policy &amp; Operations Category</b>	A maximum of 4 points can be used from the Policy & Operations Category to reach the minimum points for participation.		Cannot claim credits.	
<b>Sites Category</b>			Can not claim credit for using the school as a teaching tool S86.0 & S86.1.	

## State Energy Program (SEP) C.A.S.H. Proposal

- The Coalition for Adequate School Housing (C.A.S.H.) is part of a team proposal to the California Energy Commission (CEC) seeking funding for “targeted” energy efficiency projects for K-12 schools statewide under Federal Funds.

## Background

- The U.S. Department of Energy has allocated \$226 million to the California Energy Commission (CEC) in American Recovery and Reinvestment Act (ARRA) funding for the State Energy Program (SEP). Of this amount, up to \$95 million has been made available for energy efficiency projects.
- The ARRA allows the Energy Commission to use these SEP funds for energy efficiency, energy conservation, renewable energy, and other energy-related projects and activities authorized by ARRA.

## Funding & Types of Technologies/Projects

- Our proposal requests \$20 million in ARRA funds and may provide \$20 million in leveraged funds for a total of \$40 million available to the program.
- An LEA that has a project in one of the categories identified for these funds may be eligible to have that project paid for with CEC SEP funding.
- If our team is awarded funding under the program, C.A.S.H. hopes to assist Local Education Agencies (LEAs) by providing workshops, training and outreach for school projects that meet the SEP criteria.
- C.A.S.H. will assist schools that receive funds to help showcase these technologies and efficiency benefits within their communities.

## Types of Technologies/Projects (cont'd)

- Lighting Controls
- High-Efficiency Lighting
- HVAC Controls
- Adjustable Speed Drives
  - Pool pumps or chillers
- Personal Computer Network
  - Software and controls

## Anticipating a NEW Energy Related Funding Source

- Bid Award Date: February 11, 2010
- For more information please contact
  - Anna Ferrera: [aferrera@m-w-h.com](mailto:aferrera@m-w-h.com)
  - Greg Golik: [ggolik@m-w-h.com](mailto:ggolik@m-w-h.com)

## California Department of Education



School Facilities Planning Division  
CDE School Construction Regulations and Resources -  
Assisting Districts with Building Greener Schools

## Site Selection Guidelines

### **These guidelines can encourage:**

- Non-motor access – Located close to residential areas, avoids long-distance bussing, offers access and travel routes for pedestrians and bicyclists, avoids traffic and other hazards that can create dangerous situation for walking and biking students.
- Selection of sites that avoids significant environmental hazards that require expensive and/or significant mitigation, such as slopes that require massive grading or retaining walls, or powerlines that require setbacks resulting large unusable areas of land.

## Site Selection Guidelines – cont'd

- Proper alignment of building(s) to maximize day-lighting, natural ventilation and solar panels. Located away from noise and air hazards so the windows can be open to reduce cooling costs
- Joint Use Facilities – Districts and communities sharing parks, parking lots, gymnasiums, theaters, and other community facilities to reduce the amount of land required for development.
- Creative site design on smaller school sites in accordance with the Small School Site Policy - Schools can consider multi-story buildings, joint use facilities, parking structures, and rooftop play areas that require less land.

## Master Planning

### **A district can:**

- Plan for future expansion of school sites without substantial alterations to existing structures or playgrounds.
- Evaluate whether the district should re-use existing sites and buildings rather than tearing down existing buildings and re-building on the same site, or developing on new sites.

## Educational Specifications

### **The Educational Specification process can allow districts to:**

- Determine the district's actual educational needs and build appropriately.
- Design spaces for flexibility that are easily alterable in size and shape at a reasonable cost to meet changing educational needs so future demolition and rebuilding may be avoided.
- Incorporate design and construction features that reduce maintenance costs and encourage use of durable materials.
- Incorporate the study and use of natural site features, such as preserve areas and creeks, into the educational program.

## Construction of New Schools, Classroom Additions to Existing Schools, and Modernization Reviews

Districts can:

- Place new buildings on a campus in a manner that preserves open space and play area.
- Provide installation of energy management systems
- School facilities as an educational tool
- Provide low maintenance and low water use landscaping.
- Provide adequate area for parking, and for busses and parents to drop-off and pick up students, in order to avoid traffic congestion and idling vehicles.

## **Other Programs that CDE can provide information about:**

- Integrated Pest Management (IPM) practices for pest reduction – These practices include good design decisions (holding landscaping back away from buildings and proper construction detailing to avoid pest intrusion, designing covered areas so that birds cannot roost, as two examples) as well as use of less toxic alternatives to eliminate pests (traps rather than poisons, or student/staff behavior modification – no food in the classrooms – to avoid pests).
- Safe Routes to School programs – These state and federal programs provide funding and guidance on creating schools that provide safe walking routes for students.

## Resources

- [Healthy Children Ready to Learn: Facilities Best Practices](#) (PDF; 4.68MB; 66pp.)  
This publication brings together practical and successful ideas and solutions that schools throughout the state are implementing to support the goal of healthy children. *Healthy Children Ready to Learn: Facilities Best Practices* is a shining example of the collective effort required in the battle against childhood obesity, poor nutrition, and lack of exercise in our society.

## Resources – Cont'd

- [Guide to School Site Analysis and Development](#) (PDF; 259KB; 56pp.)  
This document updates site size standards to reflect changes in education, such as class size reduction, implementation of Title IX gender equity, technology, and parental and community involvement. This 2000 edition replaces the 1966/1987 edition. The 1966/1987 edition is retained only to comply with Government Code Section 65995.5(h), which requires the 1966/1987 edition to be used in the calculation of developer fees.

## Resources – Cont'd

- [School Site Selection and Approval Guide, 2000](#)  
This document assists school districts in selecting sites that provide a safe and supportive environment for the instructional program and the learning process. It outlines the selection criteria for gaining California Department of Education approval, a condition for receiving state funds.

## Resources – Cont'd

- [Educational Specifications: Linking Design of School Facilities to Educational Program](#) (PDF; 184MB; 120pp.)  
This document is designed to help school districts develop specifications based on a fundamental principle of modern architecture; that is, form follows function. The document includes a definition of specifications, suggested procedures, and a model format.

## Resources – Cont'd

- [Indoor Air Quality, A Guide for Educators, 1995](#)  
A brief description of school facility concerns about indoor air quality. It is a simplified discussion of problems that can affect the health of both staff and students and includes a list of management procedures that can be used to help mitigate problems of unclean air.

## An Architect's Perspective

### What Should Districts Expect?

- Going Green Does Not Have to Cost More
- Take the Opportunity to Update Masterplans, District Standards & Educational Specifications
- Products & Systems Are Readily Available & Durable
- The Community Will Support Your Efforts
- You May Get Support from Unlikely Sources
- You May Use More Electricity at a New "Green" School than at an Existing School
- It's One of the Best Impacts on Operating Costs You Can Make

## An Architect's Perspective

### Do

- Adopt a Resolution
- Seek Out an Experienced Team & Establish a Baseline of Energy Use
- Review Your Goals with Maintenance Staff & District Standards
- Always Start with Low-Hanging Fruit
- Remember Equipment and Facility Use Habits

### Don't

- Treat Sustainability as a Component or Scorecard
- Be Afraid to Question Design Team
- Be Afraid to Question Maintenance Staff
- Seek Highly Technical Solutions/Promises
- Undo Your Gains with Old Equipment & Habits

## An Architect's Perspective



### ***What's Available to Districts?***

Database of State Incentives for Renewables & Efficiency

<http://www.dsireusa.org/index.cfm?EE=1&RE=1>

DSA High Performance Incentive Grant

<http://www.dsa.dgs.ca.gov/OtherProg/hps.htm>

Bright Schools Program

<http://www.energy.ca.gov/efficiency/brightschoools/index.html>

Federal Stimulus Funds for Education Projects

<http://www.edfacilities.org/school-modernization/>

Savings By Design

<http://www.savingsbydesign.com/>

## An Architect's Perspective

### ***Lake Tahoe Unified School District***

#### **South Tahoe High School Green Career Academy**

- Curriculum-Driven:  
Green Construction & Green  
Transportation Academies
- CHPS Designed
- CTE Funded
- Local Economic & Ecological  
Focus: Construction Teams  
and Community Needs



## An Architect's Perspective

### ***Lake Tahoe Unified School District***

#### **South Tahoe High School New Classroom Building**

- CHPS Designed
- Overcrowded Relief Grant  
Funded
- HPS Grant Funding
- Removed Aging Portables  
From the Site
- Includes Environmental  
Lab with Demonstration  
BIPV Panel



## An Architect's Perspective

### ***City of Davis with DJUSD***

#### **Development Impact Plan**

- Mitigation of New Residential Development through Energy Efficiency Upgrades at DJUSD Schools
- School Improvements with Highest Return on Investment Coupled with Energy Efficiency Upgrades to New Housing Units Above City Standards
- Preliminary Estimated Reduction Goal of 1,250,000 kWh/yr from DJUSD Facilities
- Efficiency Upgrades + Self-Generation



## An Architect's Perspective

### ***L.A. Community College District***

#### **Grid Neutral Plan**

- 9 Megawatt System Providing All Daytime Electricity at All Campuses
- Largest Public Sector Sustainable Effort in the U.S.
- Power Purchase Agreement
- Sustainable Development Curriculum



## Paying for Your Green School – The Commitment

Frazer G. Thompson, P.E. LEED ap  
Owners Representative  
Pasadena Unified School District

## The Commitment

*By making a commitment to high-performance schools, many school districts are discovering that smart energy choices can have lasting benefits for their students, their communities, and the environment.*

## The Commitment

- Understanding “Green”
- Does my school have to be LEED or CHP’s Certified to be “Green”?
- Do need to ask yourself these very important questions...

## The Commitment

- Why am I undertaking this task?
- What are my project goals?
- What is my projected overall system status?
  - Bishop & Babcock blowers from the 1950’s on a building that just underwent a \$1MM exterior facelift and is now 90% glass!
- What is my budget?
- Are there local incentives/rebates/partnerships?
- Who is my team?

## The Commitment

- PUSD Bond Measure “TT”
- Community expressed strong desire to make their District Energy and Environmentally Responsible
- Acknowledged and accepted by the School Board
- Adoption of Resolution

## The Commitment

- Commitment to sustainability and environmental responsibility by the community at large
- Commitment to save energy by the Superintendent of Schools and the PUSD Board (and the Chief of Facilities and the team)
- Committed Partners within the District, within the City, and within the Community

## The Commitment

- Identify the Scope of Projects incorporated in the Master Plan and potential opportunities
  - New Construction
  - Major Renovation
  - Building Retrofits
  - Lighting and HVAC Upgrades
  - Renewable Technologies
  - Identified ECM's (including water)

## The Commitment

- Is there a vehicle that can guide us on the “sustainability road”?
- Do we need one?
  - CHP's
  - LEED Accreditation

## The Commitment

### Pros:

- Enhanced work environment
- \$'s saved through reduced energy usage
- Increased awareness through education
- Improved Comfort & Function
- Modernized Infrastructure

## The Commitment

### Cons:

- Technology alone is not enough
- Maintain Certification (more man hours)
- Potential of added cost (upfront Capital)
- Undefined ROI
- Arduous administrative process

## The Commitment

Category	Certified (points)	Silver (points)	Add'l Suggested Credit	EB M&O (Certified) Ongoing Commitment in ANNUAL Man-hours	EB M&O (Silver)
Site Sustainability	6	7	Heat Island / Roof	54	62
Water Efficiency	2	3	Add'l 10% reduction in water use (to 30%)	32	40
Energy & Atmosphere	6	8	21%/14% Energy Performance Measurement Verification	106 80	108 80
Materials & Resources	3	5	75% Construction Waste Diverted (from 50%) Use of Certified Wood	8	12
Indoor Air Quality	13	14	Daylight 75% of spaces	88	90
Innovation & Design Process	2	3	School as a Teaching Tool	ongoing	ongoing **
	32	40		368	392

Estimate of man hours required to maintain certification on-going

## The Commitment



Sustainable Sites	24 pts
Water Efficiency	11 pts
<b>Energy &amp; Atmosphere</b>	<b>33 pts</b>
Materials & Resources	13 pts
Indoor Environmental Quality	19 pts
Innovation & Design	6 pts
Regional Priority Credits	4 pts

## Commitment – A Few Facts

- A high performance school does not have to cost more than a conventionally built school
- Schools should serve and reflect the community's values
- A school can control and lower energy costs without affecting the educational mission

## Commitment – Our Projects

- ECM's – The "Low Hanging Fruit" – Committed investment on HVAC and Lighting upgrades and retrofits over two "summers"
- Two LEED Silver Middle Schools; Sierra Madre Upper Campus and Blair IB Magnet Middle School
- Evaluation of a LEED Certified School Addition at Cleveland Elementary School

## Commitment – Our Projects

- Funding through Measure “TT”
- Currently working closely with PWP, CalTech, & EMCOR/MESA on a matching funds CDE Federal Stimulus Grant Application

## Rebate Projection for Commissioning of Existing Schools and Financial Rewards

(7 Schools – all in projections. PHASE I

PUSD – Mechanical Commissioning Only

Retro / Re-Commissioning	\$460,000
Energy Saved (kWh)	500,000 kWh
Energy Saved (\$)	\$75,000
Rebate Amount	\$77,000
Simple Payback	5.1 years
ROI	~20%

## Projected kWh Savings – PHASE I – 15 Campuses

(x 1,000,000 kWh)

• Commissioning	0.50
• Lighting ECM's	2.62
• Mechanical ECM's	1.11
TOTAL	4.23 (\$635K)

## Commitment - Opportunities



## Commitment - Opportunities



## Commitment - Opportunities



## Commitment - Opportunities



## Commitment - Opportunities

- The SOLAR Myth – or Not~?!
- Partners in the Project



## Commitment - Opportunities

- Different Districts approach sustainability in different ways:
  - Pendergrass/Sedona, AZ – lots of land for SOLAR opportunities and relationships
  - Phoenix, AZ – many historical buildings as does Pasadena, combined technologies
  - Clark, NV – fast growing, committed to energy savings, no SOLAR, extremely efficient

## Commitment – What Can You Do Right Now?

- Visual Inspection of existing equipment
- Maintenance of Existing Systems
  - Incorporation of repairs into existing routine
  - Preventative Maintenance planning
- Commissioning – on-going
- Identify your partners and key stakeholders in the process and how you may plan together going forward

## Commitment – What Can You Do In the Future?

*“A technology MUST produce at the meter what it says it can do on paper.”*

*“Don’t be afraid to ask your design team for something that at first, sounds totally unreasonable.”*

## Commitment –The Future

Thank-you very much!

Questions

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