

The Collaborative for High Performance Schools: Building a New Generation of Sustainable Schools

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ABSTRACT

California schools are facing multiple challenges: unprecedented student population growth, demands for improved student performance, consistently tight budgets, and thousands of school buildings in need of repair.

The school market is extraordinarily heterogeneous, with districts varying in size, organization, and goals. Each of the Collaborative for High Performance Schools (CHPS) stakeholders—a diverse group of utility, government, and non-profit agencies—has individual programs targeted for the schools in their jurisdiction. CHPS is a forum to coordinate and pool resources to create materials that all the stakeholders can use.

CHPS has created a suite of programs and tools to directly address school districts' primary needs and to help districts and designers build the next generation of schools: facilities that improve student performance, protect student health, and lower operational costs.

The CHPS programs embrace the entire spectrum of sustainable design issues including energy, water, and material efficiency; good indoor air quality; daylighting; visual, thermal, and acoustic comfort; and reduced environmental impact. The largest program has been the development of the Best Practices Manual. The three-volume manual is the flagship reference for high performance school design in California, and includes targeted marketing, process, goal-setting, and detailed technical information. In addition to CHPS, the stakeholders have a variety of financial incentive programs, demonstration programs, value-added services, and training programs that are collectively promoted by CHPS.

The programs of CHPS and its stakeholders are helping to meet the needs of districts and designers, and are successfully transforming the market for new school construction in California.

The Challenge

This is a unique period of growth in the California school system. The state, which educates one out of every eight students in America, has historical enrollment rates four times higher than the national average. Hundreds of schools are being built each year to house more than 100,000 new students and to accommodate state-mandated class-size reductions. The current infrastructure is aging and over 30% of existing facilities are in need of major renovation. At the same time, California schools are spending more than \$500 million per year on energy in a time of rising concern over energy supplies and tight school budgets. There is an enormous opportunity for California's school districts to build a new generation

of school facilities that will improve the learning environment while saving energy, resources, and money.

The California public school system is quite diverse. At one extreme the Los Angeles Unified School District (LAUSD), with 732,000 K-12 students and 144,000 enrolled in adult education, has a school population greater than seven states and the District of Columbia. At the other extreme are the 600 small school districts with an average daily attendance of less than 2,500 students, including districts such as the Panoche Elementary School District in San Benito County with 10 students. While the school system is diverse at the local level, the process of funding schools and school operations, as well as reviewing and approving proposed construction and modernization projects, is fairly standard for all districts because of statewide programs.

California is responding to the challenge by providing funding at unprecedented levels. Proposition 1A (passed in 1998) provided about \$9 billion in state funding for new schools and modernization. The November 2002 ballot will include a bond for \$13 billion, and a third bond for \$12.3 billion will appear on the March 2004 ballot. In addition to state school funding, local school bond initiatives are being proposed and approved at record levels since Proposition 39 passed 15 months ago permitting approval of local bonds with a 55% majority vote rather than the traditional 2/3 majority. Since the law went into effect in 2001, over 71% of local school bonds are being approved. During the March 2002 general election, 73 local bond initiatives were on the ballot and 65 passed, totaling \$4.2 billion. California is recognizing the importance of public education, and after the Proposition 13 disaster¹, is attempting to provide the much-needed funding.

The Players

All public schools in California rely substantially on state funding for school construction, modernization, and other infrastructure funding needs. The California School Facilities Program (SFP) establishes the process for state funding of new schools and modernization projects. All school districts seeking state money for new construction, modernization, or class-size reduction funds are funneled through a series of state organizations to get required approvals and allocations. Overall project funding is a combination of state and local money; and the state will support 50% of new construction costs. Until this year, the state provided 80% of modernization costs but with passage of AB 16 in April 2002, the state share has been reduced to 60%. Although there are several local and state agencies approving the location and suitability of school sites, only five primary players exist in the California school funding process:

- **The School Districts** are solely responsible for the origination and management of the construction process. They must secure local matching funding, manage the designers and contractors, and are responsible for any changes required for approval and release of the funding.

¹ Proposition 13, also known as the Jarvis Gann Initiative, placed severe limits on property tax revenues, which until the initiative, were the major source of funding for public school construction.

- **The School Facilities Planning Division (SFPD)** verifies that the site and preliminary plans are safe and that the facility supports the educational specifications of the district and the state. The SFPD maintains the closest relationship with the district during the initial process. SFPD is a branch of the California Department of Education (CDE). CDE also helps coordinate site approvals by the California Department of Toxic Substance Control.
- **The Division of the State Architect (DSA)** reviews and approves school plans based on structural safety, fire safety, accessibility and compliance with the state energy efficiency requirements. DSA is the “building department” for public schools; local building departments are not involved. DSA is a division of the Department of General Services (DGS).
- **The Office of Public School Construction (OPSC)** is staff to the State Allocation Board (SAB), and as such, develops programs and policies that carry out the SAB mandates. Duties include processing funding request applications, creating agendas for the SAB, and distributing checks to local school districts.
- **The State Allocation Board (SAB)** approves all state funding for new construction and modernization of public schools.

California’s system for funding school infrastructure is unique and may be changed by the Legislature. However, the process appears to be stable for at least the next few years.

High Performance Schools: What Are They and Why Should We Build Them

Characteristics of a High Performance School

“High performance school,” as defined by CHPS, refers to the physical facility—the school building and its grounds. Good teachers and motivated students can overcome inadequate facilities and perform at a high level almost anywhere, but a well-designed facility can truly enhance performance and make education a more enjoyable and rewarding experience.

Creating a high performance school is not difficult, but it requires an integrated, “whole building and team” approach to the design process. Key systems and technologies must be considered together, from the beginning of the design process, and optimized based on their combined impact on the comfort and productivity of students and teachers.

A high performance school is:

- *Healthy.* Good indoor air quality is essential. It requires minimizing pollutant sources, and providing effective ventilation and air filtration.
- *Thermally, Visually, and Acoustically Comfortable.* Thermal comfort means that teachers, students, and administrators should be neither hot nor cold as they teach, learn, and work. Visual comfort means that quality lighting makes visual tasks, such as reading and following classroom presentations, easier. Acoustic comfort means that students can clearly hear the teacher with no audible distractions.

- *Energy Efficient.* Energy efficient schools save money while conserving non-renewable energy resources and reducing atmospheric emissions of pollutants and greenhouse gases. Heating, ventilating, and air-conditioning (HVAC) systems use high efficiency equipment; are “right sized” for the estimated demands of the facility; and include controls that optimize system performance. Lighting systems use efficient sources and supplement daylighting, and are effectively controlled.
- *Material Efficient.* To the maximum extent possible, the school incorporates building materials that have been recycled or produced in a way that conserves raw materials.
- *Water Efficient.* Water scarcity is a major problem in much of California. High performance schools are designed to use water efficiently, saving money while reducing the depletion of aquifers and river systems, and minimizing the need for sewage treatment.
- *Easy To Maintain and Operate.* Building systems are simple, as well as being easy to use and maintain. Teachers have control over the temperature, airflow, acoustics, and lighting in their classrooms, and are trained how to most effectively use these controls.
- *Commissioned.* The school operates according to design intent and meets the district's needs. This happens through a formal commissioning process—a form of “systems check” for the facility.
- *An Environmentally Responsive Site.* The site is an essential element of the school building's high performance features. Site planning conserves existing natural areas and restores damaged ones; minimizes stormwater runoff and controls erosion; and incorporates products and techniques that do not pollute or degrade the project site.
- *A Teaching Tool.* By incorporating important concepts such as energy, water, and material efficiency, school facilities can become tools to illustrate a wide spectrum of scientific, mathematical, and social issues.
- *Safe and Secure.* High performance does not compromise safety. Students and teachers feel safe anywhere in the building or on the grounds.
- *A Community Resource.* The most successful schools have a high level of parent and community involvement. This involvement can be enhanced if schools are designed for neighborhood meetings and other community functions.
- *Stimulating Architecture.* High performance schools should invoke a sense of pride and be considered a genuine asset for the community.

Benefits of a High Performance School

High performance schools have advantages from the local classroom to the district office, including:

- *Higher Test Scores.* A growing number of studies are confirming the relationship between a school's physical condition, especially its lighting, acoustics, and indoor air quality, and student performance.
- *Increased Average Daily Attendance (ADA).* A high performance school provides superior indoor air quality by controlling sources of contaminants, providing adequate ventilation, and preventing moisture accumulation. The majority of a school's

operating budget is directly dependent on ADA, so even a small increase can significantly boost the operating budget.

- *Reduced Operating Costs.* High performance schools are specifically designed—using life-cycle cost methods—to minimize the long-term costs of facility ownership.
- *Increased Teacher Satisfaction and Retention.* High performance classrooms are pleasant and effective places to work. Such environments are positive factors in recruiting and retaining teachers, and in improving their overall work satisfaction.
- *Reduced Liability Exposure.* Because they are healthy and emphasize superior indoor environmental quality, high performance school buildings reduce a district’s exposure to health-related problems, lawsuits, and loss of credibility.
- *Reduced Environmental Impacts.* High performance school buildings are consciously designed to have low environmental impacts. They are energy and water efficient. They use durable, non-toxic materials that are high in recycled content, and the buildings themselves can be recycled.

These benefits are achievable only when districts establish high performance as a specific design goal from the very beginning, and fight for it over the course of the development process.

The CHPS Response

The goal of CHPS is to help shape future school construction and to create a new generation of high performance school facilities in California. CHPS achieves this goal by coordinating school services and programs offered by utilities and state governments, and by developing a common program delivery strategy and message. CHPS wants to gain buy-in and acceptance by the school district decision makers and school construction industry. The strategy involves:

- Identifying, organizing, and focusing the program’s marketing message on “real concerns” of public schools, particularly levels K-12.
- Shifting the emphasis of program marketing from individual efforts by each utility and state agency to a venue that better uses the existing, well-established school funding approval conduit, school organizations, and professional associations.
- Enlisting critical stakeholders, with significant market credibility, to provide testimonials and endorsements of the high performance school principles, as well as aid in the delivery of services and marketing messages.
- Developing technical training materials and outreach efforts to reach a large majority of market players and decision makers.

CHPS began in November 1999, when the California Energy Commission (CEC) called together Pacific Gas & Electric Company (PG&E), San Diego Gas & Electric (SDG&E), and Southern California Edison (SCE) to discuss the best way to improve the performance of California’s schools. Out of this partnership, CHPS grew to include a diverse range of government, utility, and non-profit organizations with a unifying goal to improve the quality of education for California’s children.

In early 2002, CHPS incorporated as a non-profit organization, further solidifying its commitment to environmentally-sound design that enhances the learning environment for all schoolchildren.

The charter members and initial funders of CHPS include the investor-owned utilities (PG&E, SCE, SDG&E, and Southern California Gas), two municipal utilities (Sacramento Municipal Utilities District and Los Angeles Department of Water and Power), along with the CEC and the California Integrated Waste Management Board (CIWMB). Other key stakeholders include the California Department of Education, the Office of Public School Construction and the Division of the State Architect. Together, these entities play a powerful role in the development of California public schools and can exert significant influence.

CHPS Program/ Project Support Strategies

1. **Best Practices Manual:** As the largest CHPS program, the three-volume Best Practices Manual is the flagship reference for high performance school design in California. The Best Practices Manual is offered on the CHPS website, on CD and in print medium. The CHPS website (www.chps.net), also contains research papers, support documents, databases, and other information. More than 2,500 CDs and 600 print versions have been distributed. The manual is split into three volumes, each serving a specific purpose:
 - Volume I addresses the needs of school districts, including superintendents, parents, teachers, school board members, administrators, and those persons in the school district that are responsible for facilities. Volume I describes *why* high performance schools are important, *what* components are involved in their design, and *how* to navigate the design and construction process to ensure that they are built.
 - Volume II contains design guidelines for high performance schools. Tailored for California climates, these guidelines are written for the architects and engineers responsible for designing schools as well as the project managers who work with the design teams. Volume II is organized by design disciplines and addresses specific design strategies for high performance schools.
 - Volume III is the CHPS Criteria. These criteria are a flexible yardstick that defines a high performance school so that it may qualify for supplemental funding, priority processing, and perhaps bonus points in the state funding procedure. School districts can also include the criteria in their educational specifications to assure that new facilities qualify as high performance.
2. **High Performance School Demonstrations:** The CHPS stakeholders are supporting the construction of demonstration schools to show off the benefits of high performance design. PG&E has two significant demonstrations at Manteca and Los Altos. The CEC is sponsoring two demonstrations at Tahoe/Truckee Unified School District and Oakland Unified School District. The CIWMB is sponsoring a demonstration school in the Santa Ana Unified School District. The Los Angeles Department of Water and Power is supporting demonstrations within LAUSD. SDG&E has three demonstrations at Solana Beach, Sorrento Hills, and San Pasqual.

- SCE is supporting a high performance portables program and a demonstration high performance school at Newport Coast.
3. **Training and Outreach:** CHPS and its stakeholders have offered 10 days of formal training on how to design and build high performance schools. Approximately 12 other shorter programs have been offered, emphasizing the benefits. These have been offered up and down the state. The formal training has attracted mostly architects and engineers. The shorter programs have attracted a broader mix of the target audience, including school district officials. The program has been presented to total audience on the order of 900 persons.
 4. **Other Programs:** To provide additional incentives for high performance schools, CHPS is working with both DSA and OPSC to streamline the approval and funding process for qualifying high performance schools. The new state funding program offers an additional 5% for schools that are 15% better than minimum compliance with the California building energy efficiency standards. CHPS is also working with local school districts to make the CHPS Criteria an integral part of their education specification for new schools; LAUSD, California's largest school district, has already done this.

Barriers

One of the most significant barriers has been the tight timeline imposed by the state funding system. Under Senate Bill 50 (SB 50), state funding was allocated on a first come, first serve basis, and it was clear from the beginning that the funds were not going to last. School districts had to rush to complete their plans and to line up in the funding queue. Anything that slowed the process, such as paying more attention to energy efficiency, healthy materials, and indoor environmental quality, was often lost in the rush. The \$6.7 billion in funding provided through SB 50 initially went very quickly, but was slowed due to a legal challenge by attorneys representing minority children. A new priority points system and a slowed allocation process were initiated to allow urban districts a better chance to get funding. The last \$450 million allocation of the Proposition 1A funds is scheduled for August 2002.

Under SB 50, some school districts, such as LAUSD, were unable to get their applications in soon enough and lost out on funding, even though their need for new schools was considerable. With the new funding program on the ballot in Fall 2002, there is a set-aside for "critically overcrowded" schools. Schools that qualify can secure their funding in advance of preparing plans and specifications. This should allow more time to do a better job of design. School districts that are not "critically overcrowded" are still on a first come, first serve basis, but there are more funds this time and school districts will not be in such a panic to quickly finish their plans and get in the queue.

Another barrier is information. Many design professionals would like to choose materials that have fewer chemical emissions or design lighting systems with less glare, but they simply do not have the tools or the expertise to evaluate their design decisions. This is where the CHPS Best Practices Manual, training programs, and outreach come in. During 2001, about 900 people attended all-day CHPS training programs. In addition, CHPS receives

about 15 emails and 10 phone calls weekly. Most of these calls are requests for information or clarification of program criteria.

Has CHPS Been Successful?

CHPS is a relatively new organization and is just beginning to put mechanisms in place to track the effectiveness of its programs. These mechanisms include working with the DSA to monitor high performance features (all school plans in California go through the DSA). Until these mechanisms are in place, CHPS has only antidotal evidence that the programs are working.

- School participation in PG&E's Savings By Design (SBD) program doubled in 2001, compared to 2000. In 2000, only 30 schools qualified, while in 2001, about 60 qualified. The CHPS Criteria is consistent with SBD so this is an indication that many high performance features are being implemented.
- For LAUSD, which has adopted the CHPS Criteria as part of its educational specification, 20 out of 21 school plans submitted qualify as high performance schools.
- Each of the demonstration schools supported by the CHPS stakeholders qualify as high performance schools.
- The message has been delivered to a significant portion of the target audience. About 900 people have attended all-day training programs. In the first quarter of 2002, CHPS distributed 214 informational brochures, 450 CDs with the Best Practices Manual, and about 50 print versions of the manual (a fee of \$25 for the latter). In 2001, CHPS distributed 4,500 brochures, 2,000 CDs, and about 350 print versions (not counting those distributed at training sessions). From the number of phone calls CHPS receives, these materials are apparently being used.

Summary and Conclusions

The success of CHPS could not have occurred without the renewed awareness of the public and elected officials that something needed to be done about the deteriorating condition of public schools. California voters have shown a willingness to approve bonds and nearly every elected official supports school improvement.

CHPS success is built upon the strategic partnerships with critical stakeholders including energy program delivery agents, state funding agencies, and customer energy users. California school organizations, such as the California Association of School Business Officials (CASBO), Coalition for Adequate School Housing (CASH), and California School Boards Association (CSBA), make a natural marketing avenue to reach the "finite" market. Use of state agencies with the funding purse strings to distribute the high performance school message has also been critical to success.

CHPS success can also be attributed to a central message that plays well with the school audience—improving student performance. Energy programs in the past have focused on energy efficiency for energy's sake and not for the real consumer benefits that drive decision makers to take action. The timing of research linking the condition of the built

environment with positive and negative effects on occupants has also been beneficial. The daylighting study, as well as acoustics research and indoor air quality issues raised by molds, volatile organic compounds, and poor ventilation are examples of real concerns that have hit the popular press (Heschong Mahone Group 1999, 2002).

References

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