

Progressive Districts Promoting High-Performance Schools

Methodology

In September 2004, Reed Research Group conducted a survey for this Progress Report among key professionals in schools and universities to understand their opinions, perceptions, and actions regarding green schools and universities.

The editors and Reed Research Group would like to thank our partners for the K-12 survey – the Association of School Business Officials International (ASBO), the Council of Educational Facility Planners (CEFPI), and the National School Boards Association (NSBA) – and our partners for the university study, the Society for College and University Planning (SCUP) and the Association of Higher Education Facilities Officers (APPA), for their generous cooperation.

This survey was conducted online, via e-mail invitation from each organization. Respondent participation per group: CEFPI, 304; NSBA, 103; ASBO, 30; SCUP, 296; and APPA, 217.

¹ Source: U.S. Commerce Department, from data compiled by Jim Haughey, PhD, Senior Economist, Reed Business Information.

² "Rankings & Estimates: Rankings of the States 2003 and Estimates of School Statistics 2004," National Education Association, May 2004.

K-12 schools, coupled with the university construction market, represent the single largest sector in the nonresidential construction industry. Construction spending for educational facilities is expected to reach nearly \$83 billion in 2005.¹

Of course, educational facilities are vital not only to the construction industry, but to the communities they serve. Each day, more than 50 million children and six million adults enter the nation's public schools to learn and teach.

Largely suburban public-school districts, in a variety of sizes

	Total	ASBO	CEFPI	NSBA
Suburban	53%	43%	55%	49%
Urban	28%	23%	34%	11%
Rural	20%	33%	10%	41%
Base	409	30	304	101
<2,500 students	17%	23%	8%	40%
2,500 to 7,499	24%	40%	17%	36%
7,500 to 14,999	16%	20%	18%	12%
15,000 or more	42%	17%	57%	12%
Mean	11,208	7,658	13,576	5,911
Median	11,534	5,833	15,895	3,851
Base	405	30	273	102

In the K-12 survey, suburban districts (53%) and public systems (98%) predominate, with a wide variation in student population. Please note small sample size for ASBO throughout this section.

Respondents cover school business, facilities, and policy-making roles

	Total	ASBO	CEFPI	NSBA
Architect/designer	30%	-	44%	-
School board member	15%	-	-	65%
Facilities director/manager	11%	17%	14%	1%
Superintendent/administrator	9%	13%	3%	27%
Construction/capital projects manager	6%	-	8%	-
School business official	5%	57%	2%	1%
Consultant	4%	-	6%	1%
Facilities designer/planner	3%	3%	4%	2%
Engineer	3%	-	4%	-
Other	12%	10%	15%	3%
Base	435	30	302	103

Respondents' job responsibilities fall closely in line with the organizations to which they belong – business officials in ASBO, designers/planners in CEFPI, school board members and administrators in NSBA.

Yet numerous research studies suggest that much of the nation's public schools infrastructure is outdated at best. Consider that the average school building is more than 40 years old, and that student enrollment has risen for 19 consecutive years while annual school spending has remained stagnant, and there's little wonder why so many of the nation's children go to school in overcrowded, dilapidated facilities.²

Several progressive states and local jurisdictions are

How familiar are you with...the term "sustainable design" or "green building"?

	Total	ASBO	CEFPI	NSBA
Very familiar	52%	27%	69%	12%
Somewhat familiar	30%	40%	27%	37%
Have heard of it	10%	30%	3%	24%
Never heard of it	7%	3%	1%	27%
Mean (scale of 4)	3.28	2.90	3.64	2.33
Base	435	30	302	103

...the CHPS Best Practice Manual?

	Total	ASBO	CEFPI	NSBA
Very familiar	16%	3%	22%	4%
Somewhat familiar	23%	13%	27%	13%
Have heard of it	28%	47%	25%	30%
Never heard of it	33%	37%	26%	53%
Mean (scale of 4)	2.22	1.83	2.45	1.67
Base	435	30	302	103

...LEED?

	Total	ASBO	CEFPI	NSBA
Very familiar	42%	17%	57%	8%
Somewhat familiar	26%	33%	29%	17%
Have heard of it	12%	27%	8%	21%
Never heard of it	19%	23%	6%	54%
Mean (scale of 4)	2.92	2.43	3.37	1.78
Base	434	30	301	103

CEFPI members displayed the highest level of familiarity with sustainability, CHPS, and LEED among the three groups surveyed.

How would you describe the level of expertise about green buildings in your school district?

	Total	ASBO	CEFPI	NSBA
Very experienced	19%	3%	25%	7%
Somewhat experienced	42%	43%	47%	27%
Not much experience, but interested	27%	30%	23%	39%
No experience/no interest	12%	24%	5%	27%
Mean (scale of 5)	3.66	3.20	3.90	3.10
Base	435	30	302	103

Most respondents (61%) said their school districts have some experience in green building, with another large group (27%) expressing interest.

rethinking the way schools are designed and operated. They are adopting policies, programs, and practices as part of new construction and modernization programs that promote the development of “high-performance” schools. The ultimate goal is to create healthier and more effective learning environments that are less expensive to operate, minimize impact to the environment, and, most important of all, support and promote the education process.

California is leading the way in high-performance schools. In late 1999, with the approval of a statewide

What level of consideration should be given to green design when a major project is being contemplated?

	Total	ASBO	CEFPI	NSBA
4-5 Top 2	81%	90%	82%	77%
3 Mid-range	14%	10%	14%	15%
1-2 Bottom 2	5%	-	4%	8%
Mean (scale of 5)	4.17	4.43	4.19	4.04
Base	433	30	301	102

All three groups of respondents showed a high level of support for sustainability in school construction.

Do green school buildings cost more to build?

	Total	ASBO	CEFPI	NSBA
Yes, but they're worth it	51%	47%	60%	28%
Yes, and they're not worth it	13%	17%	14%	8%
Green schools not more costly	10%	3%	12%	5%
Not sure	26%	33%	14%	59%

While the majority of respondents (51%) see sustainability as worth any construction premium (and another 10% see no added cost), a substantial group (26%) just aren't sure about additional first costs.

What initial cost differential would be acceptable to your district to get a green school?

	Total	ASBO	CEFPI	NSBA
Up to 5%	37%	10%	39%	39%
Up to 10%	29%	43%	30%	24%
Up to 15%	6%	10%	7%	3%
Up to 20%	5%	7%	3%	9%
>20%	1%	-	1%	2%
Mean	6.78	8.95	6.41	7.32
Median	6.26	8.31	6.02	5.50
Base	416	30	291	95
Not acceptable at any cost	14%	7%	14%	14%
Green buildings do not cost more to build	8%	23%	7%	8%

Surprisingly, school business officials showed the greatest support for paying extra (8-9%) for green schools. However, the small sample size for ASBO should be noted.

\$6.7 billion K-12 construction program, several state agencies formed a partnership with utility companies and nongovernmental organizations to coordinate their separate “green” initiatives for schools. This partnership led to the formation of the Collaborative for High Performance Schools (CHPS), a nonprofit entity that has created materials, training programs, design criteria, and a rating system to help designers and school officials build high-performance, or “HP,” schools.

The CHPS model, which is loosely based on the USGBC's LEED criteria but geared toward schools, has become the preeminent HP school design and rating system in the U.S. The program has been adopted by a half-dozen school districts across California, including the Los Angeles Unified School District, which has built or modernized more than 20

Have you incorporated sustainability into recent school designs?

	Total	ASBO	CEFPI	NSBA
Yes, quite extensively	21%	13%	26%	8%
Yes, somewhat	49%	40%	53%	38%
No, but we plan to do so	11%	17%	12%	5%
No	20%	30%	9%	50%
Base	437	30	304	103

The overwhelming majority of school districts (81%) have used sustainable design or plan to do so, according to respondents.

If you have used sustainable design in building projects, has it improved student performance?

	Total	ASBO	CEFPI	NSBA
Yes, quite extensively	21%	13%	26%	8%
Yes	38%	44%	41%	18%
No	5%	-	3%	14%
Don't know/Not sure	58%	56%	56%	68%
Base	296	16	236	44

The case for improved student performance in green schools has not been made, judging from these results, but anecdotal evidence is intriguing. One respondent wrote, “Standardized test scores rose fairly dramatically” after a year at one high-performance school.

Can green buildings serve as a teaching tool?

	Total	ASBO	CEFPI	NSBA
Yes	75%	73%	80%	61%
No	3%	-	3%	3%
Not sure	22%	27%	17%	36%
Base	433	30	301	102

Three-fourths of respondents (75%) see green schools as learning laboratories. “The science behind the design allows for real-world examples of innovation and cost effectiveness for students, staff, and community,” said one school board official.

facilities using the CHPS criteria. Several states, including Massachusetts and Washington, are currently adapting CHPS to fit their school districts. HP school programs in Wake County, N.C.; Elk River, Minn.; Edmonds, Wash.; and New Jersey also have incorporated elements of sustainable design into their respective school building programs.³

With this background in mind, what are the public policy issues related to sustainability in the K-12 schools construction market? What are the obstacles and challenges to implementing high-performance schools programs, and what lessons learned can be learned from successful programs?

Two of the biggest obstacles to HP school

12 steps toward a high-performance school program

What does it take to implement a high-performance school initiative? Consultant John Zinner offers the following suggestions based on his experience implementing the CHPS program within the Los Angeles Unified School District:

1. Give CHPS precedence over other rating programs. Zinner favors CHPS over LEED for schools districts, as long as safeguards are put in place to ensure that the program is implemented. CHPS includes almost every LEED criteria relevant to schools. Many criteria have been modified to meet school needs. Criteria relevant to schools, such as acoustical performance, have been included in CHPS but do not exist in LEED. CHPS is also less expensive to implement because the paperwork requirements are much less onerous than LEED's.

2. Establish specific requirements for all projects. A CHPS program will be most successful if a school district analyzes the criteria and mandates those that it feels are important. CHPS has identified priorities with which most districts will probably agree, including daylighting, energy efficiency, and indoor air quality. First identify priorities and criteria that can be easily claimed. Use the CHPS scorecard to keep track.

3. Establish a goal for every project beyond the district's CHPS baseline. Every design team should be required to achieve a specified number of points in addition to the criteria mandated for all projects, even if the district minimum is at or above the CHPS 28-point minimum threshold.

4. Avoid the point game. Be aware that CHPS (and LEED) can all too easily become a point game in which the reasons for implementing the program, as well as its effectiveness, get lost.

5. Include CHPS funding in bond measures. To meet CHPS criteria typically costs more, although this increase is almost always offset by long-term dollar savings and benefits to students and staff. Soft costs make up most of the increase, including higher design fees, energy modeling, and commissioning. These costs should be incorporated into school bond measures to make sure they are in the budget.

6. Centralize implementation. Assign specific

responsibility and authority for developing and implementing a CHPS program. With so many staff claiming responsibility for facilities, the path is open for a CHPS program to become disjointed or simply lost in the bureaucracy. Also, establish a process for resolving conflicting priorities over health and safety, energy efficiency, acoustics, and other building-related factors.

7. Utilize all available free assistance. Technical and financial assistance from utility companies, NGOs, and government agencies can be a godsend. Include such entities in a support or advisory committee.

8. Provide training. Architects, engineers, project managers, contractors, and facilities planners may be unfamiliar with the intricacies of HP schools. Training is imperative.

9. Track the results. It's impossible to prove that a CHPS initiative is successful without tracking the results. Collect and review all the scorecards, load the information into summary matrices, and require proof of implementation from project managers, contractors, and others in the construction process.

10. Educate students about the special nature of their schools. High-performance schools offer many opportunities to educate students about good design, the environment, healthy spaces, and the important role of occupants in building performance. Implement programs to educate students on such features as energy efficiency, water conservation, and the use of landscaping to moderate local climate conditions.

11. Maintain the benefits. The advantages of sustainable design can be lost if schools are not properly maintained or toxic cleaning supplies are utilized. Use CHPS's "Best Practices Manual: Volume IV, Maintenance & Operations."

12. Reconsider compliance self-certification. CHPS is self-certifying, to simplify the process and make it less expensive to implement. While these goals are justifiable to some extent, it is all too easy for high-performance strategies to be value engineered out of projects. Require that at least a minimal level of proof that what was built actually performed as designed. Commissioning can serve as the foundation.

initiatives are a shortage of funding and the related need to overcome entrenched attitudes about priorities for constructing public schools. (Note: While the following discussion focuses on public schools, many of the issues apply as well to universities and colleges.)

As the accompanying charts show, school business officials (47% of ASBO respondents) and school board members (28% of NSBA respondents) are less inclined to believe that HP schools are worth any possible added cost than are facilities planners (60% of CEFPI respondents).

Budget-conscious school officials and board members are also relatively unaware of sustainable design. As our research shows, while 27% of ASBO respondents were “very familiar” with the term, only 12% of NSBA respondents were, vs. 60% of CEFPI respondents. They were even less familiar with specific programs such as CHPS (17% of NSBA respondents and only 16% of ASBO respondents were even “somewhat familiar” with CHPS, vs. 49% for CEFPI respondents) or LEED (17% “very familiar” at ASBO, 8% at NSBA, 57% at CEFPI).

To overcome this information shortfall among those holding the pursestrings, CHPS provides educational materials and seminars aimed specifically at California school district officials.⁴ The organization is also creating a “roadmap” to help school districts implement HP schools initiatives.

CHPS encourages school districts to employ an integrated design approach, embrace life cycle cost analysis, and apply for grants and incentives from utilities, government agencies, and NGOs to help offset some of the additional costs for HP schools, which CHPS estimates to be 1-2% of a project’s budget. (Massachusetts Technology Collaborative reports cost premiums of 2-4% on the 16 projects participating in its Green Schools Initiative pilot program, which uses CHPS criteria.)

In many cases, school officials are quick to question additional upfront costs, reluctant to slow down tight planning and construction schedules, and are not entirely sold on the notion that HP schools will lead to gains in student performance or teacher productivity. Some school officials discount the findings of research studies relating sustainable design to improved test scores⁵ as “too good to be true” and are looking for additional data in this area. (More on this in the Action Plan.)

BD&C’s exclusive survey of 437 school officials, school board members, and facilities personnel show that 37% of respondents agree that sustainability is

worth a construction cost premium of up to 5%, while another 29% would accept a premium of 10% for green schools. But 26% of respondents are “not sure” about the value of additional first costs for green schools, while another 13% say HP schools cost more to build and aren’t worth the added cost.

In some state and local districts, funding policies can undermine HP initiatives, especially when they involve additional up-front cost. California allows local school districts to retain any savings in state funding on projects that come in under budget (the state generally funds 50% of new construction projects). As a result, Building Teams are having a tough time “selling” innovative systems and materials with higher first costs, particularly for non-energy-related features, even on the basis of life cycle costing.

Complicating this situation is the fact that many school districts have separate budgets for capital and operating expenditures. Even when Building Teams can document long-term savings and reasonable paybacks on advanced technology and systems (through energy modeling and life cycle analysis), they can run into trouble trying to sell these concepts to school boards and the public.

Experts agree that it takes a “champion” within the school district to see past the bureaucracy, and to spearhead the effort in informing and educating the school boards and communities. One superintendent challenged his assistant superintendents for facilities and operations to co-mingle the two budgets. School officials at LAUSD addressed backlash over first-cost issues by mandating the use of CHPS criteria, modifying district design guidelines to include more “baseline” CHPS criteria, and requiring projects to apply for grants and incentive programs.⁶

Education and training must go beyond school district officials to reach all the key stakeholders in school construction industry, including design and construction firms. Designers need to be proficient in the tools and techniques commonly used with HP schools, including energy modeling, life cycle costing, and nontraditional building technologies. Likewise, contractors need to know how to specify, build, and commission these facilities within budgets and schedules.

In some cases, the program criteria can be quite complicated, requiring a substantial investment in time and resources to understand and implement. Many architects and consultants that have dealt with the CHPS process recommend providing resources such as model specifications and materials lists, and eliminating referrals to third-party documents.

³ For an excellent review of the legal aspects of these programs, see “Building Healthy, High Performance Schools: A Review of Selected State and Local Initiatives,” Tobie Bernstein and Zacharay Lamb, Environmental Law Institute, Washington, D.C., September 2003. www.eli.org

⁴ “Best Practices Manual: Volume I, Planning,” Collaborative for High Performance Schools, 2002.

⁵ “Daylighting in Schools: An Investigation into the Relationship Between Daylight and Human Performance,” Heschong-Mahone Group, 1999.

⁶ “Building Healthy, High Performance Schools,” Washington, D.C., September 2003.

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Lack of training and technical assistance for school facilities personnel regarding operations and maintenance of HP schools has also been a challenge, according to architects that have worked on HP school projects. Facilities designed to exceed local or state energy codes by 15% or more often incorporate nontraditional mechanical/electrical and building technologies, including cool roofs, ground-source heat pumps, and thermal displacement ventilation. Without proper training on O&M of these technologies, energy

performance may potentially be jeopardized. Facilities staff should be included periodically in project planning meetings, starting with the schematic design phase. The CHPS board recently released a best practices manual for maintenance and operations.⁷

Developing and implementing HP schools can require a tremendous amount of staff time and money — resources that budget-strapped states and local school districts rarely have. Successful initiatives, such as CHPS in California and the Green Schools

Sustainable design gaining ground in the halls of academe

Respondents' institutions: Mostly public, urban, four-year, and big

	Total	SCUP	APPA
Urban	46%	48%	42%
Suburban	26%	22%	31%
Mixed/multiple locales	15%	16%	13%
Rural	13%	13%	13%
Base	485	269	216
Public	69%	70%	67%
Private	31%	30%	33%
Base	480	263	217
Four-year	90%	88%	92%
Two-year	10%	13%	8%
Base	459	248	211
<2,500 students	13%	10%	16%
2,500 to 7,499	19%	20%	17%
7,500 to 14,999	22%	21%	24%
15,000 or more	46%	48%	43%
Mean	12,225	12,567	11,831
Median	13,606	14,422	12,806
Base	467	250	217

Most respondents represent large urban, four-year universities and colleges.

Respondents cover range of design and facility responsibilities

	Total	SCUP	APPA
Facilities director/manager	35%	11%	66%
Architect/designer	17%	28%	2%
Institutional administrator	16%	22%	7%
Facilities planner	9%	14%	2%
Construction/capital projects manager	9%	9%	8%
Facilities O&M staff	4%	1%	9%
Consultant/IT staff	4%	7%	-
Engineer	3%	2%	4%
Institutional official	3%	5%	1%
Base	504	289	215

More than three-fourths (77%) of APPA respondents performed facilities functions; 42% of SCUP respondents were designers or facilities planners.

How familiar are you with the term 'sustainable design' or 'green building'?

	Total	SCUP	APPA
Very familiar	68%	78%	55%
Somewhat familiar	26%	17%	39%
Have heard of it	5%	4%	6%
Never heard of it	1%	1%	-
Mean (scale of 4)	3.62	3.72	3.49
Base	511	294	217

How familiar are you with LEED?

	Total	SCUP	APPA
Very familiar	50%	61%	36%
Somewhat familiar	33%	20%	51%
Have heard of it	10%	10%	10%
Never heard of it	6%	9%	3%
Mean (scale of 4)	3.28	3.34	3.20
Base	510	294	216

Respondents see themselves as very familiar with "green building," somewhat less so with LEED.

How would you describe the level of expertise about green buildings at your institution?

	Total	SCUP	APPA
Very experienced	18%	25%	9%
Somewhat experienced	41%	40%	42%
Not much experience, but interested	31%	26%	38%
No experience	10%	10%	11%
Mean (scale of 4)	3.64	3.78	3.46
Base	508	293	215

College and university planners (SCUP) and higher education facilities officers (APPA) showed a high degree of familiarity with the term "sustainable design" (68% "very familiar") and with LEED (50% "very familiar"). Most (59%) see their institutions as at least "somewhat experienced" when it comes to expertise in sustainability. "Students definitely increase their incidental use of 'green' facilities over non-green facilities," said one SCUP respondent. One said students are "more motivated to enroll at 'green' institutions," while yet another stated, "Students are more conscious of recycling, not wasting energy, keeping areas clean, and shutting off the lights."

⁷ "Best Practices Manual: Volume IV, Maintenance & Operations," Collaborative for High Performance Schools, 2004.

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Initiative in Massachusetts, are the fruit of public-private partnerships of state agencies, utilities, and NGOs. By pooling their resources, these programs have been able to offer more in the way of education, technical assistance, and even grants for pilot projects or energy-efficiency measures.

Finally, while dozens of high-performance schools have been completed throughout the U.S., little hard data has been collected on the physical performance of these buildings. Most funding, by way of grants and

incentives, focuses on the planning, design, and construction of schools. School districts don't want to pay extra for metering to determine whether the systems are saving energy. Commissioning and monitoring efforts are practically nonexistent.

Assessment of completed projects is crucial not only to determine whether HP school program criteria need to be changed, but also to evaluate more accurately whether high-performance schools produce healthier, more successful students.

What level of consideration should be given to green design when a major project is being contemplated?

	Total	SCUP	APPA
4-5 Top 2	82%	87%	74%
3 Mid-range	13%	9%	18%
1-2 Bottom 2	6%	4%	8%
Mean (scale of 5)	4.18	4.35	3.96
Base	510	294	216

Both SCUP and APPA respondents said green design deserves strong consideration in the design of campus buildings, with few (6% of total) at the low end of the scale.

Do green buildings cost more to build?

	Total	SCUP	APPA
Yes, but they're worth it	57%	62%	51%
Yes, and they're not worth it	13%	7%	21%
They're not more costly	11%	15%	7%
Not sure	18%	16%	21%

Most respondents saw sustainable buildings as worth any extra cost, although a substantial group (18% of total) were uncertain about any added cost.

What initial cost differential would be acceptable to your institution to get a green building?

	Total	SCUP	APPA
Up to 5%	45%	42%	50%
Up to 10%	25%	28%	20%
Up to 15%	6%	6%	7%
Up to 20%	4%	3%	5%
>20%	1%	1%	1%
Mean	6.35	6.42	6.28
Median	4.60	4.84	4.34
Base	487	276	211
Not acceptable at any cost	9%	8%	11%
Green buildings do not cost more to build	9%	12%	5%

A remarkably high percentage of SCUP and APPA respondents said their institutions would pay about 4-6% extra for sustainability.

Have you incorporated sustainability into recent building designs?

	Total	SCUP	APPA
Yes, quite extensively	21%	26%	14%
Yes, somewhat	49%	47%	53%
No, but we plan to do so	13%	11%	16%
No	16%	15%	18%
Base	513	296	217

Seventy percent of respondents' institutions had used sustainable concepts in at least some building designs. Another 13% planned to do so.

If you have used sustainable design in building projects, has it improved student performance?

	Total	SCUP	APPA
Yes	19%	25%	9%
No	12%	9%	16%
Don't know/Not sure	70%	66%	76%
Base	350	210	140

Whether sustainable design aids student performance remains largely unproven to the great majority (82%) of respondents. Some attributed greater energy, enthusiasm, and morale among students to green building.

Can green buildings serve as a teaching tool?

	Total	SCUP	APPA
Yes	79%	80%	77%
No	4%	3%	4%
Not sure	17%	16%	19%
Base	512	295	217

Nearly four-fifths (79%) of SCUP/APPA respondents said they believed in the educational benefits of green building. An APPA member said students will learn "how good design choices can lead to buildings that serve program goals, provide a healthy place to learn, and minimize environmental damage." Having functioning green buildings on campus is particularly helpful in teaching engineering and architecture students, "far more effective than pointing to a concept in a textbook," another APPA respondent said. A SCUP member said, "By learning how it functions, maintaining sustainable habits of behavior, and interacting with the building in appropriate ways, students will become educated consumers of their environment."