# Green Building Reaches the Tipping Point in Higher Education

*By David Barista*

In August 2007, *Building Design+Construction* magazine surveyed a scientifically drawn sample of members from three major higher education professional organizations: APPA; the Society for College and University Planning (SCUP); and the Association for the Advancement of Sustainability in Higher Education (AASHE).

Together, the three groups represent a diverse workforce within the U.S. higher education sector. Recipients of the online survey were asked to gauge their level of knowledge, interest, and action with regard to green buildings and sustainable practices at their institution.

## Principal findings of the survey

- Nearly nine in ten (85%) respondents said they have incorporated sustainable design and green building principles in recent building projects, and just 5% said they have no plans to incorporate green in future building projects.
- Both SCUP and APPA members have seen a sharp increase in green building projects, compared to 2004. About half (47%) of SCUP respondents said they have incorporated sustainable strategies "quite extensively" in recent building projects, up from 26% in 2004. While 42% of APPA members have implemented green extensively, up from 14% in 2004. The green adoption rate among AASHE members is at a healthy level as well, with 86% having incorporated sustainable design in recent projects, 40% having done so extensively.
- About half (47%) of respondents said they are willing to pay up to 5% more for green, and about one-fifth said they would fork out an additional 6 to 10%. Just 9% of respondents across the three groups said a cost premium for green is not acceptable (Table 7).
- Relatively low-cost approaches for reducing energy consumption—including energy management, automated lighting controls, and daylighting—topped the list of sustainable action items that have been implemented or are planned for upcoming projects. Strategies for improving indoor air quality are also popular.

Most of the respondents that have incorporated green into recent building projects are simply not sure if it has improved student performance. About one-third (32%) of respondents saw improved performance in the classroom as a result of going green, while about half said they don't know if it has impacted performance.

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The historically high adoption rate among the three organizations is proof that the green building movement has not only reached, but has moved past the tipping point in the higher education sector.

"Universities have always built good buildings with a view toward the long-term life of their structures, and they're starting to realize that it's a very small step to go from good buildings to good green buildings," said Richard Franz, architect with David E Shambach Architect Inc., Tucson, Arizona, and formerly the facilities planning director at Pima Community College in Tucson.

Franz said the university sector's long-term outlook with regard to campus buildings, coupled with the fact that multiple funding sources are available to schools for campus expansions and improvements, make the higher education sector ripe for green building activity.

"As much as those in higher education complain about lack of funding, the sector is relatively well funded, especially compared to K-12," said Franz. Unlike K-12 school districts, universities have several ways to raise money for buildings and infrastructure, including state funding sources, bond levies, and alumni donors.

In fact, some respondents claim that going green actually helps with fundraising efforts. "Many times we'll see more donor support for a green project," said respondent Gerry Bomotti, senior vice president for finance and business at the University of Nevada, Las Vegas. Fundraising efforts have helped pay for the construction and operation of two LEED-registered buildings at UNLV: a science and technology lab and a classroom building for the school's Greenspun College of Urban Affairs.

"Yes, we have and do pay more for green, but the focus on up-front capital costs is not the only factor we look at," said Bomotti. "If you consider a full and complete analysis of the benefits, including increased fundraising, lower operating costs, and getting a higher-quality facility, we may not really be paying more for green."

Further indication that green building is flourishing in the university sector is the fact that many of the traditional barriers to green seem to be slowly fading.

First cost, for instance, remains a key obstacle, with about half of respondents claiming that sustainable design adds significantly to the initial cost of construction (Table 11). However, an overwhelming majority of respondents (88%) either "agree" or "strongly agree" that colleges and universities are more willing today than they were three to four years ago to invest in green building projects. How much more?

Moreover, other common barriers to green—including claims that the sustainable design process is too complicated and that green buildings are hard to justify even on the basis of long-term savings—were cited by a surprising small percentage (between 15 to 19%) of respondents (Table 11). In fact, besides higher first cost, the only other barriers that received substantial attention from respondents are related to "other school priorities" (38%) and concerns about the amount of paperwork required to certify green buildings (30%). The latter concern should quickly fade as the U.S. Green Building Council and other green building certification organizations continue to simplify the certification process with the use of electronic submittals and reduced paperwork.

How are universities overcoming the obstacles to green? A higher level of knowledge and expertise in green building is one way. About three-quarters (71%) of respondents across the three groups said their school has some level of experience with green building, and one-fifth of those surveyed said their school is "very experienced" with green. For SCUP and APPA members, the overall experience level is higher today than three years ago. Nearly three-quarters (71%) of APPA members said their school has some level of experience with green building, up 20% from 2004. While 73% of SCUP

respondents said their school has experience with green, up 8% from 2004.

While the desire to improve student performance is certainly a key driver of green building activity at universities, the link between sustainable design and student performance remains largely unproven to a majority (68%) of respondents. About half of those surveyed that have implemented green buildings at their school are simply unsure of the effect sustainable strategies have had on student performance, while 20% said they flat out haven't seen improvement as a result of going green. AASHE members have seen the most improvement, with 40% of those surveyed having seen better student performance in the classroom (Table 9).

Respondents are, however, reasonably confident that green buildings can help reduce operations costs, especially related to energy consumption. Eighty-one percent of respondents across the three groups either "agree" or "strongly agree" that green buildings significantly reduce energy costs, and 79% agree that these buildings operate more efficiently than comparable conventional college buildings.

Also, energy-reduction strategies are among the sustainable action items most often implemented or planned for construction or renovation projects. About 80% of respondents across the three groups have implemented approaches for reducing energy consumption, including energy management systems, automated lighting controls, and daylighting schemes (Table 11).

Strategies for improving indoor environmental quality, such as specifying low-e interior products like carpeting and paint, are also key goals of university sustainable building programs. About three-quarters of respondents have incorporated low-e products to help improve IEQ.

As expected, big-ticket items, like photovoltaics, geothermal heating/cooling, and under-floor air distribution systems, rank low among sustainable action items, having been incorporated by less than one-fifth of the respondents.

# Survey Results

**TABLE 1**
**A BREAKDOWN OF RESPONDENTS' INSTITUTIONS**

| | SCUP | APPA | AASHE |
|---|---|---|---|
| Urban | 43% | 44% | 46% |
| Suburban | 22% | 29% | 20% |
| Mixed/ Multiple locales | 18% | 14% | 16% |
| Rural | 17% | 13% | 17% |
| Base | 134 | 131 | 455 |
| | | | |
| Public | 67% | 64% | 65% |
| Private | 33% | 36% | 35% |
| Base | 134 | 131 | 455 |
| | | | |
| Four-year | 91% | 88% | 90% |
| Two-year | 9% | 12% | 10% |
| Base | 134 | 131 | 455 |
| | | | |
| <2,500 students | 10% | 13% | 16% |
| 2,500 to 7,499 | 16% | 23% | 19% |
| 7,500 to 14,999 | 31% | 26% | 18% |
| 15,000 or more | 42% | 38% | 47% |
| Base | 134 | 131 | 455 |

**Respondents mostly work for large, public, four-year schools.**

**TABLE 2**
**A WHAT ROLE DO YOU SERVE AT YOUR UNIVERSITY/COLLEGE?**

| | SCUP | APPA | AASHE |
|---|---|---|---|
| Facilities director/manager | 24% | 58% | 11% |
| Facilities designer/planner | 23% | 3% | 3% |
| Construction/ capital projects manager | 16% | 8% | — |
| University/ college administrator | 12% | 12% | 18% |
| Architect/ designer | 11% | 2% | — |
| Engineer | 1% | 2% | 1% |
| Consultant | 1% | — | 1% |
| Sustainability coordinator/ officer | 1% | 2% | 15% |
| Facilities operations & maintenance staff | 1% | 5% | 3% |
| University/ college business official | 1% | — | 3% |
| University/ college board member | 1% | — | — |
| Student | — | — | 10% |
| Other | 7% | 8% | 35% |
| Base | 134 | 131 | 455 |

**Nearly half (47%) of SCUP respondents are facilities directors and designers, and about six in ten (61%) APPA respondents perform the same role. AASHE respondents were more diversified, with about one-fifth (18%) being school administrators, 15% sustainability coordinators, 11% facilities directors and designers, and 10% students.**

**TABLE 3**
**HOW FAMILIAR ARE YOU WITH THE TERM "SUSTAINABLE DESIGN" OR "GREEN BUILDING"?**

| | SCUP 2007 | SCUP 2004 | APPA 2007 | APPA 2004 | AASHE |
|---|---|---|---|---|---|
| Very familiar | 71% | 78% | 60% | 55% | 65% |
| Somewhat familiar | 28% | 17% | 36% | 39% | 32% |
| Have heard of it | 1% | 4% | 4% | 6% | 3% |
| Never heard of it | — | 1% | — | — | — |
| Base | 134 | 294 | 131 | 217 | 455 |

**TABLE 4**
**HOW FAMILIAR ARE YOU WITH LEED?**

| | SCUP 2007 | SCUP 2004 | APPA 2007 | APPA 2004 | AASHE |
|---|---|---|---|---|---|
| Very familiar | 65% | 61% | 54% | 36% | 56% |
| Somewhat familiar | 28% | 20% | 37% | 51% | 37% |
| Have heard of it | 6% | 10% | 8% | 10% | 6% |
| Never heard of it | 1% | 9% | 1% | 3% | 1% |
| Base | 134 | 294 | 131 | 216 | 455 |

**Compared to 2004, respondents from both SCUP and APPA are generally more familiar with the terms "sustainable design" and "green building," and with USGBC's LEED program. All survey respondents, including AASHE members, said they are familiar with both sustainable design and green building, and just eight if the 720 total respondents said they never heard of LEED.**

**TABLE 5**

**HOW WOULD YOU DESCRIBE THE LEVEL OF EXPERTISE ABOUT GREEN BUILDINGS AT YOUR INSTITUTION?**

| | SCUP 2007 | SCUP 2004 | APPA 2007 | APPA 2004 | AASHE |
|---|---|---|---|---|---|
| Very experienced | 19% | 25% | 22% | 9% | 20% |
| Somewhat experienced | 54% | 40% | 49% | 42% | 50% |
| Not much experience, but interested | 24% | 26% | 27% | 38% | 24% |
| No experience | 3% | 10% | 2% | 11% | 6% |
| Base | 134 | 293 | 131 | 215 | 455 |

**While fewer SCUP members said their institution was "very experienced" with green building this year versus 2004, the overall experience level is higher today than three years ago. Nearly three-quarters (73%) of SCUP respondents said their school has some level of experience with green building, up 8% from 2004, and the number of respondents with "no experience" decreased from 10% to 3%. APPA members appear to have made the most progress in sustainable design, with nearly a quarter (22%) saying they're school is "very experienced," up from 9% in 2004.**

**TABLE 6**

**WHAT LEVEL OF CONSIDERATION SHOULD BE GIVEN TO GREEN DESIGN WHEN A MAJOR PROJECT IS BEING CONTEMPLATED?**

| | SCUP 2007 | SCUP 2004 | APPA 2007 | APPA 2004 | AASHE |
|---|---|---|---|---|---|
| 4-5 Top 2 | 91% | 87% | 88% | 74% | 94% |
| 3 Mid-range | 7% | 9% | 11% | 18% | 3% |
| 1-2 Bottom 2 | 1% | 4% | 2% | 8% | 3% |
| Base | 134 | 294 | 131 | 216 | 455 |

**Nine out of ten respondents across the three groups said green design deserves strong consideration in the design of campus buildings, a moderate increase among SCUP members and a strong increase among APPA respondents, compared to 2004 data. AASHE members feel most strongly about green, with 94% ranking it at the top end of the scale and just 3% saying it deserves minor consideration.**

**TABLE 7**

**WHAT INITIAL COST DIFFERENTIAL WOULD BE ACCEPTABLE TO YOUR INSTITUTION TO GET A GREEN BUILDING?**

| | SCUP | APPA | AASHE |
|---|---|---|---|
| Not acceptable at any cost | 10% | 9% | 7% |
| Up to 2% more | 16% | 20% | 11% |
| 3-5% more | 37% | 34% | 22% |
| 6-10% more | 18% | 19% | 13% |
| 11-15% more | 4% | 4% | 4% |
| More than 15% | 2% | 3% | 2% |
| Don't know/Not involved with cost estimates | 13% | 11% | 40% |
| Base | 134 | 131 | 455 |

**When it comes to paying a premium for green buildings, about half (47%) of respondents across the three groups said they are willing to pay up to 5% more for green, and about one-fifth said they would fork out an additional 6 to 10%. Just 9% of respondents across the three groups said a cost premium for green is not acceptable.**

**TABLE 8**

**HAVE YOU INCORPORATED SUSTAINABILITY INTO RECENT BUILDING PROJECTS?**

| | SCUP 2007 | SCUP 2004 | APPA 2007 | APPA 2004 | AASHE |
|---|---|---|---|---|---|
| Yes, quite extensively | 47% | 26% | 42% | 14% | 40% |
| Yes, somewhat | 43% | 47% | 38% | 53% | 46% |
| No, but we plan to do so | 6% | 11% | 15% | 16% | 9% |
| No, and we have no plans to do so | 4% | 15% | 5% | 18% | 5% |
| Base | 134 | 296 | 131 | 217 | 455 |
| More than 15% | 2% | 3% | 2% | | |
| Don't know/Not involved with cost estimates | 13% | 11% | 40% | | |
| Base | 134 | 131 | 455 | | |

**Both SCUP and APPA members have seen a sharp increase in green building projects, compared to 2004. Nearly half (47%) of SCUP respondents said they have incorporated sustainable strategies "quite extensively" in recent building projects, up from 26% in 2004. While 42% of APPA members have implemented green extensively, a significant increase from the meager 14% who said they did so in 2004. Less than 5% of total respondents across the three groups said they have no plans to incorporate green in future building projects. SCUP members are the most active, with 90% of respondents having implemented some level of sustainability into recent projects, followed by AASHE members, with an 86% adoption rate.**

**TABLE 9**

**IF YOU HAVE USED SUSTAINABLE DESIGN IN BUILDING PROJECTS, HAS IT IMPROVED STUDENT PERFORMANCE?**

| | SCUP 2007 | SCUP 2004 | APPA 2007 | APPA 2004 | AASHE |
|---|---|---|---|---|---|
| Yes | 27% | 25% | 29% | 9% | 40% |
| No | 21% | 9% | 29% | 16% | 12% |
| Don't know/Not sure | 52% | 66% | 42% | 76% | 48% |
| Base | 121 | 210 | 105 | 140 | 390 |

**Most of the respondents that have incorporated green into recent building projects are simply not sure if it has improved student performance. AASHE members have had the most success so far, with 40% of those surveyed having seen improved performance in the classroom as a result of going green.**

**TABLE 10**

**ARE THE GREEN BUILDING CONCEPTS INCORPORATED IN RECENT PROJECTS BEING USED AS A TEACHING TOOL?**

| | SCUP | APPA | AASHE |
|---|---|---|---|
| YES | 54% | 49% | 66% |
| NO | 16% | 27% | 15% |
| NOT SURE | 30% | 24% | 19% |
| BASE | 121 | 105 | 390 |

**About half of the SCUP and APPA respondents that have incorporated green into recent building projects said the concepts are being used as a teaching tool. Two-thirds of AASHE respondents said green buildings are being incorporated into the curriculum.**

**TABLE 11**

**WHICH GREEN STRATEGIES HAVE YOU INCORPORATED OR PLAN TO INCORPORATE IN RECENT PROJECTS?**

| | SCUP | | APPA | | AASHE | |
|---|---|---|---|---|---|---|
| | Have done | Plan to do | Have done | Plan to do | Have done | Plan to do |
| Energy management | 91% | 84% | 89% | 90% | 75% | 70% |
| Automated lighting controls | 86% | 82% | 87% | 87% | 74% | 63% |
| Daylighting | 83% | 81% | 83% | 82% | 71% | 65% |
| Low-e paints/finishes/ adhesives | 75% | 78% | 70% | 77% | 61% | 60% |
| Low-e carpeting | 69% | 75% | 73% | 78% | 56% | 60% |
| Building commissioning | 69% | 72% | 74% | 79% | 49% | 47% |
| Energy analysis/ modeling tools | 68% | 69% | 62% | 69% | 54% | 58% |
| Recycled/renewable building materials | 64% | 68% | 64% | 72% | 60% | 64% |
| Environmentally sensitive landscaping | 61% | 71% | 62% | 72% | 57% | 59% |
| Environmentally responsive site design | 60% | 66% | 44% | 59% | 43% | 55% |
| High-reflectance, high-emittance roof | 43% | 57% | 44% | 60% | 34% | 42% |
| Acoustics/soundproofing | 50% | 57% | 64% | 72% | 44% | 43% |
| Green furniture, fixtures, equipment | 51% | 62% | 47% | 64% | 51% | 55% |
| Reused construction and demolition waste | 46% | 61% | 42% | 54% | 42% | 50% |
| Waterless urinals | 32% | 36% | 38% | 35% | 41% | 39% |
| Storm water harvesting | 37% | 59% | 34% | 48% | 34% | 44% |
| Environmentally preferred purchasing | 32% | 42% | 42% | 54% | 44% | 53% |
| Passive solar | 27% | 43% | 27% | 42% | 31% | 43% |
| Green (vegetated) roof | 25% | 36% | 23% | 30% | 28% | 37% |
| Photovoltaics | 17% | 29% | 18% | 29% | 25% | 35% |
| Geothermal heating/ cooling | 17% | 21% | 14% | 28% | 19% | 23% |
| Underfloor air distribution | 13% | 19% | 12% | 23% | 12% | 17% |
| None of the above | 1% | 2% | 3% | 2% | 4% | 7% |
| Other | 7% | 5% | 9% | 6% | 13% | 18% |
| Base | 121 | 129 | 105 | 125 | 390 | 433 |

**Relatively low-cost approaches for reducing energy consumption topped the list of sustainable action items that have been implemented or are planned for upcoming school construction or renovation projects. Energy management, automated lighting controls, and daylighting are green features most often implemented or planned by the survey respondents. Indoor air quality is also a key issue, with low-e interior products like carpeting and paint scoring high on the list.**

**TABLE 12**
**WHAT ARE THE BARRIERS TO ADOPTING GREEN BUILDING PRINCIPLES AT YOUR INSTITUTION?**

| | SCUP | APPA | AASHE |
|---|---|---|---|
| Adds significantly to initial costs of construction | 56% | 58% | 55% |
| Too much paperwork | 39% | 27% | 24% |
| Other program needs are more important than green building | 36% | 39% | 38% |
| Not comfortable with new technology | 21% | 8% | 21% |
| Green building isn't required by law or regulation so isn't necessary | 19% | 15% | 23% |
| Too complicated | 16% | 17% | 18% |
| Too hard to find contractors with green building/sustainable design expertise | 19% | 16% | 18% |
| Green buildings hard to justify even on the basis of long-term savings | 14% | 18% | 14% |
| Too hard to find materials for green building/ sustainable design | 8% | 10% | 7% |
| Green building doesn't provide enough flexibility | 5% | 8% | 4% |
| Green building is a passing fad | 2% | 2% | 3% |
| None of the above/institution doesn't see barriers to green building | 21% | 24% | 16% |
| Don't know | 3% | 2% | 7% |
| Other | 14% | 7% | 19% |
| Base | 134 | 131 | 455 |

**Cost remains the most significant barrier to the adoption of green strategies, with more than half of respondents from the three groups claiming that sustainable design adds significantly to initial costs of construction. The exorbitant amount of paperwork required to certify buildings is also cited as a chief obstacle, but this barrier should quickly fade as the U.S. Green Building Council and other green building certification organizations continue to simplify the certification process with the use of electronic submittals and reduced paperwork.**