May/June 2006
VOLUME 22
NUMBER 3

Facilities Manager

THE OFFICIAL PUBLICATION OF APPA

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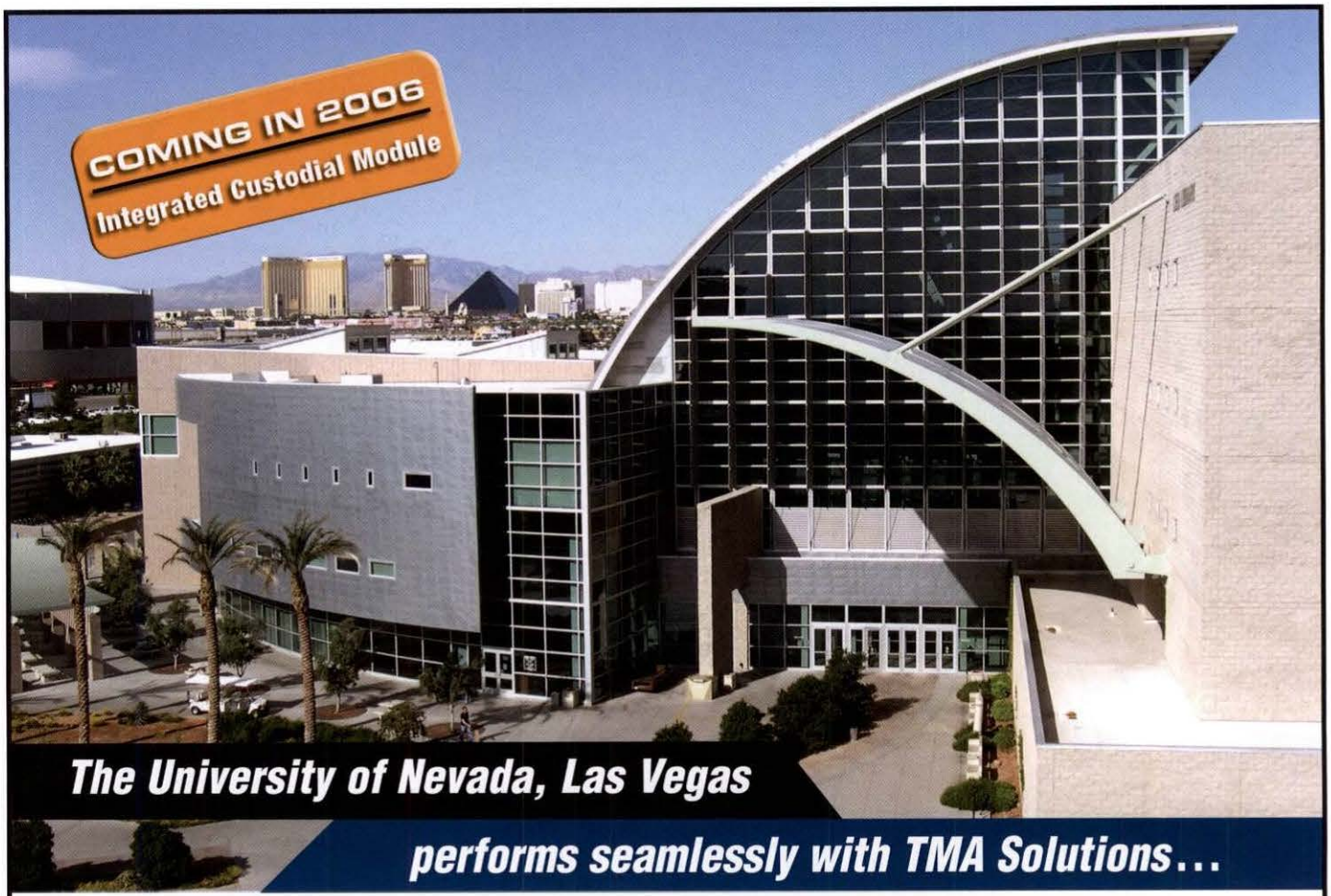

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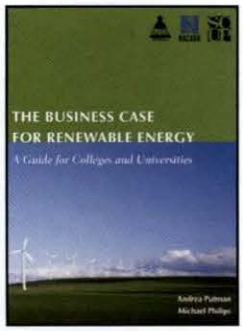
Volume 22 Number 3 May/June 2006



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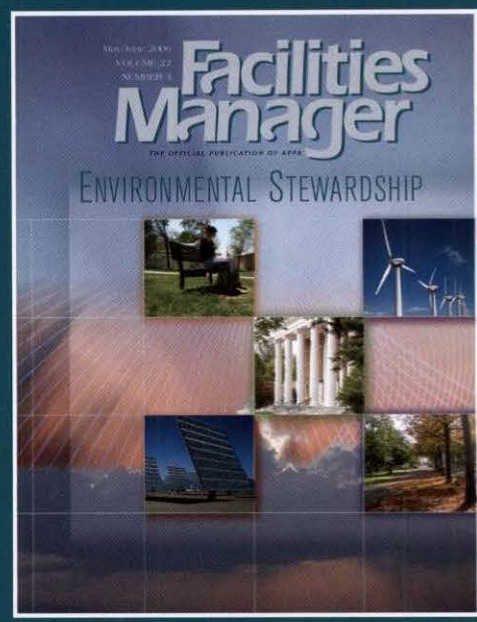

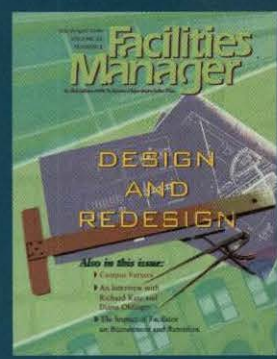

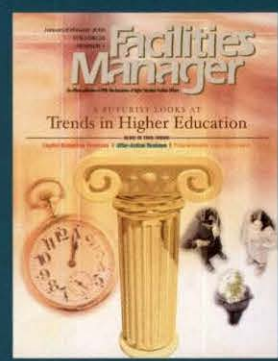

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Contact: Julie Ecker
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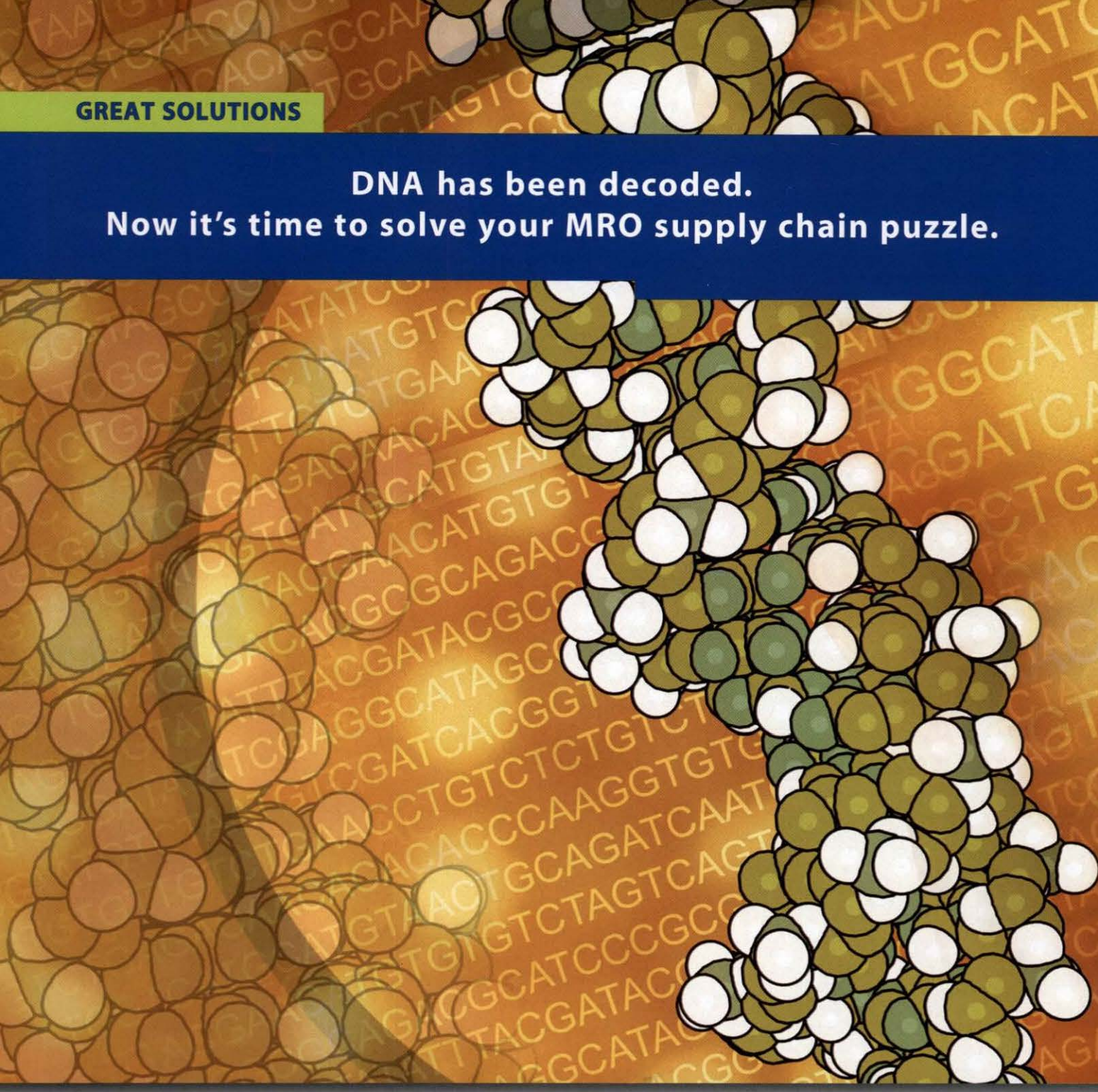

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APPA
SERVING EDUCATIONAL FACILITIES PROFESSIONALS

From the Editor

by Steve Glazner

According to a 1987 United Nations report, sustainability is defined as "The ability of current generations to meet their needs without compromising the ability of future generations to meet their needs."

As sustainability becomes more ingrained into our consciousness as a natural perspective, it is important to note that the definition makes no mention of energy savings, green design, non-mainstream lifestyles, net-zero impact, tree-hugging, red states versus blue states, or environmental stewardship, the theme of this issue. In fact, this definition of sustainability more succinctly applies to the choices we make at all levels of our personal and professional lives, and the legacy we want to leave.

On May 9 I had the pleasure to hear a presentation by Ray C. Anderson, chairman and chief executive officer of Interface, Inc., a manufacturer of floor coverings. The occasion was a meeting of the newly formed Higher Education Associations Sustainability Consortium (www.heasc.net), of which APPA is a founding member. There were about 40 education association representatives in the room—Anderson is used to speaking to thousands as a keynote presenter—and we had the rare opportunity to hear him speak in a more intimate setting on his conversion to sustainability.

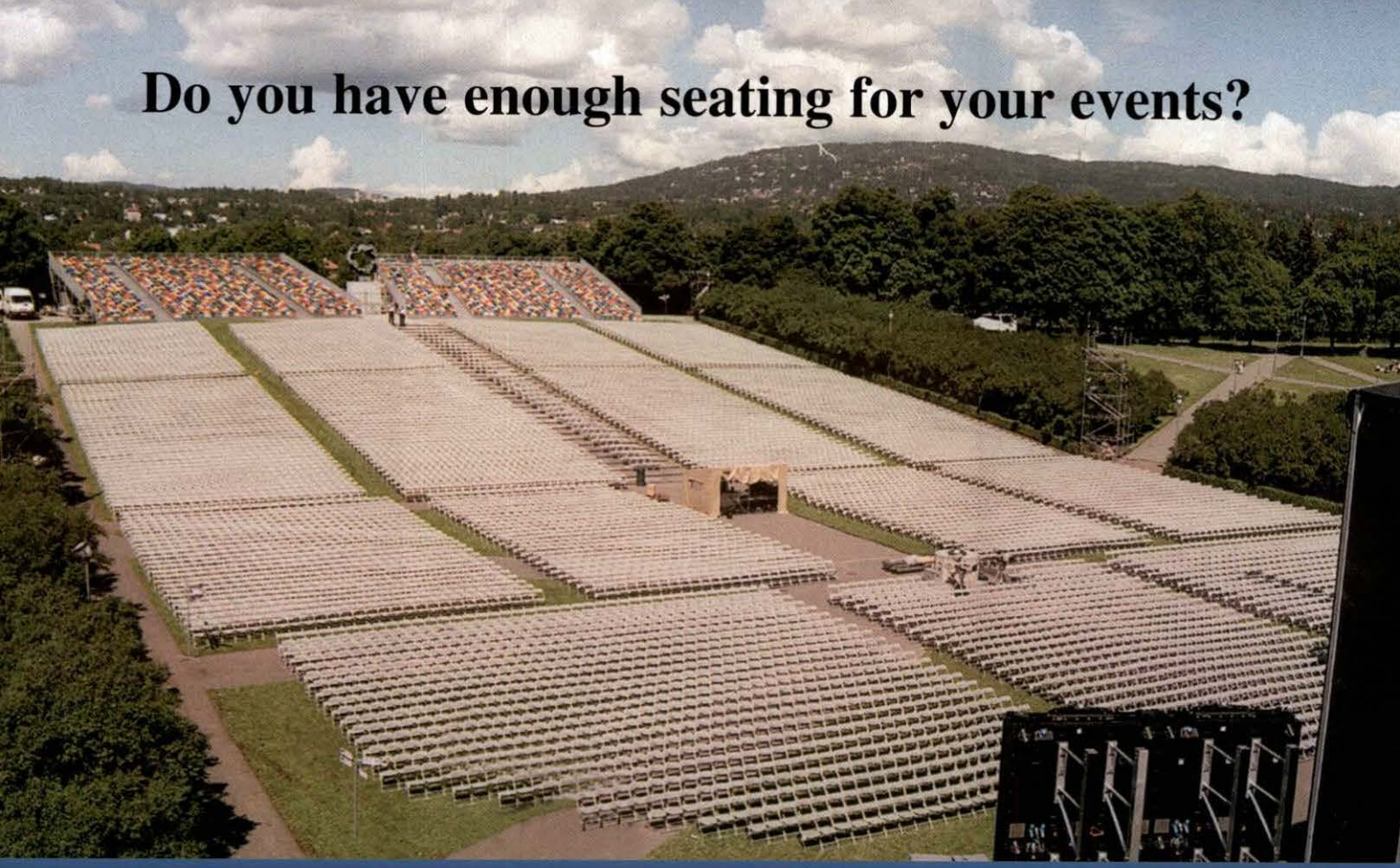
Anderson, a captain of industry and self-professed fierce competitor in business, remains as both as he guides his company to be a more responsible, sustainable entity. He describes his journey from "polluter and plunderer" to leader of a more sustainable, and profitable, enterprise in his 1998 book, *Mid-Course Correction*, and in his many speeches throughout the world. You can learn more about Ray Anderson at www.interfacesustainability.com. In addition, he will be the keynote speaker at the inaugural meeting of AASHE, the Association for the Advancement of Sustainability in Higher Education, which will be held October 4-6, 2006 in Tempe, Arizona. For more information, visit www.aashe.org.

In this issue of *Facilities Manager*, we do spend some time talking about energy savings, green design, and environmental stewardship. The authors have done a tremendous job in providing us with practical concepts and tools to improve your educational facility, save money for your department, and provide a cleaner environment more conducive to the teaching, research, and public service missions of your institution.

You'll also learn more about the research efforts of APPA, as well as of the National Association of College and University Business Officers and the Society for College and University Planning, with whom we're sponsoring the Campus of the Future conference in Honolulu July 8-11, 2006. And the second part of David Cain and Gary Reynolds' major research project on the impact of facilities on student recruitment is included here as well.

To register for the joint conference or to review our rich resources, visit www.campusofthefuture.org. Most of the concurrent presentations will be posted on the site after the conference. Aloha!

Do you have enough seating for your events?



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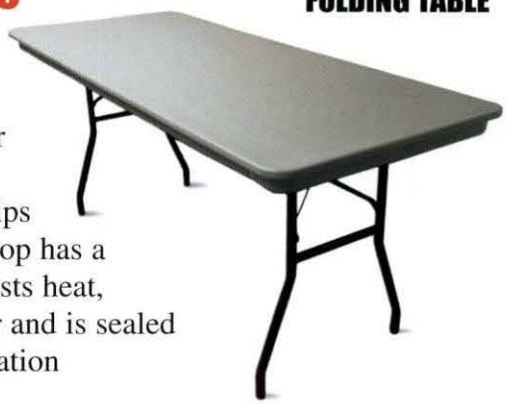

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by Julie Ecker

Leadership Academy

APPA's Leadership Academy will be held June 11-15, 2006 at the Starr Pass Marriott Resort & Spa, in Tucson, Arizona. The Leadership Academy enhances and further develops leadership throughout the educational industry. It provides opportunities for professionals to increase their awareness of the issues affecting them, teaches them the skills they need to handle the resulting changes, and provides opportunities to explore and discover one's own leadership potential. The Academy is a four-track learning opportunity, with each track emphasizing a different perspective and type of leadership skill. For more information and to register, please visit www.appa.org/education.

Environmentally Friendly Building Principles

Federal agencies recently agreed to take the lead in developing and maintaining buildings that show high environmental performance and demonstrate principles of sustainability. Nineteen agencies said they will commit to a memorandum of understanding developed by the White House's Office of the Federal Environmental Executive.

The agreement establishes common goals for high performance buildings. The goals are designed to reduce maintenance and utility costs, improve energy efficiency and water conservation, provide safe, healthy and productive environments, and promote environmental stewardship. In signing onto the high performance buildings agreement, the agencies will enter a nonbinding commitment to adopt the goals and to develop implementation plans from a menu of guiding principles.

For new buildings, that includes measures related to integrated planning and design, and benchmarks for environmental performance in areas such as energy and water use. For existing buildings, indoor air quality is a major consideration, and will be addressed through specifications for characteristics like ventilation and moisture control, as well as selection of indoor materials such as paints, carpets, and furnishings that minimize indoor chemical emissions.

Agencies will be able to tailor their adoption of the buildings agreement by selecting which guiding principles to implement, and by creating their own implementation plans. This agreement comes after new endorsements for energy efficiency in federal buildings that were included in the 2005 energy bill.

THE CAMPUS OF THE FUTURE
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Campus of the Future: A Meeting of the Minds is a joint conference of three leading associations that serve higher education: APPA, NACUBO, and SCUP that will take place July 8-11, 2006 in Honolulu, Hawai'i. This conference will provide an opportunity to explore a vision of the trends, challenges, and advancements anticipated for the Campus of the Future. An exciting lineup of concurrent sessions has been planned, featuring topics such as:

- The 21st Century Project: The Future Residential Campus
- Zero-Based Budgeting Link to Performance Driven Facilities
- Beautiful Convergence: Integrating Architecture, Art and Landscaping
- Education for Our Times: Expertise and Engagement
- How Would a Sustainable Campus Function?

And many more! Visit www.campusofthefuture.org for more information and to register for this important event!

.edu Internet Domain Continues

The U.S. Department of Commerce (DoC) National Telecommunications and Information Administration has extended the contract granting administration of the .edu Internet domain to EDUCAUSE through September 30, 2011. The five-year contract was initially scheduled to end on September 30, 2006.

In the five years that EDUCAUSE, a nonprofit association for information technology in higher education, has administered the .edu domain, it has implemented procedures and controls to insure adherence to the DoC policy that .edu domains be assigned only to postsecondary institutions that are institutionally accredited by an agency on the U.S. Department of Education's list of Nationally Recognized Accrediting Agencies. Under a grandfather principle, institutions and organiza-

Continued on page 8

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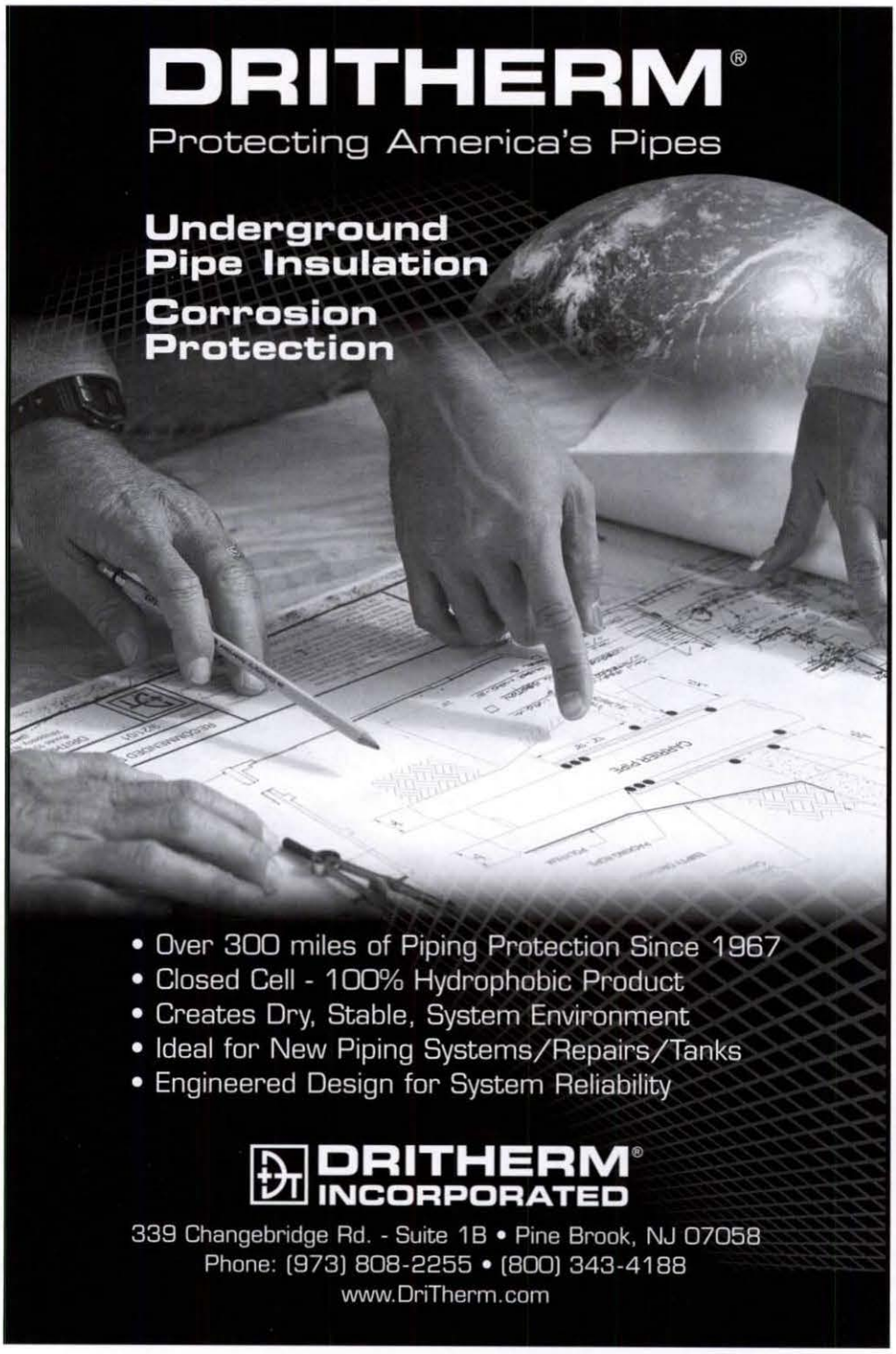
Continued from page 6

tions with .edu domains prior to October 2001 have been allowed to retain those domains so long as they maintain proper administrative control.

Another provision of the contract extension authorizes EDUCAUSE to implement a procedure addressing violations of the prohibition against transferring .edu domains from one entity to another. The DoC and EDUCAUSE expect a welcome consequence of both this and the fee collection procedures to be a significant reduction in the number of inactive and ineligible .edu domain names. Details on these and other policies and procedures can be found on the .edu administration website at http://www.educause.edu/edudomain/.



National Electrical Safety Month

May is National Electrical Safety Month, which means that it's time to begin year-round electrical safety awareness efforts, according to the Electrical Safety Foundation International (ESFI).

To increase electrical safety awareness at home and in the workplace, ESFI has developed an electrical safety tool kit that includes statistics on electrical hazards and recommendations to avoid electrical shock, burns, and fires.

According to ESFI, electricity kills nearly 400 people and injures thousands more each year. Most of these deaths and injuries could be avoided with an increased awareness of electrical safety, such as noting locations of power lines when working outside. Power line contact with construction equipment, ladders, and gardening tools are among the leading cause of electrocutions.

Estimates indicate electricity causes 140,000 fires each year. These fires kill hundreds of people, injure thousands more, and cost billions of dollars in property damage. Aging electrical systems, combined with the growing power demands, contribute to electrical fire hazards. Overloaded circuits, flickering lights, and discolored electrical outlets and light switch face plates, point to the need for electrical upgrades. Addressing these hazards can save lives, reduce injuries, and cut economic losses caused by electrical fires.

For more information on electrical safety, visit www.electrical-safety.org or call 703-841-3229.

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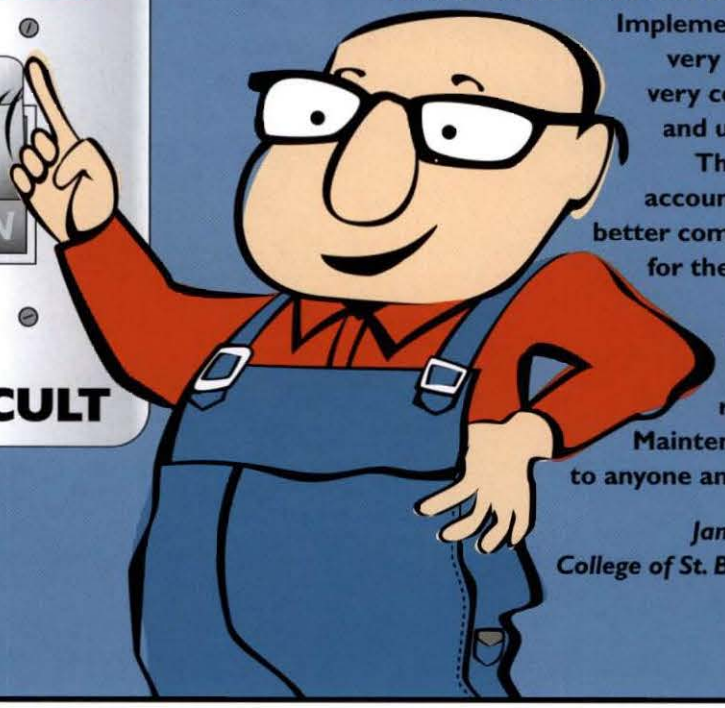

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APPA's Seven Key Strategies

by E. Lander Medlin

The wealth of data and critical information that we received from the qualitative and quantitative research surveys of APPA's members in late 2005 supported our focus on the future and set our direction around seven key strategies. These seven key strategies will position the association for a bright future, especially since they align with the desired outcomes that will ensure the following:

- The APPA "brand" is clear and well known
- APPA is the "go-to" resource for all education facilities questions
- Credibility with senior institutional officers
- An increase in APPA's information and offerings through partnerships
- APPA nurtures and mentors young professionals
- Educational programs for continuing professional development needs
- Competence of educational facilities professionals

Now that the plan is clear, it is critically important for both volunteers and staff to effectively implement each of these seven key strategies.

1. ***Develop and execute a "brand" initiative.*** Branding is a process. One that requires intentional organizational focus on the members' perception of our identity and image, and the clarity of our message. We must clarify the value proposition and cleanly differentiate ourselves from other peer or competitor organizations. Yet, we clearly serve two constituencies, the senior facilities officers and the mid-level

managers, and their needs are somewhat different. One way to resolve this dilemma is to target cutting-edge educational programs to meet both the professional development needs of both. It is also important to recognize that APPA's mission is two-fold. And of equal importance, we must reinforce the strategic role of physical assets in education.

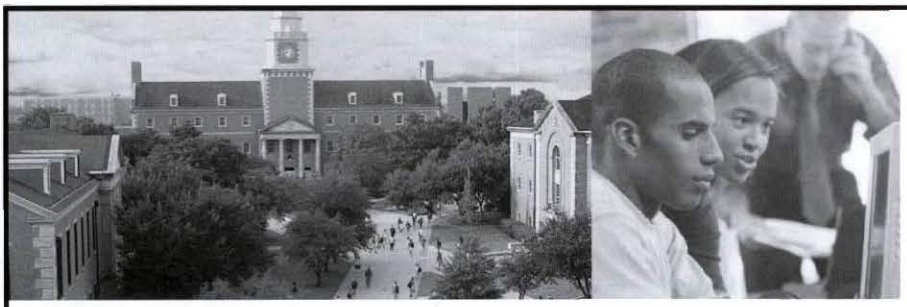
2. ***Develop and implement an enhanced website to become the "go-to" resource for facilities questions.*** Accordingly, APPA's website is undergoing a transformation to be more dynamic and robust, to improve user navigation, and to increase its utilization by young facilities professionals. As the world shifts technologically from information to communication, it will be critical for APPA to compete with other providers by improving the content and delivery of its website.
3. ***Expand research to build credibility and visibility by senior institutional officers.*** To accomplish this end, we must target strategic, institutionally focused projects and activities. This will enhance member service, increase the value provided by the association, and provide research information for better institutional decision-making. We are presently engaged in several critical activities, such as delivering the outcomes of our two major sponsored research projects at the upcoming 2006 joint conference in Hawai'i, The Campus of the Future: A Meeting of the Minds. *The Impact of Facilities on Student Recruitment and Retention* explores the differences of gender, race, institutional type, and other comparative responses. *Buildings...The Gifts That Keep on Taking: A Framework for Integrated Decision-Making,* will outline the value of a clear, well-articulated asset investment strategy designed to better predict and control facilities investment decisions. In addition, APPA has sponsored a Thought Leaders series workshop that will result in the identification and articulation of the critical facilities issues in higher education in order to positively impact the future state of higher education institutions. This body of work coupled with our Web-based Facilities Core Data Survey information and its resultant *Facilities Performance Indicators* will continue to build and further increase the awareness of facilities professionals and their issues with senior institutional officers.
4. ***Engage in symbiotic and collaborative partnerships.*** Through partnerships, APPA will increase the depth and breadth of its information and offerings, broaden its scope and value, leverage its resources, and create increased synergy across the facilities and educational community. Our strategic alliance agreements with both national and international organizations continue to increase value for our members. The code advocacy program comes alive in the

Lander Medlin is APPA's executive vice president. She can be reached at lander@appa.org.

magazine's Code Talkers column. Plus, synergy with APPA's regions and state and local chapter enhances value for all educational facilities professionals. Of particular note, APPA is working with Sebesta-Blomberg and the EPA's Energy Star program to improve our energy benchmarks and rating tools.

5. ***Engage Young Facilities Professionals.*** In doing so, we ensure a focus on the future that is knowledge-based and technologically improved. Young facilities professionals desire credentials to increase their mobility and to demonstrate their work accomplishments in more credible ways. APPA's Board of Directors has authorized the development of a credential for the young facilities professional *and* an accredited certification for the seasoned facilities professional. This is indeed an exciting new venture for all of us.
6. ***Provide Targeted Cutting-Edge Educational Programs.*** In Baltimore, Maryland next July, we will introduce a conference called "APPA 2007—Back to the Future" and a "Senior Facilities Officers Summit." These two educational programs will serve the continuing professional development needs of both mid-level managers and senior facilities officers. These activities are considered essential by the volunteer leadership to provide for a continuum of professional development opportunities for the educational facilities professional.
7. ***Establish Credible and Valued Credentialing Programs for Individuals and Institutions.*** APPA will endeavor to develop and deliver the first of two credentials at its new APPA 2007 conference in Baltimore, Maryland. Although a significant undertaking, its time has come. The need for a curriculum-based credential/ designation for the young educational facilities professional is overdue. The corresponding need for a certification for the seasoned professional will take more time to develop since it will incorporate both the body of knowledge of facilities management and successful demonstration that knowledge has been shared and applied at the institutional level. We are planning to unveil this accredited certification program at the APPA 2008 conference.

Implementation and execution of these focused strategies and targeted outcomes over the next three to five years will be critical to APPA's future as the association of choice for educational facilities professionals They will serve as the foundation for APPA to be the voice on strategic institutional issues for the educational facilities professional.



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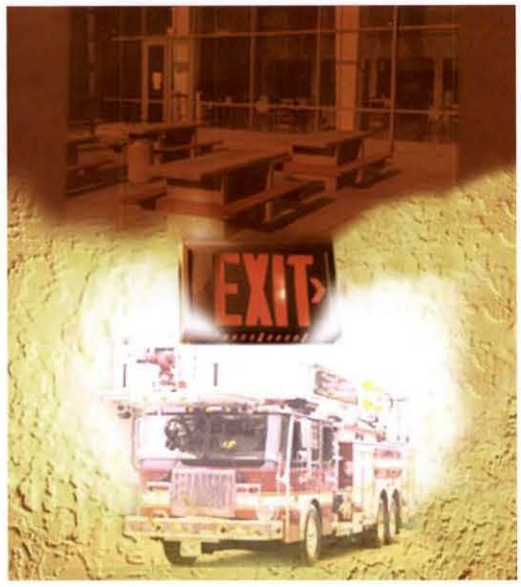
College Residence Hall Safety: Is the Code Enough?

by John Antonucci, B.A.

As someone who has been in the fire protection field for more than 30 years, 18 of them as a Fire Chief, I am used to putting out fires, so I am not going to dive headlong into a code dissertation, citing chapter and verse of all applicable codes as they relate to residence hall safety. It would serve our purpose better if I discuss the global sense of a few codes affecting residence halls and beg the question, "Is the code enough?"

The other day I sat in yet another committee meeting, this one addressing safety in residence halls, discussing a university's elevated bed, or loft policy. We talked about height, width, configuration, and anything else that could be even remotely related to elevated beds or lofts. This may seem reasonable to you, the reader, but to me the committee member, it is another 30 minutes of my life that I can never get back; 30 minutes that could have been better spent on fire prevention and saving lives. That particular institution has a student handbook that contains all student policies including those concerning elevated beds and lofts; these policies have been in existence for at least the past ten years. The university has multiple residence halls, more than half of which have pre-engineered and installed modular furniture systems. The remaining rooms have standard room furniture, and may be configured into lofts, providing the lofts are constructed in accordance with university guidelines and that a permit has been issued. Since the policies have existed for some time, it seemed that there was nothing to discuss.



After much waiting and biting my tongue, it was my turn to discuss fire drills—life safety issues—and the need to establish a written evacuation policy for residence halls that is not included in the student handbook. Whereas the structural safety issues of elevated beds had been a part of the student handbook for several years, the handbook did not contain a similar statement of policy to address this vital life safety issue. Policies for fire drills and evacuation have the potential to prevent life threatening danger for far more residents than does a loft policy. One of the committee members immediately asked, "Who says we have to have fire drills?" How do you even begin to answer that question? Often times, our automatic response to such a question is, "it is in the fire code," or "it is in NFPA," or "it is in the building code." Any of these is supposed to be a sufficient answer, after all, "the code" is what keeps us all safe, isn't it?

What is the code? Is it the absolute, is it a baseline for owners to build upon, or is it the minimum standard that we all tend to stand on from time to time as do most defense attorneys? Does it represent the ultimate protection? Consider NFPA 72 as it relates to residence hall fire alarm systems. Does providing detection in common areas and corridors afford adequate protection or adequate warning?

The same code applies to many different sizes and types of buildings with a variety of different occupant categories. Do systems installed per NFPA 72 provide acceptable levels of sound via signaling devices for application in residence halls? As construction techniques and materials improve, what is the acceptable decibel reading above ambient room noise in a sleeping compartment? We must keep in mind that the signal must be loud enough to rouse persons from a sound sleep and then cause them to take the prescribed action. If we follow the codes to the letter, will the alarms be sufficient to alert residents to danger in time to save lives? What level of signaling is required to do the job in this setting?

When considering R-2 occupancy, the International Building Code states that if an automatic sprinkler system is installed, the system shall conform to the outlined code provisions. The key words missing are "required system". Many lives depend on these few words. While it is true that certain local jurisdictions have enacted measures requiring sprinklers to be installed in residence halls, these measures always seem to follow catastrophic events.

Take into account the Boland Residence Hall fire at Seton Hall

John Antonucci, B.A. is the fire protection operations chief for the University of Notre Dame in Notre Dame, Indiana. This is his first article for* Facilities Manager. *He can be reached at john.v.antonucci.2@nd.edu.

In 1979, Notre Dame University's St. Edwards Residence Hall caught fire while undergoing an extensive renovation.

Today, Notre Dame is protected by a full-time career department.

Workers were installing a sprinkler system in St. Edwards Hall when this fire started. Unfortunately, the sprinklers were not functional yet.

University in 2000, in which three students died and 58 were injured. Most people remember that fire, but do we remember the Aquinas Residence Hall fire at Providence College in 1977, which claimed the lives of ten students? How far did we come in 23 years? Code may not require sprinklers, but how many more people must die before residence halls with sprinklers become the norm rather than the exception? How many grieving parents were satisfied to know that the residence hall in which their child died met the code?

Today's changing legal climate may begin to affect more immediate change in the level of protection provided in university residence halls. In a recent 2004 court case, a defendant stood upon code compliance while defending liability litigation. The campus facility was in compliance with an earlier code that had been in effect when the building had been constructed. Both the state court and state supreme courts upheld findings that the defendant had a minimal responsibility to provide a safe environment for all occupants. The courts further ruled that the defendants were responsible to remedy any dangerous situation that was reasonably foreseeable.

University residence hall safety is not only being scrutinized in legal circles, but also in peer group circles. All universities like to point to their respective ratings in academics, research grants, endowed faculty chairs, athletics, and anything else that can be used as a marketing tool. The *Princeton Review* has developed a rather telling survey that has 23 questions that rank a university based on the degree of safety provided for its students. You can find the survey at www.princetonreview.com (you will need to register to access the data at this website). It would be interesting to see how we would all fare after having answered the questions.

Three days after the Seton Hall disaster, the University of Notre Dame questioned its current level of protection provided in residence halls. Given Notre Dame's national reputation and an endowment comparable to some of those found in the Ivy League, the university seemed to be in an indefensible position. In February 2000, Notre Dame made the choice to be proactive and embarked on one of the most aggressive retrofit programs during that period.

The university's 27 residence halls each were equipped with code compliant fire alarm systems, and some degree of automatic sprinkler protection. Twelve residence halls were fully outfitted with sprinklers, leaving 15 facilities to be retrofitted. The university mandated project completion by August 2001 working only during summer and winter breaks. The project encompassed the installation of 8,500 sprinkler heads between May and August 2000, December 2000 and January 2001, and May and August of 2001.

Perhaps not every university is able to conduct such an aggressive retrofit project. Funding such a project becomes increasingly more difficult as economic pressures impact all facets of university management. We can however, become more vigilant in searching out those situations that may pose dangerous risks for our students, faculty, and staff. We can be *proactive* in our efforts. Standing on code compliance may no longer provide a defensible position. Is the code enough? Was the code enough at Providence? Was the code enough at Seton Hall? If you were a student living in a residence hall on your campus, would the code be enough for you?

APPA to Be Key Player in Historic Event in Higher Education

by Sam L. Polk Sr., Ed.D.

In July, APPA will join with the National Association of College & University Business Officers (NACUBO) and the Society for College & University Planning (SCUP) to offer an educational event that will provide educational and networking opportunities that no one in higher education has ever seen before.

Campus of the Future: A Meeting of the Minds will be held July 8-11, 2006 in Honolulu, Hawai'i. The conference has been designed to allow facilities professionals, business officers, university planners, and other campus administrators to build synergy through outstanding programming and collaborative networking. This single event will allow those who "wear many hats" on campus to gain all the professional development needed at one time.

The conference content has been designed to offer attendees ten tracks with 160 compelling sessions that will give insight on what the future holds for higher education. APPA members will find many sessions that cater specifically to their needs and interests.

Attendees will explore trends, challenges, and advancements on the horizon for the campus of the future. Chosen strategic thinkers will present value-rich topics including; students of the future, the campus of the future, tradition prosperity, and preparing for changes. These topics along with keynotes and panel discussions will provide for collaboration and working together to develop strategies that will help institutions successfully plan and navigate the future. APPA members Gary Reynolds, of Colorado College, and David Cain, of Carter & Burgess (formerly of Northern Arizona University), will discuss their report on the soon to be released CFaR study, entitled *Impact of Facilities on the Recruitment and Retention of Students.*

THE CAMPUS OF THE FUTURE

A MEETING OF THE MINDS

Honolulu, Hawai'i • July 8–11, 2006

In addition to the concurrent sessions, Campus of the Future will feature two outstanding plenary speakers: Thomas Friedman, a Pulitzer Prize-winning columnist with *The New York Times* and best-selling author of *The World is Flat*, will share his insights on the impact of globalization on higher education and what it means for our future; and Tim Sanders, Leadership Coach with Yahoo!, best-selling author, and irrepressible advocate for good values in the business world, will offer his perspective on how higher education creates today and tomorrow's civic society.

The exhibit hall will be unlike anything ever seen in terms of breath and variety. The Campus Expo will feature a plaza, walkways, open spaces, fountains, and even a clock tower to recreate a campus-like experience. Exhibitions will be positioned along campus-like streets and will display the latest products and services to support the campus of the future. APPA, NACUBO, and SCUP all see the value in working together to hold this conference, therefore each association has arranged to represent a different area of a campus on the exhibit floor. Attendees are encouraged to bring their teams and split up the knowledge; guaranteed to return home with more than ever thought possible!

APPA members should not miss out on this unique opportunity. APPA's visibility within this historic event is even more strategic as fellow members Doug Christensen, Rod Rose, and Terry Ruprecht will share the work of their CFaR project with the entire community.

Sam Polk

I would like to especially thank members of APPA who served with me on the Program Action Committee: Jack Colby, Maggie Kinnaman, Gary Reynolds, and Rod Rose, as well as APPA staff members Lander Medlin and Suzanne Healy. It was their guidance and dedication that has brought APPA this far in providing a program unlike any other.

Again, I encourage all members of APPA to register for this once-in-a-lifetime event. APPA's continued collaboration with NACUBO and SCUP will only help to advance the facilities professional in their everyday career on campuses and universities throughout the world.

See you in Honolulu!

Sam Polk is director of facilities management at Tennessee State University, Nashville, Tennessee. He is also APPA's Vice President for Educational Programs and can be reached at spolk@tnstate.edu.

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The Next Reporting Change

by James R. Watson

Chief financial officers (CFOs) are coming to grips with the fact that they have the ultimate responsibility for financial information provided to investors, creditors, and auditors. Measuring costs and reporting liabilities resulting from defined benefit pension plans have been sources of accounting controversy for many years. In 1966, the Accounting Principles Board concluded that improvements in pension accounting were necessary even if it was considered not practical at the time.

In 1995, the Financial Accounting Standards Board (FASB) issued Statement No. 123, Accounting for Stock-Based Compensation, which mandated that expense recognition for the fair value of employee stock options granted was the preferable approach. It permitted the continued use of existing methods with disclosure in the footnotes to the financial statements of the pro forma effect on net income and earnings per share as if the preferable, expense recognition method had been applied.

Pressure to adopt the preferable method has dramatically increased in recent years. Several major U.S. companies have announced their intentions to change their method of accounting for employee stock options to an approach that recognizes an expense for the fair value of the options granted in arriving at reported earnings.

In addition, public pressure and congressional oversight have dramatically changed the way pension funding and stock options are reported, and even the process of reporting sales. The impact, for example, of Enron and several other major corporations having to restate their earnings on investors' confidence has been dramatic.

Now, the next area in which CFOs and SFOs (senior facilities officers) may be held accountable is in the reporting or more precisely the non-reporting of the negative impact of a growing backlog of needed repairs and maintenance. Sarbanes Oxley and Executive Order 13327 (which requires all federal agencies to improve real property inventory data and establish performance metrics and goals for facility maintenance operations) have both added pressure to government agencies and public corporations to account for the value of the investment in facilities and the stewardship of that investment.

Corporations typically have facility assets that represent 20 to 40 percent of their net worth and the requirement for funding proper stewardship of that asset commonly estimated to be 4 percent of replacement value. This requirement is viewed by management as subjective and deferrable. Corporate reported earnings could be artificially inflated by simply not funding or under-funding this significant requirement, thus creating a backlog of maintenance and repair. The resultant liability can be more significant than any of the reporting issues FASB has recently addressed.

Current accounting practices do not account for this liability and permit the reporting of inflated earnings. While currently the standard practice, this non-reporting of a significant liability flies in the face of the spirit and intent of both FASB and the AICPA.

Until recent advances in facility asset management technology, the decisions to defer maintenance and repair were made under pressure to increase near-term profits and reduce reported costs and without auditable data exposing the impact on future earnings. The increasing use of auditable facility asset management technology now captures the extent of the backlog, creates a database of deficiencies that comprise the backlog, and more importantly calculates the significant short-and long-range impact on shareholder value.

The CFO now has the opportunity to regain the trust of corporate investors by not only following the letter of financial laws, but by taking the additional steps of embracing the concept of stewardship of the investment shareholders have made in the facility asset. This will result in dramatic saving in total ownership costs over the life cycle of facilities. Open reporting of unfunded maintenance and replacement requirements could very well become the next financial reporting change.

James R. Watson is director of federal programs for NexDSS, a MACTEC company in Kennesaw, Georgia. Watson can be contacted at jrwatson@ mactec.com. This is his first article for* Facilities Manager. *Also visit www.nexdss.com for additional information.

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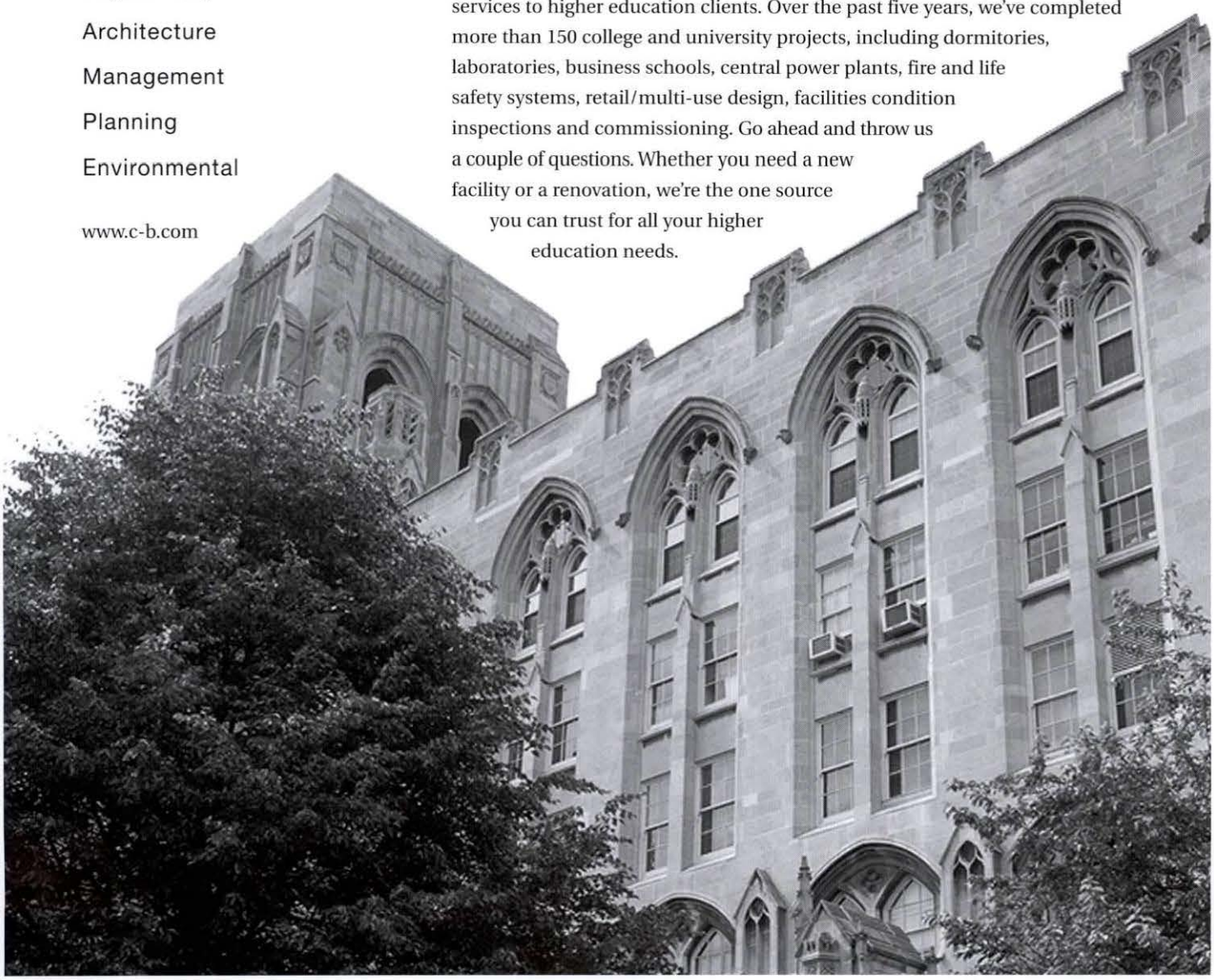

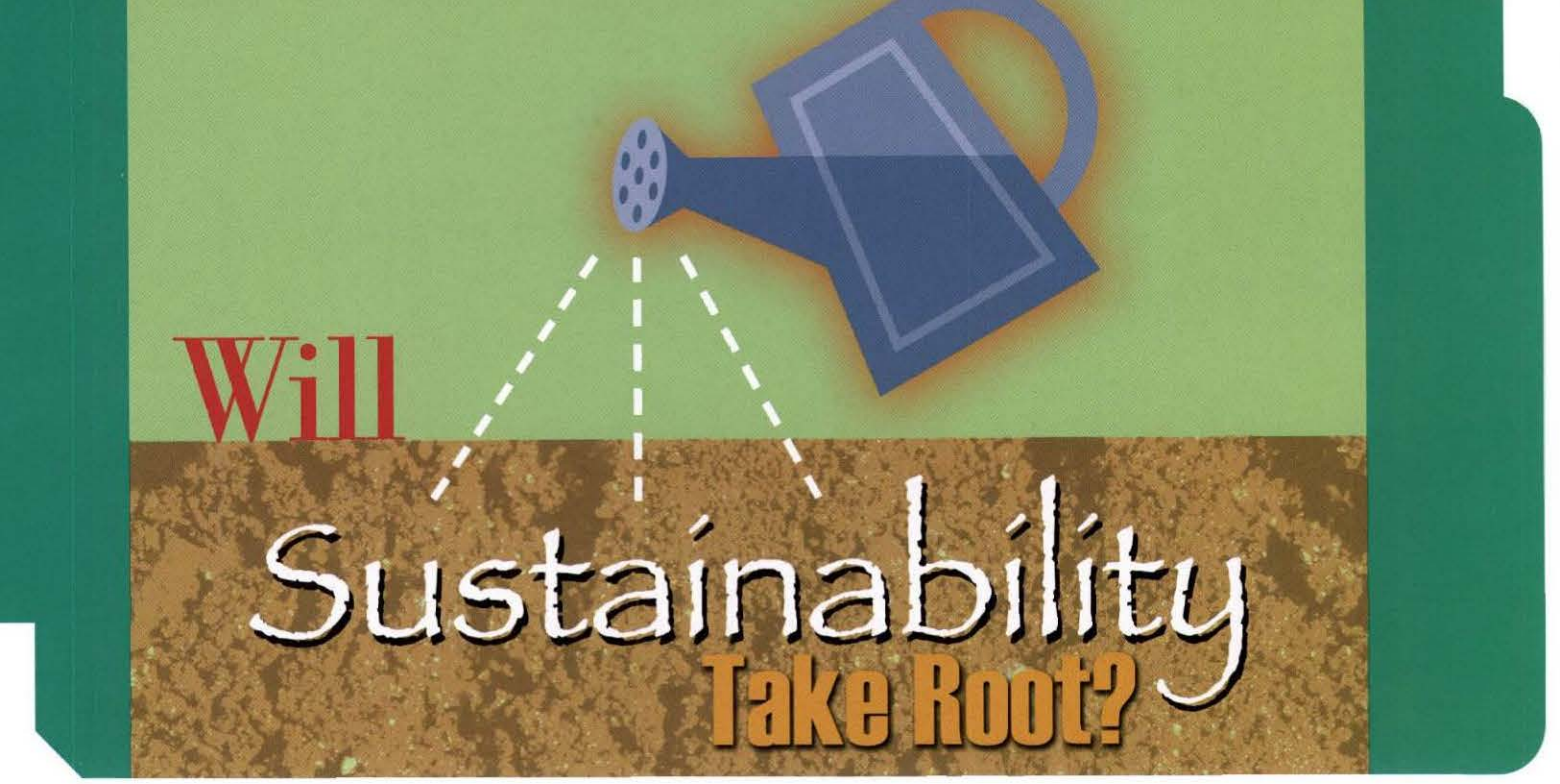

Will Sustainability Take Root?

by Karla Hignite

Do you know sustainability when you see it? The results of an institution's commitment to environmental, social, and economic health are often subtle. They aren't always evident, and they can be measured by what you *don't* find.

While every isolated action is important—from paving bike lanes to perking fair trade coffee to paying workers a living wage—the core value of sustainability transcends individual efforts. Campus advocates and practitioners who have been planting sustainability ideals for years declare that absent a strong network of support nurtured across disciplines, departments, and stakeholder groups, the probability that any initiative will reach full height is hampered. A holistic focus is needed to capitalize on curriculum changes and operational investments tilted toward a sustainable future. And that's what appears to be happening: More institutions are embracing systemic sustainability, pairing theory and practice and involving students in key problem-solving and decision-making roles.

Karla Hignite, principal of KH Communication, Tacoma, Washington, is senior editor of* Business Officer*; she can be reached at karlahignite@msn.com. This is her first feature for* Facilities Manager.** ***This article was developed by the National Association of College and University Business Officers on behalf of the joint APPA/NACUBO/SCUP conference, The Campus of the Future: A Meeting of the Minds, July 8-11, 2006, Honolulu, Hawai'i.

Why Now?

College and university sustainability projects have been around for years. The more recent push to connect academic and operational initiatives and reposition sustainability at the campus core is gaining ground in part because related issues have entered mainstream public debate. "There is growing awareness concerning how various social, economic, and ecological issues interrelate," says Judy Walton, executive director of the Association for the Advancement of Sustainability in Higher Education (AASHE).

In one example, serious concerns about energy supplies and costs in the midst of unstable economies, devastating natural disasters, and burgeoning development of population giants such as China and India have heightened discourse about a shared future on this planet. Combined, the 4,100 higher education institutions in the United States also represent a vast economic engine with a definite capability to leverage spending and consumption patterns in positive ways, says Anthony Cortese, president of Second Nature and AASHE cofounder. The question is: Does higher education have the will to be a key player in teaching and modeling sustainability? In the face of escalating operational costs alone, can it choose *not* to?

For Cortese, the problem drills much deeper. He argues that, at a macro level, higher education has made far more progress in modeling sustainability than it has in teaching about sustainability. "A sustainability focus requires that we as a society focus simultaneously on systemic solutions for building healthy, economically strong, and secure thriving communities." And yet, we still tend to view health, econom-

ic, political, security, environmental, population, and other major social issues as separate, competing, and hierarchical, says Cortese. Likewise, higher education itself is generally organized into specialized areas of knowledge and traditional disciplines, emphasizing individual learning and competition and producing graduates ill prepared for cooperative efforts.

"Because they prepare most of the professionals who develop, lead, manage, teach and work in, and otherwise influence society's institutions, higher education institutions bear a profound moral responsibility to increase the awareness, knowledge, skills, and values needed to create a just and sustainable future," argues Cortese. Understanding how to create a just and sustainable society must become a fundamental principle taught throughout all education levels and disciplines. "Sustainability is not one more issue that higher education must deal with—like computer literacy. It really is central to an institution's mission and function."

The number of alliances and coalitions that have formed in recent years to support sustainability show that it is gaining attention if not acceptance as an organizing value for setting mission. At the least, says AASHE Associate Director Julian Dautremont-Smith, society in general and local communities in particular are increasing expectations for higher education to respond to global challenges in sustainable ways. While early campus efforts represented more of a scattershot approach, Dautremont-Smith is excited about a recent convergence of four key areas in which he believes institutions can make a substantial impact: *energy, facilities, food*, and *curriculum*.

Hold the Carbon

Skyrocketing campus energy costs are encouraging more institutions to revisit long-term heating, cooling, and lighting options. More attractive than ever: conservation and alternative energy strategies.

Berea College, located in a southern Appalachian Kentucky community of 12,000, serves 1,500 undergraduates. Through its campuswide energy master plan, Berea is in the early stages of a multiyear project to redesign its energy system and slash consumption by 45 percent by 2015, says Diane Kerby, vice president for business and administration and past APPA President. In addition to building retrofits, Berea is transitioning from a 65-year-old coal-fired heat plant to natural gas. The roughly five miles of buried insulated pipe will bear only a 3 or 4 percent loss of energy compared to a 30 percent loss from the current central coal plant and will require about half the space, says President Larry Shinn. Geothermal technology represents another piece of Berea's new energy plan. Entertaining this option meant the college had to slow its renovation process and hire an engineering firm to learn about geothermal requirements and benefits. Today 5 of Berea's 70 buildings are heated this way.

"The entire process has entailed stepping back to figure out how to take a late 19th-century campus with $140 million in deferred maintenance in 1995 and turn it into something with a smaller environmental and financial footprint," says Shinn. It's been a somewhat slow, building-by-building approach, but the outcome will be measured not only in cumulative energy savings but in knowledge gained, says Shinn. "Along the way we are educating architects, contractors, our staff, and community members, whom we've invited to be part of our process."

Shinn argues that the greatest cost of ecological design is when you do little. "Cutting energy use of a single building by 15 percent is a good start, but if you can make bold steps to cut campuswide energy use by 40 or 50 percent, that will certainly cost more upfront but will save much more and more quickly." Leaders must base investments on fact, including costs of not implementing energy efficiency and renewable energy. Institutions that don't begin to pay attention to the need to conserve energy and water will pay mightily in the not-too-distant future when greater percentages of operating budgets are required for utilities, says Shinn. "We all need to calculate what we will spend in ten years if we don't do anything now."

Understanding how to create a just and sustainable society must become a fundamental principle taught throughout all education levels and disciplines.

Walter Simpson couldn't agree more. As energy officer for the State University of New York at Buffalo (UB), he believes that a key thrust of any campus greening effort must be energy conservation. "Simply put, energy reflects the single largest environmental impact of a campus—and the biggest potential payback," says Simpson. "You can do many things, but if you aren't serious about conservation, you are simply missing the boat."

In the world of energy conservation, Simpson is marathoner. He's been catalyzing UB's energy efficiency efforts since 1982 when he pitched the idea for his job to university administration by promising to pay his own salary from reduced energy costs. Since then, the combination of conservation efforts employed by Simpson and UB's facilities staff has paid off handsomely, resulting in an estimated annual savings of $9 million. Even so, says Simpson, UB's energy team is still scratching the surface.

On a campus as big as UB—with 27,000 students and 10 million square feet of buildings—severe energy price fluctuations can spell the difference between a $20 million and a $30 million energy bill during a single year, says Simpson. The big culprit: continued reliance on fossil fuels. "In addition to implementing dramatic conservation measures, making any real dent in energy cost savings requires a radical departure from current consumption practices. From an energy perspective, you aren't really talking about sustainability until you can cut

fossil fuel use by 60 or 70 percent." So far, UB has achieved about a 30 percent reduction—nowhere near where it needs to be, Simpson notes.

Until recently, the university was New York's largest purchaser of wind-generated electricity. "We've taken small steps in the right direction for renewable energy, but when you look at total consumption, renewable still represents less than 5 percent of our total energy source," he points out. This semester Simpson has rallied the involvement of several engineering students to analyze renewable energy options on campus, and he hopes to expand the research into a course this fall that will consider energy from a fully sustainable perspective.

"I could take you building by building and give you two tours of this campus. On the one hand I could point out some impressive conservation measures we've taken, but in the same breath note dramatic inefficiencies that still exist. In reality, this campus is still a giant waste machine. There is so much more we could be doing." Simpson says what he most needs is a big boost from the top. "To really start making the transition to energy sustainability, we need active involvement by campus leaders. This should be a campus priority."

Certified Sustainability

A second component pushing campus sustainability forward is the establishment of accepted criteria, says AASHE's Dautremont-Smith. While many institutions are developing critical internal benchmarks for measuring progress toward specific goals, national standards offered by external industry groups have done much to raise awareness about available and proven technologies and applications. Probably no other group is more recognized in campus sustainability circles than the U.S. Green Building Council for its levels of LEED (Leadership in Energy and Environmental Design) certification for both new construction and existing facilities. "Not only do national criteria help shape the debate around credible assessment tools, they also provide the basis for healthy peer pressure and public recognition," says Dautremont-Smith.

Look no further than the University of Florida for well-earned kudos. UF is sending a strong sustainability message with its certification achievements. Rinker Hall, a learning lab for architecture and building construction students, models the design and efficiency standards that students are being taught. *[Ed. Note: For detailed information on Ricker Hall, visit www.bcn.ufl.edu/rinkerhall/rinker.htm.]*

The new LEED gold facility is the second LEED-certified building on the Gainesville campus, where another 14 buildings are registered as LEED projects, says Kim Tanzer, UF School of Architecture professor and faculty senate chair.

Beyond its built environment, UF has received a prestigious certification from the Audubon Cooperative Sanctuary Program. When the suggestion was made to seek sanctuary status for the university's golf course, UF's associate vice president of finance and administration spearheaded a proposal to apply the standards across the entire campus, says Tanzer. The designation recognizes a high level of environmental stewardship in wildlife habitat management, resource conservation, and outreach associated with the 2,000 contiguous acres of the Gainesville campus, which includes 23 conservation areas, some off limits to human traffic.

What's for Dinner?

A third area of increased campus sustainability focus is within food services. Specifically, local food initiatives are carving a place at more institutions.

Middlebury College has been setting its table with local produce and dairy for decades. One third of its dining budget is shared among 35 suppliers in Vermont, says Nan Jenks-Jay, director of environmental affairs and planning. In an age of mass transport and wide food distribution networks, she says, that takes more effort than many may think.

One tangible benefit for students is fresher food, but the bigger payoff extends beyond campus boundaries. Support of local and regional production and labor sources strengthens local economies and bolsters community relations, says Berea's Kerby. Berea recently formed a steering committee of students, faculty, and staff to develop a local food initiative through which the college will become a patron and a producer, growing some of its food on existing farms located on campus. The proposal will also formalize the college's commitment to buy locally produced food and make evident the institution's economic link to its community, says Kerby. "Establishing guidelines for purchasing targets will entail working closely with local producers to determine their capability and may require helping local farmers get organized, perhaps by forming cooperatives, so they can meet Berea's increased needs."

According to Cortese, sustainability blossoms in such instances when colleges and universities start to understand their mutual interdependence with their local and regional communities. And understanding occurs to the extent that institutions view themselves of their communities and not merely in them.

Changing Coursework

No discussion of what campuses are doing to promote sustainability would be complete without considering what they teach. While decades-long environmental studies programs

have produced wonderfully trained specialists, the harder part—and arguably the greater need—is to infuse the full curriculum with a sustainability focus, says Cortese. Among the institutions to comprehensively tackle this challenge is the Georgia Institute of Technology, where the process has proven intensive and long term.

Berea has been sustainability-minded since its founding, with a long-standing commitment to educating students of limited economic means and a strong focus on interracial education and service-learning opportunities. More recently, concerted efforts toward ecological proficiency have grown central, with a multidisciplinary sustainability and environmental studies program. And students aren't only learning about sustainability in the classroom. Ecovillage is the college's newest residential component for married and single parent students who, along with their children, experiment with environmentally responsible living through everyday practice. Vegetable gardens, fruit trees, a greenhouse, and a wetland are accompanied by technologies that help residents dramatically reduce energy and water use by up to 75 percent.

That kind of modeling and experimentation are vital for sustainability as a core value to take root, believes Cortese. "Ultimately the entire educational experience of students is a function of not only what they are taught, but how they are taught and the way in which an institution conducts research, manages operations, designs facilities, purchases materials, invests resources, and interacts with local communities," he says. "In many cases, we think of these as separate activities. They are not. All parts of the university are critical in creating transformative change in the individual and collective mindsets."

If sustainability makes such good sense, why aren't more institutions heading down this path? Why aren't some further along? One major impediment to a full-scale sustainability focus is denial of the real-world challenges we all face, says Shinn. "College campuses are good at this. Not all scientists agree, therefore we don't think we should move forward. The very diversity of opinions on campus can create a certain skepticism about taking any action."

Half Full

Despite its unrealized potential, sustainability is gaining ground to an extent that should dissuade glass-half-empty thinking. The promise that a sustainability focus can permeate a campuswide agenda certainly seems feasible. But most veterans caution that cultivating a sustainability mindset still requires getting down in the weeds.

For Simpson, putting a commitment in ink can encourage desired actions and attitudes. More institutions are developing socially and environmentally responsible purchasing policies and spelling out specific benchmarks for everything from tons of waste recycled and kilowatt hours saved to zero sweatshop-produced products sold in the bookstore. Not having written policies and standards can be a real impediment, says Simpson.

One achievable goal in his mind would be shifting the entire UB campus to 100 percent post-consumer content recycled copying paper. "Currently about 60 percent of the campus has converted. Getting the remaining 40 percent on board would be much easier with a campus policy," he says. "We can do only so much by knocking on doors to make a plea for voluntary transition."

Good policies are one thing. Implementing those policies is another matter. UB has energy-conserving temperature polices, but compliance is a challenge, Simpson admits. "We do our best, knowing that each degree of overheating is costing us more than $300,000 a year." Deep cuts in energy use and kicking the fossil fuel habit will be possible only when everyone sees the urgency of addressing problems such as climate change and is ready to make sacrifices for the sake of achieving genuine sustainability, says Simpson.

The invisible nature of daily consumption is another impediment, notes Cortese. "We simply don't see the waste stream associated with the manufacture of goods and prod-

ucts or their disposal." Making that waste expressly visible should be a key strategy for institutions in teaching sustainability, he says.

The invisibility of stakeholders can also stunt efforts, says Simpson. While cross-disciplinary collaborations have begun to flourish, the tendency still exists to leave out at least one key constituent. Too often, when institutions engage in new construction, fixed budgets force decision makers to shave on first costs without factoring in long-term operation and maintenance costs that will eventually become burdensome, says Simpson. "Who is missing is the next generation. Any decision ought to require children in the room as a reminder of future costs and who will pay."

Likewise, cost-cutting decisions should be considered in light of potential impacts to other program areas, says Simpson. His goal of moving UB from 35 percent recycling of solid waste to 50 percent or better should get a boost with improvements in construction debris recycling. His bigger concern now is what appears to be a setback in office paper recycling. UB's incremental transition from fully benefited state cleaners to contract cleaning crews who are paid low wages and no benefits has resulted in high worker turnover and a sloppy job of keeping recyclables out of the waste stream, he notes. "Understandably, when university employees start to believe that their efforts to separate materials are a waste of their time, they lose interest in recycling, and the program begins to unravel." As Simpson asserts, this is also a living wage issue that shows how sustainability has a justice component.

Externally, the ways in which institutions are evaluated present a significant obstacle, Tanzer believes. "In addition to assessing institutions on student-teacher ratios and their volumes of library holdings, what if institutions were also accountable for their energy consumption?" On the positive side, commitments to diversity and access do give sustainability a foothold in the larger debate, she notes. "If institutions would begin measuring the criteria by which students choose the institution—including decisions based on an institution's sustainability focus and programming—perhaps national rankings would some day include these aspects in their priority mix."

As Cortese suggests, one way to expedite that kind of influence on accreditation standards would be to seek a strong voice among employers in business and industry asking for graduates with the kind of knowledge, skills, and values needed to move society toward a sustainable future.

Influencing a significant shift in the priorities of external funding sources is another key challenge, says Debra Rowe, professor of renewable energies and energy management at

Bartlett Science.

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Oakland Community College, Bloomfield Hills, Michigan, and senior fellow of University Leaders for a Sustainable Future. "Many foundations that fund sustainable production in non-industrialized countries—such as fair trade coffee or sustainably harvested wood—don't yet recognize that sustainability initiatives within higher education in the United States are necessary to create healthy demand for these sustainable products."

You Are What You Fund

Internally, how to pay for sustainability initiatives requires creativity. Rowe believes bonds offer one great way to fund a package of sustainability projects. "While an individual project may not have a return on investment that would meet that of a bond, the combination of projects that focus on both the social and environmental components of sustainability can meet that ROI and allow a much greater number of projects to be implemented."

Budget incentives don't hurt. The promise of payback can set significant savings in motion that pay for other initiatives and programs, says Tanzer. With approximately 75,000 people on its Gainesville campus each day, UF is a city unto itself. "Specific steps we take to reduce energy consumption can have a big impact on institutional savings." The university has the ability to measure energy use within each building and is working on an incentive program to reward departments and units that reduce consumption by giving half the savings back for them to use as they wish.

Jenks-Jay believes institutional funding should be used to encourage further innovation. "Funding to explore and experiment with campus sustainability can not only result in savings back to the institution but can also reinforce the very purpose of higher education." In 1999, Middlebury initiated an environmental grants program with a mere $1,000. After seeing the results of first-year projects, the president was so impressed that he offered $10,000 from his discretionary fund to support the next grant cycle, says Jenks-Jay. Since its inception, the program has awarded $69,000 to fund 56 projects, and the college is now working to permanently endow the program.

Grants are available to anyone on campus, but to reinforce the collaborative spirit of sustainability, proposals that include involvement by more than one group—such as students and faculty or students and staff—are more highly ranked, says Jenks-Jay. "Many of the grants have served as the catalyst to lead to permanent systemic changes on campus." For instance, one grant made it possible to offset the initial higher costs of using a 100 percent recycled, no-bleach paper stock for the college magazine. In making the switch, the college is planning to partner with other institutions in a bulk purchase agreement to bring down overall expenses on a permanent

Continued on page 25

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Continued from page 23

basis. Beyond inspiring innovation and creating collaborations among staff, faculty, and students, she believes the grants program models the foundation required for larger societal sustainability by breaking down barriers, encouraging trust in partner relationships, and building an ethic of joint problem solving.

That kind of close-knit collaboration presents a bigger challenge for an institution the size of UF, but the university's sustainability committee is striving to bring together the hundreds of faculty members working in some aspect of sustainability. For starters, the committee is developing a dedicated Web section for faculty research to capture their projects and to encourage at least virtual interactivity, says Tanzer.

In building interactions, it's important to cast a wide net when identifying campus sustainability, says Cortese. "Those who work to improve public health may not think that what they do relates to sustainability. But the health of individuals is an essential component of a sustainable society."

Germination

Ultimately, the benefits of sustainability are lost if not communicated—externally, internally, and at all levels, says Cortese. He believes one indicator of whether an institution is moving toward a sustainable future is what it is doing to promote its initiatives in every manner possible.

Ironically, while colleges and universities are a hotbed of learning and innovation, they often miss key opportunities to educate, says Cortese. "I have toured six new LEED silver buildings on campuses in the past six months and only one had information about its sustainable design and what that means for the community." Finding ways to celebrate and communicate everything being done by anyone—administrators, business and operations staff, faculty, and students—is critical for shifting a campus community in favor of sustainability.

According to Cortese, other essential elements of germination are these:

- Is sustainability recognized as a core goal of education and practice by the president, trustees, and senior academic and administration officers?
- Is it incorporated into the mission and vision?
- Are academic and operational policies in place and relations established with the local community to help move in this direction?
- Are specific rewards and incentives in place for faculty and staff that make sustainability an obvious goal?
- Have indicators been established and measurement processes put in place to benchmark progress?
- Does the institution have a comprehensive communication plan that not only celebrates what it is doing but also connects those activities with the social and economic health of its larger community?

Learn More at Hawai'i Conference

With the spread of sustainability as a piority focus joining campus sectors, associations serving academic, business, operational, planning, and student leaders are likewise collaborating on behalf of their individual and institutional members. The newly formed Higher Education Associations Sustainability Consortium (HEASC) is an informal network of associations with a shared commitment to advancing sustainability within their constituencies and within the higher education community by supporting the programming of other member associations, exchanging information and ideas, and engaging in joint projects.

One such collaboration is The Campus of the Future: A Meeting of the Minds conference in Hawai'i, July 8–11, cohosted by APPA, NACUBO, and SCUP. These three HEASC member associations also collaborated to copublish the soon-to-be-released book *The Business Case for Renewable Energy: A Guide for Colleges and Universities,* which is excerpted in this issue on page 38.

www.campusofthefuture.org

Even after an institution has embraced and internalized the concepts of sustainability, it still must commit to ongoing internal education, says Shinn. "We will always have an influx of new faculty, staff, and students each semester. In trying to make sustainability part of the air we breathe, we must continue to entertain the broad philosophical question about humans in relationship to their natural and fabricated environment."

From a practical standpoint, engaging that philosophical debate is more easily accomplished if sustainability efforts are centralized. A Berea graduate, Tammy Clemons serves as sustainability coordinator for her alma mater. "Part of my job is simply making sure that the campus community has access to information about green purchasing practices and recycling," says Clemons. Currently she is compiling best practices so

that others are aware of what they can do without reinventing the wheel. Assessment efforts include monitoring performance metrics for a range of activities and 24 progress indicators established by Berea's campus environmental policy committee. The college also tracks students' awareness of and commitment to environmental issues from the time they enter as freshmen to when they graduate.

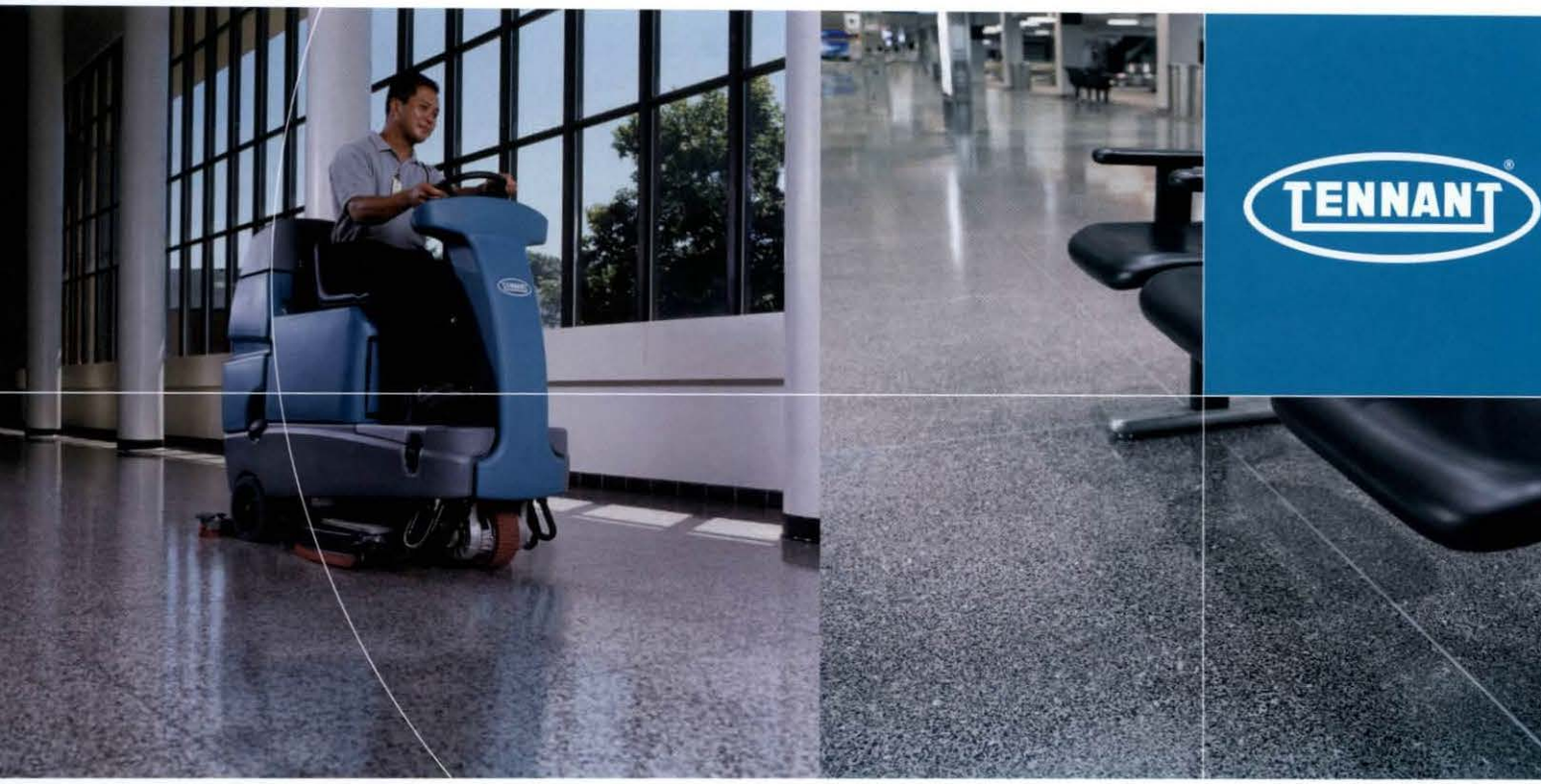
Education, another component of Clemons's role, may be as straightforward as explaining how a product is offered on campus. Recent energy efficiency measures to turn off display lights on vending machines required signage to let people know that the machines were operable. "Part of teaching sustainability is modeling behavior," says Clemons. "It's important to show that you don't have to suffer to be sustainable but can still operate in ways that contribute to personal comfort and convenience without harming other people, cultures, or the environment." To the extent that institutions model these behaviors, Clemons believes municipalities will take note of the possibilities and potential for sustainable living.

Other venues for bringing campuswide sustainability front and center include formal governance structures. Middlebury College's environmental council is a standing committee of appointed faculty, staff, and students that recommends policy, educates the campus community, and advises the president about projects and their progress. Jenks-Jay believes that the prominence given to serving on the council and to her own role speaks volumes about the institution's commitment to placing sustainability at its core. She was recently involved in the search for a new vice president for facilities and is serving on the committee to name a new architect firm responsible for campus design under a new master plan. A newly revised college mission statement clearly identifies a commitment to environmental stewardship in both curriculum and campus practices, says Jenks-Jay. "Sustainability isn't an add-on here, but is central to the decision-making infrastructure of the institution."

Beneath the Surface

As higher education cochair for the U.S. Partnership for the Decade of Education for Sustainable Development, Rowe has seen a national trend toward sustainability in both the higher education and the corporate sectors. And for those that haven't yet found their sustainability footing? "My experience is that many colleges and universities can already find a sustainability focus somewhere within their mission," says Rowe. "At its core, sustainability is about educating students and the larger community of the challenges our society faces and providing them with the skills and knowledge to engage in solutions."

Seeds worth planting.



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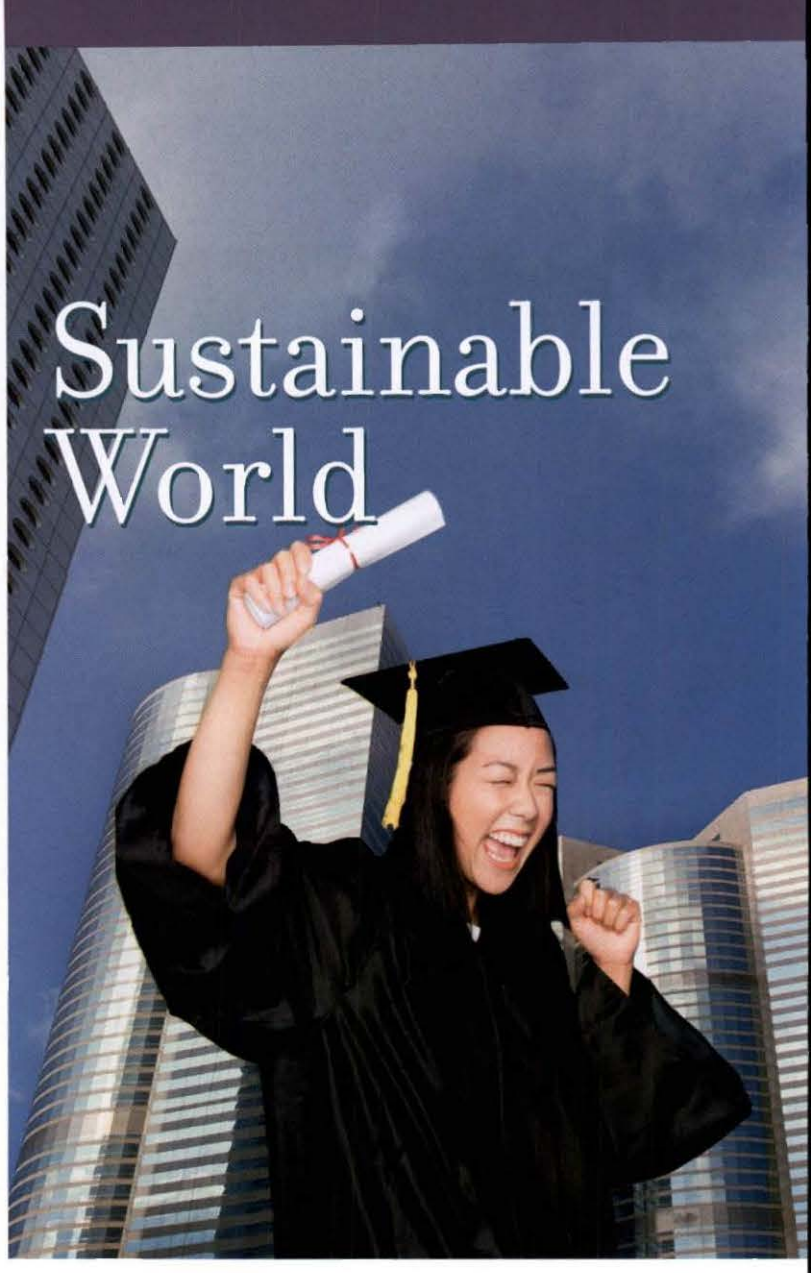


When students leave college and seek employment, they often wish they could obtain the secret formula for obtaining their dream job. What, they wonder, do employers want from their employees today? In addition, what will organizations seek in the future? All employers are looking for a set of skills beyond the job-specific technical skills from their employees. They want interdisciplinary skills and experiences, along with the deep disciplinary grounding.

Moreover, as time goes on, employers are finding that they need employees with a holistic understanding of natural systems and environmental sustainability. In fact, one of the most important drivers for sustainability literate graduates will be the demand from employers. Increasing public interest in environmental issues and responsible organizational behavior means that companies increasingly must manage their environmental and social performance alongside their financial one. Additionally, several expected changes to corporate law could make the reporting of environmental impacts mandatory for large companies, with smaller ones influenced through the supply chain.

Sustainability is a complex issue, involving many disciplines and perspectives. Globally, professionals in many roles are realizing that they need to demonstrate their skills in dealing with such complex problems. For example, as a part of their education accreditation procedures, several professional associations now require undergraduate programs to demonstrate how sustainable development is incorporated into the curriculum.

The skills that students need to learn are not just about the work tasks. They also serve crucial environmental and social purposes. Achieving a sustainable and equitable society depends on young people leaving school or college with the full set of abilities that they will need. When students lack such skills, this deficiency is likely to be compounded during their lives, and they often struggle in the work world.

When we combine the general skills that will be required, as well as those that involve environmental sustainability, it comes to quite a list. Students will need help from their universities, mentors, communities, families, and interim employers—we all have a part in shaping our young people.

So, what is this magical list of skills? Many of them are hard to identify, and even harder to train someone to have. Just a few of them are:

- Communication skills—listening, verbal, written and interpersonal—are by far the skill mentioned most often by employers
- Understanding the need for the shift to sustainability

By Carol Ann Brodie

***Carol Brodie is a doctoral student and staff member at the University of the Pacific, Galt, California. She is also a member of the Advisory Council for the Association for the Advancement of Sustainability in Higher Education (www.aashe.org) and can be reached at cbrodie@pacific.edu. This is her first article for* Facilities Manager.**

- Sufficient knowledge to decide and act in a way that favors sustainability
- Adaptability and flexibility
- Problem-solving skills
- The ability to work in a team
- Analytical and research abilities
- Multicultural sensitivity and awareness, including in an international context

So, how do our young people learn all of this? Simply put, through experience. As often documented in the literature, we remember 80 percent of what we do or experience, versus only 10 to 20 percent of what we hear. Additionally, few real-world problems rest comfortably within individual disciplines; therefore, it is helpful for a student to be able to view a situation from many viewpoints and disciplines.

We must be careful, though, that employer demands are not the sole reason for teaching sustainability. A paradigm shift is occurring, and a sense of urgency is pervading our society—the time is now, we must respond. The economy, politics, and the whims and fads of society should not dictate this effort. In addition, the flip side of this same coin is that sustainability should be looked at as a reason why someone would want to work for an organization. It represents a commitment to the future. The organizations that people want to be a part of are ones that have a sense of their past, as well as a sense of purpose for the future—these values attract people. Adding sustainability to the mission and values statement—and then carrying them out through policies and practices—strengthens an organization's place in the world.

Adding sustainability to the mission and values statement—and then carrying them out through policies and practices—strengthens an organization's place in the world.

An example of how students are being prepared to deal with issues of sustainability in a complex world, through curriculum, policies and practices is taking place at the University of Washington in Seattle.

University of Washington Preparing Students

In November 2005, I spent a few hours at the University of Washington, Seattle campus, talking with David Secord, co-director of their Program on the Environment (POE), an interdisciplinary program offering a degree in environmental studies. I set out to learn more about POE, and all of the other environmentally related activities on the UW campus. What I found out was remarkable.

POE was started in 1997, with the intent to foster an inclusive, interdisciplinary approach to environmental studies. At the time, these educational activities were decentralized, and the campus was realizing the need to bring people and expertise together. POE was formed, and soon thereafter launched a new Bachelor of Arts in environmental studies and took on the coordination of the Graduate Certificate in environmental management. Secord states that this Certificate program stands on a "three-legged stool"—with the "legs" representing science, policy, and business.

Building on integrative courses, field and study abroad experiences, all POE environmental studies majors also complete a year-long culminating senior "Capstone Experience" project. This experience requires the students to participate in community-based research and learning in government, non-profit or corporate sectors. A recent issue of POE's newsletter Connections describes several of the students' activities, from working with immigrants and farmworkers, to ecological restoration and investigative journalism, and working on Superfund sites on the Columbia River. Secord states in a recent issue of Connections: "We are all about connections and we thrive—indeed, depend upon—creativity in our collaborations."

Secord is working hard to prepare his students to succeed in the world. He says that his goal is to give students life-changing experiences, and to teach them how to approach complexity of big societal issues that combine social, cultural, economic, and scientific dimensions of the environment. Central to POE is the opportunity for students to become well informed about an issue, and then giving them the opportunity to share the information with relevant audiences.

For example, a recent experience that POE offered students was a class entitled Choices and Change in the Arctic National Wildlife Refuge. After preparation in Seattle, the nucleus of this class was a trip to the Arctic National Wildlife Reserve (ANWR), a highly contested landscape. Twelve students—six undergraduate and six graduate—and two professors spent 11 days in Alaska, including eight days rafting in the reserve and three days debriefing at the University of Alaska, Fairbanks. These students reflected the many lenses that this issue must be viewed through, coming from degree programs as diverse as environmental studies and international studies to economics, geology, political science, and marine affairs.

ANWR is a 19-million-acre wildlife refuge, having obtained that status in 1980, 12 years after the largest known oil field in North America was discovered in Prudhoe Bay, about 60 miles to the west. Despite its prominence in the media and politics, less than 1 percent of the nation's popula-

tion visits the reserve each year. Secord says that the students who went there ultimately grasped the immensity of the problem, despite the complexity of all the issues within and around ANWR. And age or progress in their program did not seem to matter—they all had a life-changing experience. He feels that diversity was the key to that understanding—the contingent represented eight academic departments. Together, they learned a great deal from each other—there are disciplinary depths surrounding such places as ANWR, and they come together in a complex, multidisciplinary puzzle. The field part of this course was partly funded by student travel scholarships provided by two donors to the Program on the Environment, the Lucky Seven Foundation and local Seattle businessperson Tom Campion.

Secord said that the students came up with a phrase to describe their experience: "There's more there than you think." While there, they explored several different avenues very deeply—environment, history, petrol, indigenous peoples, geology, and politics. Students met first-hand with two dozen individuals – in Seattle, Fairbanks, and native villages—who as scholars, politicians, business people, or citizens have been directly engaged with ANWR for decades. Secord feels that the experience was a model for how we can make environmental education at a big research university reflect the complexity of actual controversies. This model—combining multiple people, disciplines, and an intensive place-based analysis—could be applied to other important and contested issues, both locally and internationally.

As a follow-up to the Alaska trip, 10 of the 12 students went to Washington, D.C. This trip was not a formal part of the course, nor was it even anticipated before the course began. Students viewed it as a way to bring their uniquely well-informed study and experience to the decision-making arena. Secord said this trip to our capital was a revelation for the students in regards to how policy is formed. The idea for the trip started in Seattle and Fairbanks, when students met with environmental staff for Senators Maria Cantwell (D-WA) and Lisa Murkowski (R-AK). They also met with several Gwich'in tribal elders. The Gwich'in tribe has lived in the arctic for thousands of years, and they are heavily reliant on the caribou that migrate to the refuge each year. The elders and other class speakers urged the students to do something further with the wealth of knowledge they had gained. In response, the Lucky Seven Foundation funded the optional student trip to Washington, D.C., where the students met with members or staff of eight House or Senate offices from both Democratic and Republican parties and debriefed them on what they learned. On November 21, the students who had gone to ANWR made presentations to over 250 people in Seattle, including the general public, faculty, staff, and students.

Earlier this year Secord led another course, Comparative International Perspectives on Cities and the Environment, to New Zealand and Australia. Fifteen students explored international approaches to urbanization and the environment in three growing coastal metropolitan areas: 1) Seattle-Tacoma, Washington, 2) Sydney, New South Wales, Australia, and 3) Auckland, New Zealand. For 35 days, the students traveled and learned from their interactions with faculty, local urban and naturalist guides, indigenous peoples, urban planners, marine and terrestrial scientists, sustainability experts, and the incredible diversity of sites, organisms and habitats in urbanized Australia, New Zealand, and the Pacific Northwest.

The entire curriculum at UW actually helps provide the interdisciplinary training that students need to work in a complex, sustainable world. A variety of sustainability courses are offered across the university in fields such as sustainable design, sustainable energy, sustainable development, sustainable natural resource use, and corporate and industrial sustainability. Interdisciplinary degrees are available to graduate students, as well as POE's Environmental Management Certificate Program and an interdisciplinary program called Interdisciplinary and Policy Dimensions of the Earth Sciences. The latter provides graduate students in the Earth sciences a forum to explore interdisciplinary and policy dimensions of their science, and extend their graduate research to encompass those dimensions.

In the College of Architecture and Urban Planning, the UW BaSiC Initiative (Building Sustainable Communities) allows faculty and students to work together to develop partnerships throughout the campus, and with communities in the U.S. and Mexico to develop sustainable communities. For example, the Mexico Program occurs during the winter quarter in various squatter settlements in Morelos. Moreover, the Strawbale Program in Montana occurs during the summer quarter, building on various American Indian reservations.

Campus Experience

In addition to their coursework, UW students have a variety of on-campus opportunities to help them prepare for a sustainable world. Student organizations help to promote sustainability on, and off, campus. For example, the Graduate Environmental Policy Forum (GEPFa) is the student organization associated with the Environmental Policy gateway at the Evans School of Public Affairs. GEPFa is an active participant in the UW environmental community, hosting events and brownbag discussions throughout the school year. In addition, GEPFa offers students an opportunity to network through events both on and off campus.

The Sustainable UW Alliance is an umbrella group for campus interests that wish to see sustainability institutionalized at the University of Washington. Recent projects of the Alliance include passing through student government a small student fee for clean energy investments, as well as an assessment of water use, electricity use, vehicle miles traveled (and fuel efficiency), and solid waste generated. Additionally, the group is collecting the sustainability research and projects being done by UW students into an online bibliography.

Secord and others at UW have also made a commitment to sustainability through their membership in the Association for the Advancement of Sustainability in Higher Education (AASHE), a professional association of colleges and universities working to advance sustainability in higher education in the U.S. and Canada. AASHE promotes the efforts of the entire campus sustainability community, uniting diverse initiatives and connecting practitioners to resources and professional development opportunities in curriculum, operations, facilities, and outreach. The association also provides a professional home for campus sustainability coordinators and directors. AASHE conferences bring together administrators, faculty, students, business and community leaders, and others interested in sustainability.

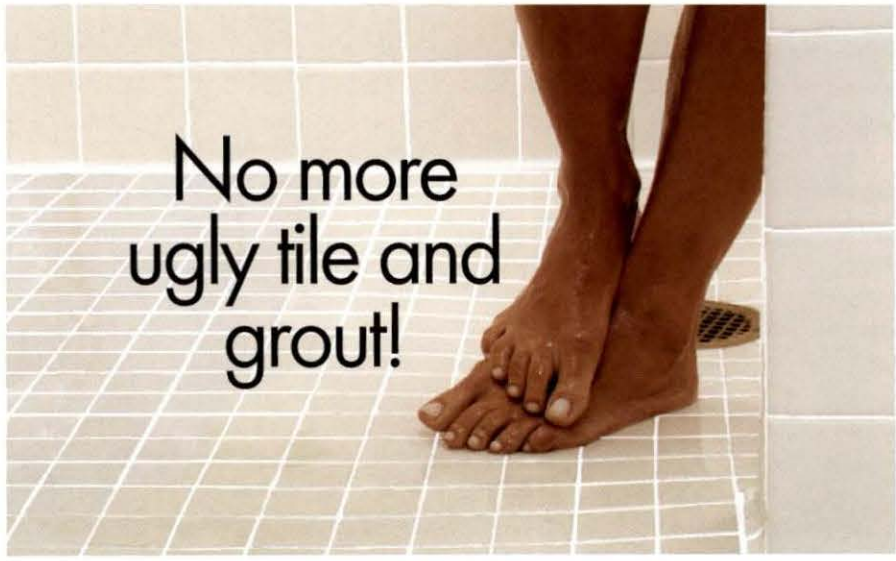
Buildings and Facilities

Additionally, the university's physical setting and operations promote sustainability, providing a consistent message to students about the appropriate way to live, work, and earn. The university's policy on environmental stewardship states, "By exercising effective management over its activities, the University will promote the sustainable use of its resources, seek to minimize risks to and negative impacts on the environment, and underscore our commitment to protect human health and the environment."

The University of Washington Campus Master Plan—Seattle Campus 2003 guides campus development. The Plan states that sustainable building is an integrated framework of design, construction, operations and demolition practices that encompass the environmental, economic and social impacts of buildings. It goes on to describe sustainable design as that which includes efficient management of energy and water resources, management of materials and waste, protection of health and indoor environmental quality, protection of the environment and reinforcement of natural systems and an integrated design approach.

Because of this foresight UW has shown, several of the buildings on campus have won acclaim. For example, in 2005 Merrill Hall at the Center for Urban Horticulture was awarded a LEED Silver Rating.

Two other completed projects include the Nordheim Court Apartments and UW Tacoma Phase 2B. The apartments feature a hidden 150-car underground parking garage, an electrical car fueling station, upgraded insulation, and passive solar design. UW Tacoma Phase 2B is the adaptive reuse of five existing warehouse buildings in the City of Tacoma's historic Union Station District by the University of Washington Tacoma campus. The project included reuse of historic structures, revitalization of an historic, urban neighborhood, and hazardous materials abatement. The project also included the use of materials salvaged on site; increase landscaping areas,



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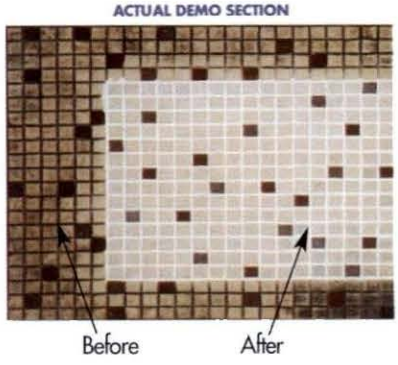

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The university's Capital Projects office lists over a dozen current building projects, all of which encompass LEED standards.

Energy and Water Conservation

The university also sets high standards, and is a model of efficiency, in its use of energy and water. Considered a large user of energy in Seattle, the city conducted an energy audit of the university in 1994. Following that audit, UW entered into an agreement with Seattle City Light to implement energy conservation measures. Examples of measures taken include occupancy sensors, heating thermostats set at 68 degrees F in most buildings, lowered water heating thermostats, and a higher air conditioning temperature.

Water conservation measures have included replacing 1,500 older toilets for a projected savings of approximately 30 million gallons of water annually, installing over 100 water-free urinals for a projected savings of approximately 40 million gallons of water annually, and computerizing campus irrigation systems.

Recycling

Recycling at UW is part of a comprehensive solid waste management plan. The recycling program is visible, convenient, and maximizes the recovery of waste. The plan includes waste reduction, procurement of recycled goods, waste collection and disposal, administrative oversight, and outreach efforts designed to educate the campus community regarding recycling opportunities and services.

Transportation Solutions

The ways in which the university deals with transportation needs also sets an example to students, and the community at large. In 2004, UW won the Governor's Award for Pollution Prevention and Sustainable Practices, winning for its Motor Pool.

UW has developed a wide-ranging transportation management plan, with several components. The U-PASS program is the main component of the plan, and covers transit, parking management, carpool/vanpools, bicycle, and pedestrian. Additionally, the university operates two local shuttles. Implementation of U-PASS in 1991 helped to increase the use of transit by students, faculty, and staff.

Currently, the university coordinates with the transit agencies for ride sharing, which helps encourage car and vanpools to and from campus. Additionally, UW offers discounted parking rates to carpool/vanpool users. With a U-PASS, members of a carpool/vanpool can park on campus free-of-charge.

UW is also supplying bicyclists with numerous locations for securing and storing their bicycles on campus. Clothes lockers and showers are available at some of these locations, and the university has the largest inventory of bike lockers in the nation.

Summary

The University of Washington is educating its students about sustainability through a well-thought-out curriculum taught by forward-thinking faculty. They also educate their students by setting an example of how a large organization—and individuals—can exist comfortably today and yet still leave more than enough for the future.

For more information on UW's programs of sustainability, including their environmental degree and certificate programs, visit http://depts.washington.edu/poeweb. For more information about environmental and social sustainability, visit AASHE's website, www.aashe.org.

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[1]Software developed in consultation with Jack Dudley, P.E., Editor and Co-Author of the First Edition of the *Custodial Staffing Guidelines* and Co-Author of the Second Edition. Mention of APPA does not imply endorsement of the product.
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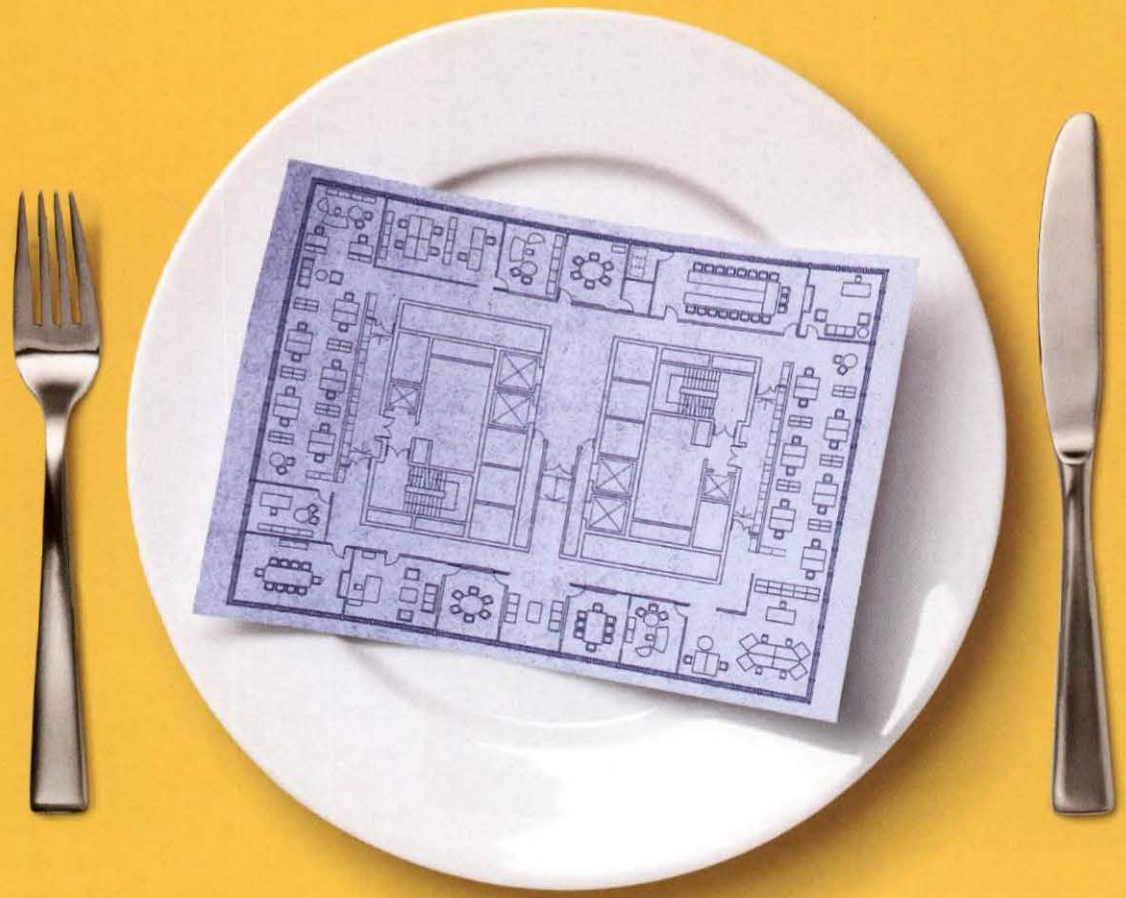

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PROMOTING SUSTAINABLE FM: THE TOOLS YOU NEED

By Maureen Roskoski, REPA, LEED AP

The U.S. Green Building Council has done an admirable job over the past several years in promoting the virtues of green design. Their primary tool for green design is the LEED building rating system. LEED for new construction (NC) has been in place since the year 2000, and continues to grow at a rapid rate. LEED for existing buildings (EB) and LEED for commercial interiors (CI) are relative newcomers, but will have an even greater impact as they are implemented over a wide range of buildings in the U.S. To date, the largest impact of these green building rating systems is on design and construction community. Unfortunately, the facility management community has lagged behind in the adoption of green practices and green building rating systems. This is not unexpected, in that it is a lot easier to create green buildings from the start, than it is to modify existing systems and recreate them into energy-efficient, eco-friendly workplaces.

That's where sustainable facility management (SFM) makes an impact. Sustainability means much more than designing and building green buildings—that's just the beginning. True sustainable facility management requires an integrated approach to the entire life cycle of a facility, and an emphasis on *sustainable operations*. Design and construction processes and outcomes are an important first step toward sustainable facilities, but they are only the preliminary steps. Proper facility planning prior to building construction, with input from the facility manager, is required for long-term *sustainable practices*. Day-to-day operations and maintenance procedures, repair processes, and capital renewal practices can have just as large an effect on long-term sustainable practices as the design and construction phase of green buildings.

Throughout the life cycle of a facility, the asset is under the care and management of the facility manager for a far greater proportion of time than it is under the care and direction of those that design and build it. Although green building design practices are intended to have a significant effect on the long-term performance of a building, operations and maintenance methodologies also have a significant influence over a building's ability to stay green. Therefore, the facility manager can have much more influence over a facility's effect on the environment. The cost savings of sustainable facility management can be significant, and the facility manager is in the best position monitor, maintain, improve, and perpetuate green building operations.

Policies and Strategies

An effective approach to sustainability in existing facilities involves policy development, transformation of that policy into an action plan that includes green operational practices, and a methodology for constant measurement and improvement of those practices. There are many tools that a facility manager can use to advocate sustainable facility management in their facilities, including; the LEED-EB rating system, utilizing life-cycle assessments, life-cycle costing, and total cost of ownership approaches, and measuring the policy effectiveness using a balanced scorecard approach.

The USGBC laid the groundwork for the public and private building community to adopt green design strategies. The federal and state governments are becoming the leading pro-

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moters of green design. In 2003, the U.S. General Services Administration required that all new construction projects meet a minimum LEED Certified level.

Nearly 20 state governments and more than 40 municipalities require some level of LEED certification to be met for public projects. Arizona and Washington were the first two states to adopt mandatory green building standards for public buildings. The City of Seattle embraced green design and requires a minimum of LEED Silver certification on all public projects over 5,000 square feet.

In addition, many universities have adopted green building initiatives that require a minimum green building standard for new construction. Existing buildings constructed with green intent or older buildings planning major mechanical upgrades are in a great position to take advantage of the benefits of implementing sustainable practices.

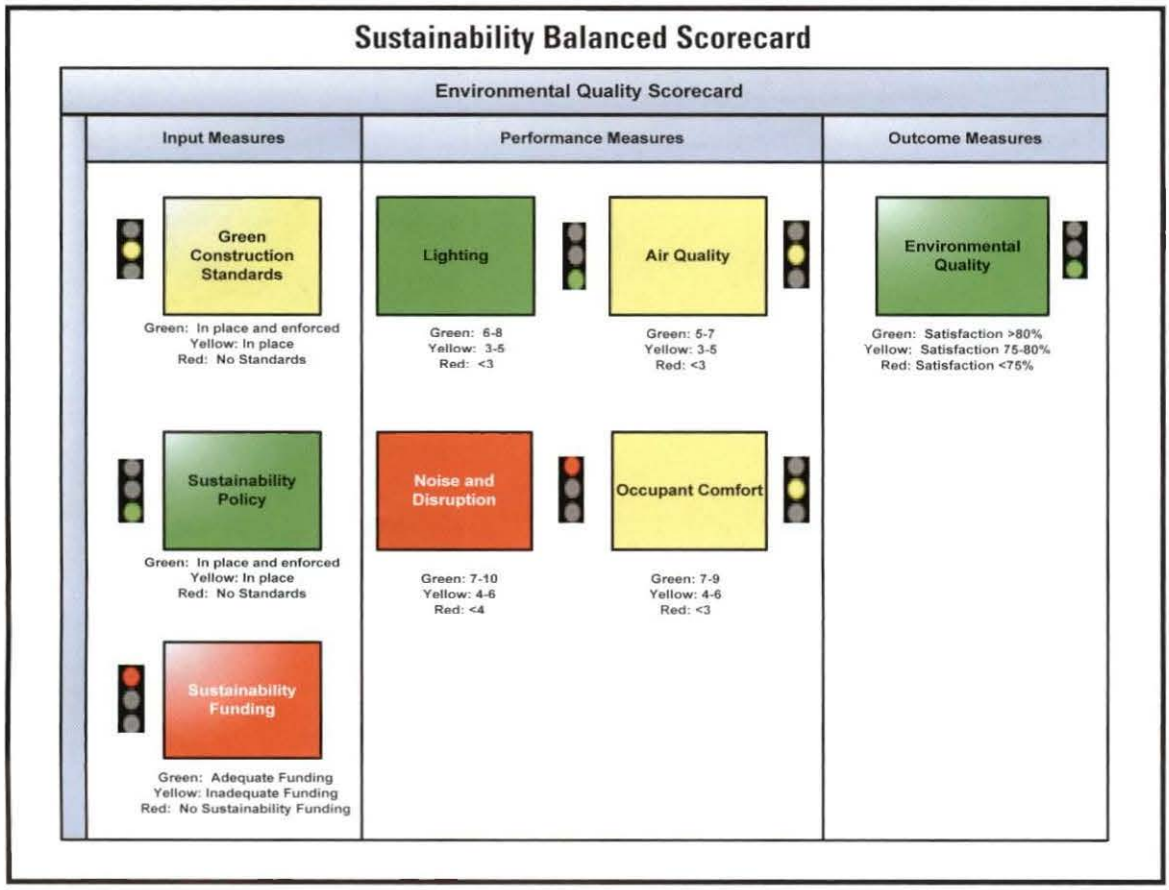
The intent of green building design and the USGBC LEED rating systems are to create buildings that are environmentally responsible and to minimize the negative impacts of development on the environment. In addition, green building design focuses on enhancing occupant comfort and health by providing a healthy and productive place to live and work. Specific elements of green design target to occupant comfort include the use of natural lighting, improved indoor air quality, and thermal comfort control.

The Rocky Mountain Institute, a leading promoter of green and sustainable building practices, documented productivity gains as high as 16 percent in eight separate cases, by implementing green design practices. Typically, 92 percent of the total operating cost to an organization is the cost of the workforce, 6 percent is the operations and maintenance of the facility, and 2 percent is the initial design and construction cost of the facility. Therefore, green strategies that result in even a small increase in productivity could have a dramatic effect on the total operating cost to an organization.

Energy Savings and Health Benefits

A significant benefit of green design is the reduction in energy consumption and subsequent reduction in the use of fossil fuel to produce that energy. Reductions in water consumption, operations and maintenance costs, building-related illnesses, waste and pollution, and increases in comfort and productivity of occupants are also significant benefits of sustainable and green building practices. Studies show that energy and water requirements can be cut to less than half of a traditional building when well-integrated green design concepts are utilized. This can result in a large reduction in operating costs. In addition, energy efficient buildings can result in a reduction in size requirements for mechanical equipment, reducing initial construction costs.

The LEED-EB rating system allows facility managers to evaluate their existing buildings and provides a tool to promote sustainable practices within the organization. LEED-EB outlines a series of credits a building can obtain to achieve



To achieve cost savings relating to energy and water efficiency, the sustainability policy must have sustainable operating practices as a core component.

certification. The credits come from five main categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. The credits identify steps that can be taken to upgrade an existing building to increase water and energy efficiency, improve indoor environmental quality, and decrease the building's impact on the environment.

Many of the credits are simple to achieve and others require little capital investment. Usually, the desire to be certified under the LEED-EB system is not quite enough to get the ball rolling. If you have an existing building that is more than ten years old, it is likely that it would take a significant amount of renovation to make LEED certification probable. That's the one major drawback to LEED-EB. However, the facility manager can use the LEED-EB rating system as a guideline to help implement key sustainable practices.

Implementing a sound sustainability policy is the first step toward an effective approach to sustainability in existing facilities. To achieve cost savings relating to energy and water efficiency, the sustainability policy must have sustainable operating practices as a core component. Simple steps such as lighting retrofits, utilizing Energy Star equipment, and identifying potential energy saving opportunities are examples of practices that can result in energy savings. Implementing a life-cycle cost (LCC) assessment technique to sustainable operating practices and looking at the total cost of ownership (TCO) is important to a successful sustainability policy. A report of green building design developed for the California Sustainable Building Task Force, prepared in October 2003, showed that minimal increases in upfront costs of approximately 2 percent to support green design would, on average, result in life-cycle cost savings of 20 percent of total construction costs.

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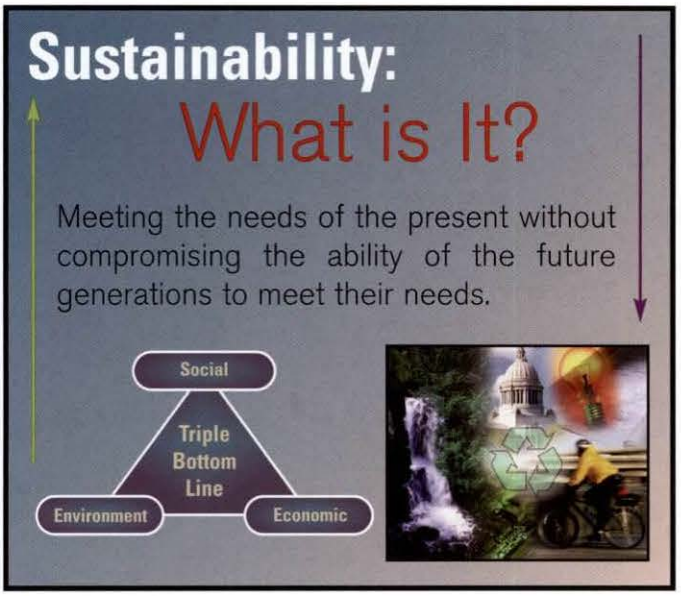
Many components of green design lead to decreased life cycle costs. Savvy designers are using life cycle cost analysis to entice building owners and developers to develop green buildings. However, the longevity of green building systems versus traditional systems is typically not recognized. The danger in this approach is in assuming that green products and systems have equivalent service lives to those of their traditional counterparts. If the designer does not choose carefully, this may lead to the design and construction of green building systems with a significantly shorter service life than that of a comparable traditional system.



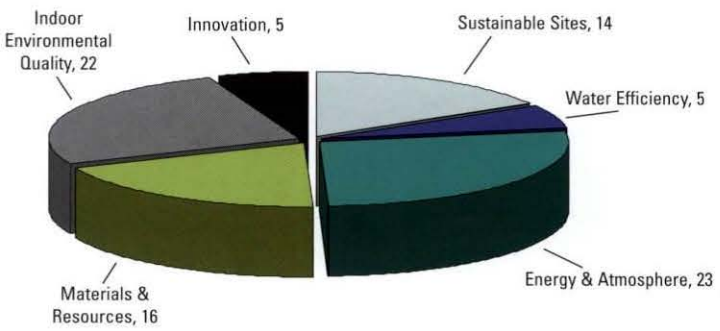
It is important that the design team *and the end-user*—the facility manager—look at LCC and TCO as a means of justifying sustainable practices. TCO involves looking at the costs of buildings or systems over their entire life cycle—through planning, design, and construction, through operations and maintenance, and through replacement and recapitalization—until the life cycle of the asset is repeated again. A key factor in accounting for TCO is looking at the service life of a building or system and including the projected service life of the system in the assessment.

Publicize Your Sustainability Policy

In addition to creating sustainable operating practices, a key component of an effective sustainability policy is to publicize the efforts of the facility to create awareness and inspire staff to participate in the process. If a policy is not endorsed by the management and staff, it will not be effective. After the policy is implemented, it is critical to measure the effectiveness of the policy.

The balanced scorecard approach can be easily adapted sustainability and green building practices. The balanced scorecard approach is a methodology for defining key performance indicators (KPIs) for sustainability and presenting

LEED-EB Point Distribution



them in an easy-to-understand format that allows for continuous measurement and monitoring of the effectiveness of the policy. The facility manager can then use that approach to validate new sustainable practice expenditures, show cost savings through energy and waste reduction plans, and increase the value of the their assets. Using the categories of the LEED-EB rating system to identify your KPIs can help the facility manager identify the critical areas you want to measure.

For example, you might wish to focus on energy issues and measure your utility consumption and alternative energy use. Or you might wish to focus on indoor environmental quality and use lighting as your KPI and include items such as use of daylighting, use of occupancy sensors, and use of low mercury bulbs as inputs in the balanced scorecard. Measuring the inputs, processes, and outcomes of key performance indicators will give the facility manager an overall view of the effectiveness of the sustainability policy and allow the facility manager to identify specific areas that need improvement.

The Tools for Success

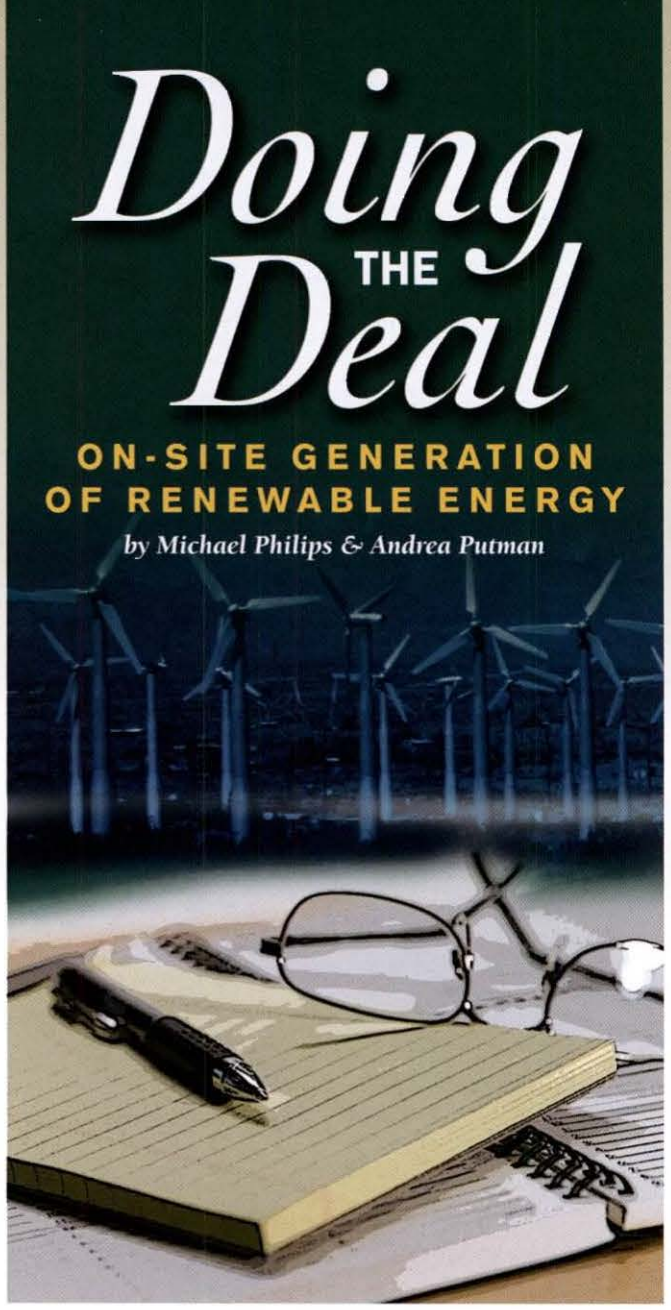
Using tools such as the LEED-EB rating system and a balanced scorecard approach combined with proper planning, measurement of key performance indicators, and monitoring of successes will provide facility managers with new tools for budgeting, program justification, and demonstrating the value of their profession.

Identifying key performance indicators and implementing a balanced scorecard approach will allow the sustainable facility manager to set higher standards for sustainable practices in existing buildings and encourage higher levels of building performance. Successful integration of sustainable operational practices and reviewing the policy using a balanced scorecard approach can create a winning economic scenario for sustainability and green buildings.

Doing the Deal

ON-SITE GENERATION OF RENEWABLE ENERGY

by Michael Philips & Andrea Putman



This article is excerpted from a new book, The Business Case for Renewable Energy: A Guide for Colleges and Universities, *a joint publication of APPA, the National Association of College & University Business Officers, and the Society for College & University Planning.*

In some ways, planning and undertaking a renewable energy project is like any other capital project because it involves design work, costing out of materials and labor, getting permits and so forth. But in other ways, a renewable energy project is different. The college or university is building a small power plant, so there are electric utility interconnection issues. There is also a revenue stream from the project—in the form of reduced electric bills or payments from the utility for the electricity—that will affect decisions on project sizing and cash flow calculations. There may also be ownership issues. Will the school own the project, will an energy service provider own it, or will it be a community project with co-owners?

This article addresses the major steps and considerations in planning and building a renewable energy project on campus or near the campus: renewable energy resource assessment and site selection; initial economic analysis; ownership options; interconnection issues; and design and preconstruction. The steps are not necessarily sequential, and in fact some may need to be undertaken simultaneously. Others may not be relevant in a given situation or for a given technology.

Resource Assessment and Site Evaluation

Unless a college or university is certain which renewable technology it wants to pursue, the first step will be to assess the availability of all renewable energy resources located on or near the campus. This initial assessment should seek to identify each renewable energy resource and quantify its long-term availability. Extensive information is available online, especially from the National Renewable Energy Laboratory [www.nrel.gov] but also from state energy agencies. These general resources show, for example, prevailing wind conditions in a given region of a state. Data for some renewable energy sources, such as wind and biomass, must be site specific. The assessment will be easiest for solar energy, easy but

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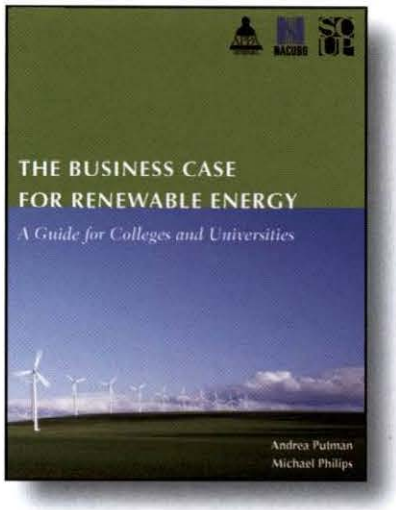
time-consuming for wind, and most complex for biomass given the variety of biomass feedstock fuels, which range from agricultural products, to landfill methane, to animal wastes.

Wind Assessment

A wind resource assessment will determine the best site (or sites) for locating a wind project. It can be based on production numbers from nearby wind turbines or on public data from nearby meteorological towers. If there are no such towers or if the data are unavailable, the college or university can hire a meteorologist to prepare a production estimate. An expensive and time-consuming option is to rent a tower with wind data collection equipment (anemometers) for a year, at a cost of approximately $8,000, including installation and removal. More than one tower may be needed if there is more than one potential location for the wind turbine.



It's a good chance that the available locations on a campus are not the best wind sites in the larger area. Nearby properties may have better wind conditions and/or proximity to transmission lines (for interconnection with the electric utility). The lease payment the school would make to another landowner will be a small part of the total project costs, and will be more than offset by the value of the increased kWh output from the superior site. As both Iowa Lakes Community College and Carleton College found in preparing their wind power projects, the wind resource was better one mile from campus than directly on campus.

Solar Assessment

The amount of solar radiation striking the campus will not vary from location to location, so a solar radiation assessment will not be needed to make a project siting decision. However, determining the average annual amount of solar radiation will be useful in evaluating the economic feasibility of the project. The National Renewable Energy Laboratory's online tools help assess the solar radiation at any geographic location in the United States [see www.nrel.gov/gis/solar_maps.html]. Its PVWATTS software provides easy-to-understand performance estimates for grid-connected photovoltaic systems.

Selecting a suitable site for a solar project can be as simple as determining which unshaded campus rooftops are preferable (and are able to withstand the extra weight). However, Pierce College found that its preferred location on the gymnasium roof would violate local building codes and so had to select an alternative site over a parking lot.

Biomass Assessment

A biomass assessment should initially consider the full range of biomass resources. Although the availability and cost of the resources will vary by location, the most widely available resources are generally landfill methane, urban wood waste, and forest residues. In rural areas, crop residues and animal wastes should be considered, although odor issues can arise with the animal wastes. Crops grown specifically for fuel will tend to be cost-prohibitive in most instances, and can be dropped from most resource assessments. Resource assessments can also consider organic waste products from certain industries.

As a general rule of thumb, the assessment should consider resources within a 50-mile radius of the campus; otherwise, transportation costs become an issue. Some biomass projects use smaller radii. For landfill projects that transport their fuel via pipeline, there is no such rule of thumb. Hudson Valley Community College transports its landfill gas less than a mile, while UCLA has a 4.5-mile pipeline.

Initial Economic Analysis

The data from the resource assessment and site evaluation are used to calculate the cost per installed kW of each renewable technology. A careful analysis of the data will be essential to the decision making, but for an initial economic analysis, the general technology costs will be $5,500 to $6,300 per installed kilowatt for solar photovoltaics (PV); $1,000 to $1,500 for wind; and $1,300 – $3,000 for biomass (lower if biomass will be used for space heating and not electricity generation). These prices assume that no batteries or other storage system will be included.

Ownership Options

Most colleges and universities begin on the assumption that they will own and operate their renewable energy projects. But there are alternative ownership approaches that can reduce costs, limit exposure to risk, provide price predictability, and allow for larger projects to be built than might otherwise be possible with sole ownership.

College or University Ownership

The simplest approach is for the college or university to own and operate the renewable energy project. The advantage is complete control of the project and first-hand knowledge of the costs, revenues, and technical performance. The disadvantage is the inability to make use of available tax benefits. Also, budgetary limitations may mean that the college or university will have to build a smaller project than it would have built with community partners or private investors.

Vendor Ownership

Under some ownership structures, the equipment provider retains ownership of renewable energy equipment, at least during an initial contract term. This is the case, for example, under leases, performance contracts, and the third-party service model. For a college or university, the obvious advantage

of vendor ownership is not having to provide the capital for equipment purchase. Although the institution may eventually purchase the equipment, it does not have to raise a down payment. Under a third-party service arrangement, Stephens Institute of Technology in New Jersey had a 125 kW solar PV system installed at no cost. The school pays only for the solar electricity generated, while the vendor retains ownership of the system and captures the tax benefits and government incentive payments.

Vendor ownership is also advantageous when the energy equipment is innovative or experimental. In such cases, the vendor may want to retain ownership so that it can better monitor performance and make adjustments or repairs. The performance risk is mitigated for the college or university, and it faces no operations and maintenance costs. When a fuel cell was installed at SUNY College of Environmental Science and Forestry, for example, the vendor chose to retain ownership in order to engage in joint research with the university on the fuel cell's performance.

Other approaches include private equity ownership and community ownership, which are not addressed here. There are also several third-party service models to consider; these are discussed in more detail in our book.

Connecting to the Grid

All projects that generate electricity for campus facilities—even those that will not be exporting electricity to the local electric utility—require approvals from the utility to avoid power quality problems. The utility does not need to approve generation projects that are providing power to an isolated facility, such as a building on a research farm that is unconnected to the campus electrical grid.

A college or university may decide it wants to export some portion of its generated power to the utility and engage in power sales. It will thus have to negotiate the price and terms under which the utility will buy the renewable energy offered to it. As part of this negotiation, the institution may want (or need) to negotiate possible changes in the price and terms under which it continues to buy electricity from the utility.

Many of the issues involved in connecting or "interconnecting" to the utility are addressed in state law. Most states have statutes or regulations that deal with utility purchases of renewable energy. These laws have been needed because utilities typically prefer not to buy power from small power providers. Even when required, utilities can and do place what can be costly conditions on the purchase. They can also end up offering far less than the price they pay for power from conventional power plants and certainly lower than the price at which the school is buying its electricity. The college or university should be prepared for some resistance and negotiation.

Power Purchase Agreement

A college or university will enter into two agreements with the utility: a power purchase agreement and an interconnection agreement. The power purchase agreement (PPA) is only necessary if the institution is selling some or all of its renewable electricity to the utility. The PPA specifies how much electricity the utility will buy, over what time period, and either the price or the method of calculating that price. Even if utilities are required by law to purchase the college or university's electricity, there is still a lot to be negotiated. Utilities generally oppose PPAs with small power producers and resist paying a good price for the electricity.

In cases where a college or university plans to rely on the utility's payments to help service the debt on a renewable energy project, they should be aware that banks will generally not finance such a project without a ten-year or longer PPA. This is applicable mainly to wind projects, but it may apply to other projects as well. The utility will often press for a much shorter PPA period.

In states that require net metering, there is no need to negotiate the electricity price because the utility is required to buy the college or university's electricity at the rate at which the school is buying electricity.

In some cases, PPAs address the disposition of Renewable Energy Certificates (RECs). Colleges and universities should make sure they are not inadvertently transferring ownership of the RECs that accrue to them from their renewable energy project.

Interconnection Agreement

An interconnection agreement is needed for all college and university renewable energy projects, even those that do not export electricity off campus. This technical agreement commits the institution to generating electricity in a manner that does not adversely affect the safe and reliable operation of the utility's electricity distribution system. The utility will want the college or university to avoid the generation of harmonic frequencies, voltage fluctuations, or operating at voltage levels outside normal ranges. These phenomena can cause problems with the utility's equipment and can damage the lights, appliances, and other equipment of its other customers. In the interconnection agreement, the utility will often provide specifications (and even the brand name and model number) of the equipment needed and will require that the college or university conduct specific testing and maintenance activities in order to avoid the creation of power quality problems in the future.

In some cases, the utility may express concerns that merely specifying equipment and maintenance practices is insufficient to protect its system. The utility may thus decide to conduct a thorough technical appraisal of the college or university's proposed plant and associated equipment. The appraisal is known as a power quality impact analysis or interconnection study and can cost $50,000 or more. The institution must bear this cost.

Colleges and universities should avoid an interconnection study, not just because of the high cost, but because the study could lead the utility to impose operational requirements that

add procedures and costs to the projects. Operational requirements are included in the interconnection agreement and specify when the plant can and cannot supply electricity to the utility grid.

For small systems, interconnection studies are unnecessary as long as the college or university agrees to install the specified equipment. The definition of what is small in this situation is a project that is less than 15 percent of the utility's circuit. The utility's circuit refers to the particular transformer in the local substation that serves the school. The capacity of transformers generally ranges from 10 MW to 40 MW. Thus, for a project to reach 15 percent of the smallest circuit (a 10 MW circuit), it would have to be at least .15 x 10, or 1.5 MW in size. To date, the majority of college and university renewable energy projects are significantly smaller.

However, some utilities claim that even a project smaller than 15 percent of the circuit—and as small as 1 percent—can cause problems and will necessitate an interconnection study and the associated expense. Colleges and universities encountering this situation should be aware that the 15 percent guideline has been adopted as a federal rule applicable to generators interconnecting to federal government utilities. It has also been adopted as a rule at the state level in California, New Jersey, and Ohio, while Arizona, Colorado, and Pennsylvania are in the process of adopting it. The 15 percent guideline is a widely accepted standard, even by the utilities' trade association, the Edison Electric Institute.

In essence, colleges and universities must be aware that some utilities seek to derail renewable energy projects by making them more costly. One way of adding to the costs is to require the institution to pay for an interconnection study based on the claim that the project could cause power quality problems for the utility. Colleges and universities must thus be cognizant of the 15 percent rule and be able to show that the proposed project is too small to warrant an interconnection study.

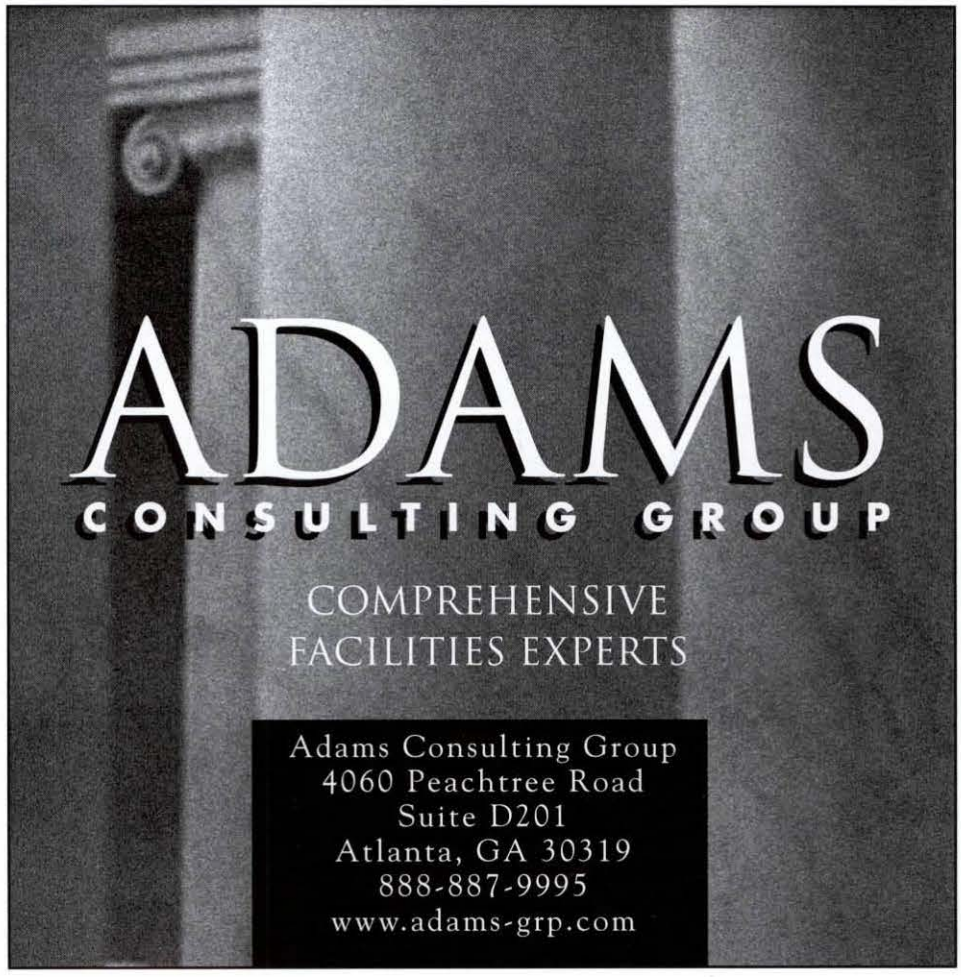
Preconstruction Arrangements

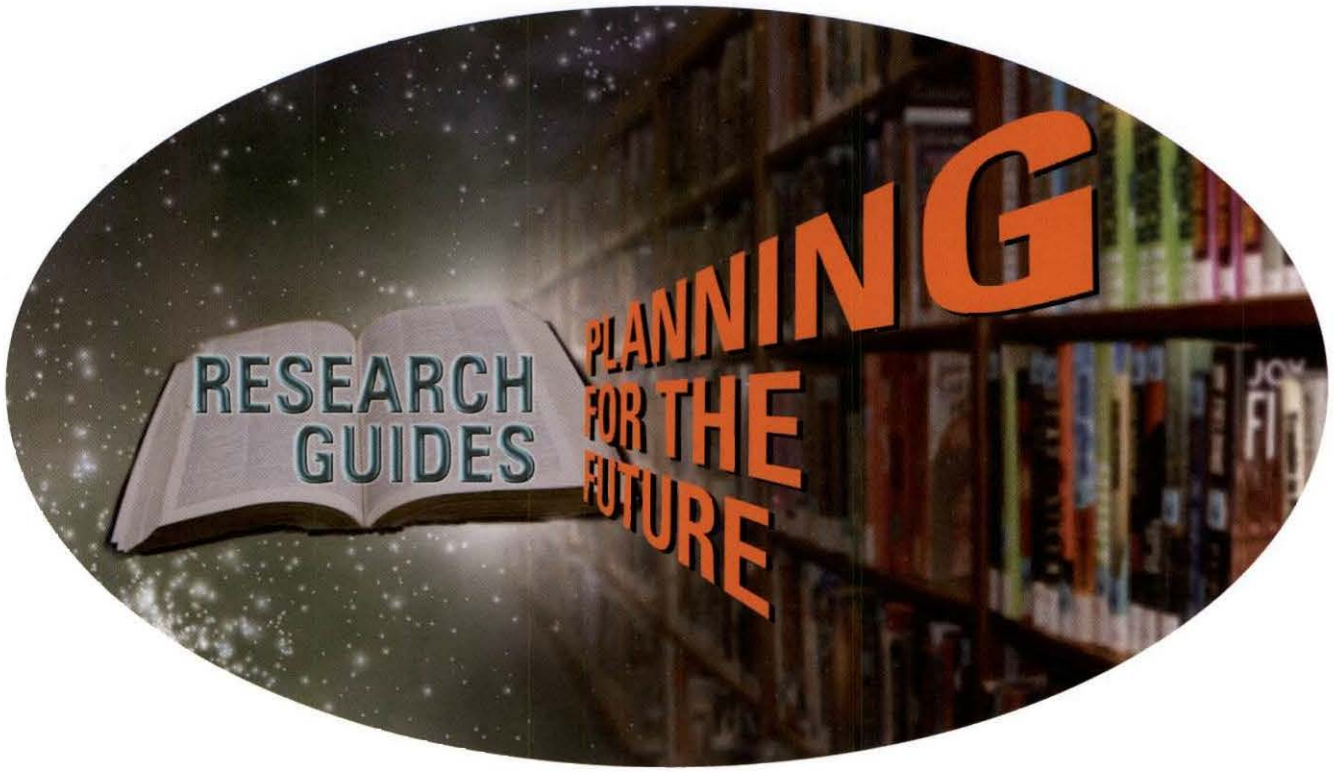
Once the resource analysis and site assessments, initial economic analysis, and determination of ownership structure have been completed, and as the discussions begin with the utility regarding interconnection and electricity sales, the next step is project design and preconstruction. Every project faces its own special set of issues, but the following general considerations will help the college or university prepare to build the project. Many steps will be reduced or even eliminated if a performance contracting or third-party service approach is chosen.

Design Work

In most cases, design work is handled by an engineering, procurement, or construction (EPC) contractor in consultation with facilities staff. For simple projects such as small or medium-sized rooftop solar PV projects, some colleges and universities do the design work in-house, using some outside consulting for decisions on specific components or system integration. In other cases, the equipment vendor handles the design work.

In general, large wind projects involve the most extensive and expensive design. They require site planning, underground wiring configurations, and soil borings to determine foundation design. Solar projects are generally the easiest and least costly in terms of design. It is difficult to generalize about biomass, but typically biomass projects that do not involve a fuel conversion step (e.g., converting solid biomass to gas) entail a more straightforward design phase. The easiest and quickest designs are for cofiring a biomass fuel with fossil fuel in an existing boiler, landfill methane recovery, and direct combustion of woodchips for space heating.





by Alan Dessoff

Facilities, business, planning, and other institutional officers considering what the college or university campus of the future should look like and how it should operate can find valuable guidance in the research their professional associations conduct.

Facilities, budgets, and personnel are the principal areas of responsibility for senior institutional officers and "the more we can do in solid research that they can use to make objective decisions about where they are headed, the better off they are and the better we serve our members," says E. Lander Medlin, executive vice president of APPA, the association of choice for educational facilities professionals.

APPA, the National Association of College and University Business Officers (NACUBO) and the Society for College and University Planning (SCUP) are all conducting significant research that is making a difference in higher education administration. And all three associations will be highlighting their research projects and results at a jointly produced, first-of-its-kind conference, The Campus of the Future: A Meeting of the Minds, July 8-11 in Honolulu, Hawai'i.

APPA recently reevaluated its strategic plan and concluded from an overwhelming response from its members that "we need to expand our research efforts," says Medlin. "It is one of the most valuable things we do for them." In addition to the information they already receive through APPA publications and other resources, members want applied research "to provide benchmarks, best practices, and credible information. Research helps our members support the mission and goals of their institutions, and in return, helps APPA develop guidelines and standards for the educational facilities profession."

Model for Investment Strategy

Two studies that **APPA** researchers will report on at the Hawai'i conference, both conducted through the association's Center for Facilities Research (CFaR), demonstrate the type of research Medlin says is useful to facilities officers specifically and also to other institutional officers, including those at senior levels.

One study, *Buildings...The Gifts That Keep on Taking: A Framework for Integrated Decision-Making,* is expected to produce a widely accepted model for understanding the total cost of investing in and maintaining college and university facilities. CFaR says it is intended to assist higher education policy makers, including presidents and chancellors, boards of trustees and legislators, to "better understand the impact of major decisions" on such key issues as resource allocation, building design criteria, recruitment and retention of faculty and students, construction strategies, the nature of the learning and research environment, and accountability measures.

"This is going to really drill in on the fundamental financing issues of facilities, with a cradle-to-grave approach to assessing and analyzing the investment strategies that are related to making the decision to build a facility," explains Michael Sofield, APPA's vice president for information and research and director of facilities planning and operations at the Smithsonian Institution's National Museum of American History.

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"There is a lot of information out there about what it costs to build, and lots of recommendations about how much you should spend every year to maintain your facilities and how much reinvestment you need to forecast to keep them in top condition. This project is pulling together all that material," Sofield says.

The study's principal investigators are Douglas K. Christensen of Brigham Young University, Rod Rose of Stratus-Heery, and Terry W. Ruprecht of the University of Illinois, Urbana-Champaign. The project included direct participation of and/or consultation with higher education institutions, major associations, federal or state agencies, corporations, and foundations.

The study's findings will be important not just for APPA members but also for senior financial officers, provosts and campus presidents "so they will be able to understand that there is a business approach to facilities," states Sofield.

Attracting and Keeping Students

The second APPA study, *The Effect of Educational Facilities on Recruitment and Retention of Students,* updates a 1984 study by the Carnegie Foundation for the Advancement of Teaching that evaluated the decision-making process of parents and potential students in selecting a college or university. The latest CFaR study more fully explores the impact of the type and quality of educational facilities on the recruitment and retention of today's students and their parents.

"Since recruiting and retaining students is an essential part of the success of any institution, we think it will be a good guidance tool for people in admissions, residential life, development/advancement, the business office and potentially presidents," says Gary L. Reynolds, one of the study's principal investigators with David A. Cain of Carter & Burgess, Inc. A past APPA President, Reynolds is also co-director of CFaR and director of facilities services at The Colorado College. The two-part executive summary of this research project has been published in the March/April and May/June 2006 issues of *Facilities Manager.*

In other current CFaR projects, researchers are studying subjects including the structuring of in-house construction rates in colleges and universities and the effect of the Facilities Condition Index on National Science Foundation-funded research grants. Previous studies looked into workplace violence in higher education and the relationship between the "organizational culture" of institutions and their productivity.

APPA established CFaR about five years ago to coordinate what previously were ad hoc research activities by some members and provide a mechanism "to answer some big-issue questions," says Reynolds.

In addition to CFaR's projects, APPA began last year an annual Facilities Core Data Survey, the only comprehensive collection of facilities-related costs and personnel information, strategic financial measures, and other relevant data for colleges, universities, and K-12 schools and districts.

Institutions participating in the survey receive customized reports comparing their data to that of other participants. The information helps facilities officers budget for current spending, plan for future capital needs, and present their needs effectively to campus decision-makers. The annual Web-based report and database tools are published as *Facilities Performance Indicators.*

Endowments and Student Aid

NACUBO focuses its research on producing two major annual studies. One—the NACUBO Endowment Study (NES)—is the largest and longest running yearly, voluntary survey of higher education institutions and their foundations about their endowment holdings. It is the primary source of college and university endowment management and performance data in the United States.

According to 2005 survey results, released last January, an average one-year return rate of 9.3 percent for fiscal year 2005 provided college and university endowments with the investment income necessary to pay for annual educational spending and various management fees along with adjustments to preserve the endowment against inflation.

A matching ten-year compounded 9.3 percent return rate "validates the investment strategies employed by higher education endowment managers to maximize both current and long-term spending for the benefit of their institutional stakeholders," NACUBO stated in releasing the 2005 results.

They were based on responses from 746 colleges and universities, the highest participation level since the study's inception in 1971. Participants reported $298.9 billion in total endowment assets, representing an overwhelming majority of colleges and universities with endowments greater than $1 million.

"Endowment income is an increasingly vital funding element of many college and university budgets and will undoubtedly remain so for the foreseeable future," NACUBO President James E. Morley Jr. said when the survey results were released.

Detailed analysis of the 2005 NES data indicates that "institutions should look beyond their asset allocation mix to understand long-term investment success factors. We found that while asset allocation is critically important, manager and strategy selection, as well as resources, also matter," adds Nancy Heller, asset management managing director of TIAA-CREF, a national financial services organization that worked with NACUBO on the endowment survey.

For 15 years, NACUBO also has conducted an annual Tuition Discounting Survey. It collects information from independent colleges on the level of institutional student aid, percent of students receiving institutional grants, net revenues and other related data. The 2004 survey, with 450 participants, marked the highest participation in the history of the study.

"It gets at a lot of different issues, including the net price—what it actually costs for a student to come to an institution,"

says Jessica Shedd, NACUBO's director of research and policy analysis. "There also are enrollment management issues; how an incoming class is put together. One side of it is helping well-qualified students who can't afford to attend your institution. The other side is attracting the students you would like to have, and what that means for tuition revenue."

NACUBO is considering the future of the study, Shedd says, including possibly "moving more to a benchmarking system for institutions so they can compare themselves and their strategies to others."

Other NACUBO research activities are mostly ad hoc, Shedd reports, often focusing on current and relevant legislative issues. Following implementation of the Sarbanes-Oxley Act to strengthen organizations' financial accountability, for example, NACUBO surveyed its members "to see what they were doing about it," Shedd says.

Trends and "Hot Topics"

At **SCUP**, Phyllis Grummon, Ph.D., director of planning and education, compiles a quarterly report for use by the organization's board of directors and staff in their decision-making. The report covers six key areas affecting higher education and lists current "hot topics" within them:

- Demographics—trends in student recruitment, enrollment and retention and the impact on them of age, gender, ethnicity, income and geographic distribution. Hot topics, according to SCUP, include Generations X and Y, European "massification," and the impact of the Patriot Act on international-student enrollment in the United States.
- Economy—trends in institutional budgeting practices and financial resource development, national and state education budgeting, financial aid and tuition, as well as global economic issues. Hot topics include reauthorization of the Higher Education Act, tuition increases, and the loss of international students to countries like Australia, China and India.
- Environment—trends in environmental sustainability and green practices on campus. Hot topics include sustainability in the curriculum and the adoption of environmental practices, products and services by institutions.
- Learning—trends in adult learning, how people learn, and campus and classroom design to support learning. Hot topics include the use of active learning and connecting emotions to learning.
- Politics—trends in government and legislation as well as elections. Hot topics include cuts in financial aid and research funding.
- Technology—trends concerning the use of information technology on campus.

Hot topics include wireless networks, the use of electronic devices by the campus community, course management systems, and privacy protection.

The *Trends* report released last February discussed such issues as "growing dissatisfaction with the usefulness and accuracy" of national statistics on the race/ethnicity of students. It cited a recent study by the American Association of Colleges and Universities that showed, among other things, that the increase in the number of students identifying as "other" or "unknown" likely leads to overstated enrollment figures for minorities.

This trend "affects every level of the institution," SCUP wrote. "Campuses may need to improve the accuracy of their statistics by not only collecting data on student admission applications but through surveys conducted once students are already on campus."

Other issues discussed in the February *Trends* report included how some institutions are "strengthening the old concept of 'in loco parentis' and accepting greater responsibility for more parts of students' lives," and how the Hurricane Katrina disaster plus increases in the costs of oil and natural gas have "created unexpected deficiencies" in institutions' operating and capital budgets.

Copies of the *Trends* reports are free and available to the public at the SCUP website. Enhanced versions for SCUP members feature links to articles and other online resources for each area.

In addition to compiling and publishing *Trends*, SCUP conducts what Grummon calls "action research" with a specific focus. She cites a survey of community college planners to learn the "hot topics" for their institutions. SCUP also collects data for an annual campus facility inventory on the amount of space devoted to residence halls, athletic facilities, research laboratories, classrooms, offices and other uses. "People find that useful for following trends in the allotment of space on campus," Grummon says.

* * *

Whatever the nature of each association's research activities, they have value beyond the individual organizations that conduct them. "We not only have to educate our own members about the facilities issues important to us, we also have to educate the broader education community about them and the kinds of decisions that have to be made that are critical to the future success of individual institutions and of education in general," concludes APPA's Medlin.

Resources

APPA
www.appa.org/cfar
Steve Glazner · cfar@appa.org

NACUBO
www.nacubo.org/x44.xml
Jessica Shedd · jessica.shedd@nacubo.org

SCUP
www.scup.org/knowledge
Phyllis Grummon · phyllis.grummon@scup.org

Supervisor's Toolkit

Nuts and Bolts of Facilities Supervision

WHY TRAIN?? • The educational facilities workplace has been transformed in recent years by a variety of forces. Intensified competition, advancing technology, changing values, and a global economy have created new possibilities as well as vulnerabilities. This transformation is changing the nature of management and the roles of supervisors. Due to these changes, supervisors must develop a systematic approach toward organizing, managing, motivating, and meeting customer expectations. The traditional role of the supervisor/manager is no longer adequate. The new business environment demands leadership.

WHY SUPERVISOR'S TOOLKIT?? • **Supervisor's Toolkit** has been specifically designed to meet the needs of the facilities management employee. It is a structured, open-ended, and pragmatic approach to developing supervisors. It is not a "teach" program but a development process designed to help supervisors realize both personal and professional growth. The program is designed for a full week of training.

Module 1: Supervision, What Is It?
Learn to define effective facilities supervision; identify the roles and responsibilities of supervisors; and understand four key functions of supervision (4 hours).

Module 2: It's More Than Administrivia.
Learn to understand the supervisor's role in administering organizational policy and procedures; recognize the legal considerations in the facilities environment; and gain an awareness of resource management (4 hours).

Module 3: Communication, Let's Talk!
Identify barriers to effective communication; demonstrate communication skills; and understand your role in the communication process (8 hours).

Module 4: If It Weren't for the People.
Understand the importance of developing and maintaining effective relationships with others in the workplace; examine the different types of relationships that exist in the workplace; and identify strategies and skills for improving relationships with others (4 hours).

Module 5: Motivation and Performance.
Identify methods of training and developing employees; ascertain methods of positive reinforcement; and understand the importance of performance management and evaluation (4 hours).

Module 6: Customer Service Triangle.
Learn to create a basic understanding of three major aspects of customer service which include process, experience, and recovery; examine the role of the supervisor in customer service; and help participants identify areas for improvement in service delivery in their organizations (4 hours).

Module 7: Supervisors as Leaders.
Master techniques to understand critical elements of leadership; transition from managing to managing and leading; and understand your own preferred leadership style (4 hours).

Module 8: Success, What Does It Take?
Look at lessons learned, examine your toolkit, and evaluate the program's effectiveness (4 hours).

Cost
This unique program, taught by Master Trainers in human resources, is tailored specifically toward the education facilities professional. All training materials used and distributed for this session, from the videos that depict real-life work examples to PowerPoint presentations, use facilities language so that participants can relate to what is being taught. You can bring this exciting program to your campus for $750* a person (this price includes all class materials and training fees for two APPA Master Trainers). Minimum class size is 25; let APPA help you promote this program to nearby colleges, universities, and schools.

APPA 2006 SUPERVISOR'S TOOLKIT PROGRAM SCHEDULE

September 10–14	**APPA Institute, Indian Wells, CA**
October 3–7	**ISSA/ INTERCLEAN, Chicago, IL**
October 23–27	**Virginia Commonwealth University, Richmond, VA**

For additional information on one of the above programs, please contact toolkit@appa.org.

* Costs may vary for different locations.

The Impact of Facilities on Recruitment and Retention of Students

by David Cain, Ph.D. & Gary L. Reynolds, P.E.

Over the past 30 years considerable research has been done to understand the issues that impact the decision of a student's choice of a higher education institution. The purpose of our study is to determine (a) the relative importance of an institution's physical assets on a student's choice of college or university, (b) the relative importance of various facilities in the decision process, and (c) the demographic differences in this decision process.

A total of 16,153 students responded to a survey from 46 institutions across the United States and Canada. For this article the results will be provided for the U.S. respondents only (13,782 respondents).

PART II: COMPARATIVE ANALYSIS

This article will provide statistical analyses on the differences of observation and opinion between various demographic respondents. The appropriate statistical tests were used in SPSS 14 for Windows to determine if there was a statistical difference. If a given demographic is stated as having a different position then it is statistically different at the alpha = 0.05 level.

Gender Comparative Analysis

Issues of Recruitment

The evaluation of various institutional *characteristics* is recorded in Table 1. The inference column indicates the relative importance for men and women.

The evaluation of various institutional *facilities* is recorded in Table 2. The inference column indicates the relative importance for men and women.

A breakdown by gender for facilities that are important to see during the campus visit is shown in Figure 1.

The results indicate that it was more important for women to see *Residential Facilities On Campus, Facilities Related to My Major, Library, Classrooms, Student Center/Union,* and Open Space. It was more important for men to see *Computer and Technology, Research/Lab Facilities,* and *Varsity Athletic Facilities.* Men and women viewed as equally import to see (or not to see) all other facilities.

David Cain is vice president and associate, Higher Education Sector, for Carter & Burgess, Inc., Phoenix, Arizona; he can be reached at david.cain@c-b.com. Gary Reynolds is director of facilities services at Colorado College, Colorado Springs, Colorado; he can be reached at greynolds@coloradocollege.edu. ***This article is the second part of an executive summary of the authors' research project sponsored by APPA's Center for Facilities Research. Part I: Research Findings appeared in the March/April issue.***

Table 1

Comparative Analysis of Gender versus Institutional Characteristics

Characteristic	*Inference (statistically significant)*
Preparation for a Career	Women view as more important than men
Strong Major in your Field of Interest	Women view as more important than men
Preparation for Graduate or Professional School	Women view as more important than men
Overall Quality of the On-campus Facilities	Women view as more important than men
Excellent Teachers	Women view as more important than men
Prestige or the Academic Reputation	Men and women view equally important
An Attractive Campus	Men and women view equally important
Opportunity to Play Intercollegiate Athletics	Men view as more important than women
Accessible Professors	Women view as more important than men
Many Extracurricular Activities	Men and women view equally important
Excellent Academic Advising	Women view as more important than men
Many opportunities for Hands-on Learning (Internships)	Women view as more important than men
Challenging Courses	Women view as more important than men
The Ability to Customize Your Education	Women view as more important than men
The Climate and Weather	Men and women view equally important
Recommended by Friends and Family	Men and women view equally important
Technology Capabilities	Men view as more important than women
Location of the Institution	Women view as more important than men

CFaR | Center for Facilities Research

Women (30.3 percent) tended to reject an institution because it lacked an important facility more often then men (27.2 percent). Women rejected a college more often than men because *Facilities Related to My Major, Open Space, Other, Residential Facilities On Campus, Residential Facilities Off Campus* were missing. For all other facilities men and women tended to reject a campus equally.

Women (27.0 percent) tended to reject an institution because an important facility was inadequate more often then men (24.3 percent). Women rejected a college more often than men because *Residential Facilities On Campus and Open Space* were inadequate. Men rejected a college more often than women because *Computer and Technology* and *Research/Lab Facilities* were inadequate. For all other facilities men and women tended to reject a campus equally.

Women (18.3 percent) tended to reject an institution because an important facility was poorly maintained more often then men (13.1 percent). Women rejected a college more often than men for *Residential Facilities On Campus, Classrooms, Open Spaces, Student Union/Center,* and *Other* because they were poorly maintained. For all other facilities men and women tended to reject a campus equally.

When asked if the good condition of facilities was important in the choice decision women indicated it was more important to them than men. When asked about "first impressions," women agreed more often than men that they knew the campus was right for them when they visited it.

Issues of Retention

The respondents were also asked if they were pleased with their college or university. Women were more pleased than men. When asked about their overall enthusiasm for their college or university women were more enthusiastic than men. When asked about their overall satisfaction with the campus facilities women were more satisfied than men.

Race Comparative Analysis

Issues of Recruitment

An analysis was completed to determine if there were differences in importance of institutional characteristics by race. Table 3 summarizes the results. The second column indicates which race indicated a given characteristic was more important.

We analyzed the importance of a given facility during the choice decision by race. African American students indicated that all the facilities were more important to them than to other races, except for science and engineering facilities, which were more important to Asian students, intramural facilities which were more important to Native American students, exercise facilities which were more important to

Table 2

Comparative Analysis of Gender versus Importance of Facilities

Characteristic	*Inference (statistically significant)*
Student Center/Union	Women view as more important than men
Dining Hall(s)	Women view as more important than men
Residence Hall(s)	Women view as more important than men
Varsity Athletic Facilities and Fields	Men view as more important than women
Student Recreational Facilities	Men view as more important than women
Library	Women view as more important than men
Facilities Related to Your Major	Women view as more important than men
Classroom Buildings	Women view as more important than men
Science or Engineering Facilities	Men view as more important than women
Sophisticated Technology for Academics	Men view as more important than women
Facilities for Intramural Sports	Men view as more important than women
Exercise Facilities	Women view as more important than men
Open Space or Quads on Campus	Women view as more important than men
Bookstore	Women view as more important than men
Performing Arts Center	Women view as more important than men
Visual Arts Center	Women view as more important than men

Hispanic students, open space which was more important to Asian students, performing arts which were more important to Asian students, and visual arts which were more important to Native American students.

We analyzed the issue of which facilities were important to see during a campus visit. *Residential Facilities On Campus* were most important for everyone to see with it being more important to Caucasians. *Facilities in My Major* was next most important, with Mixed Race and Caucasians indicating a slightly higher interest.

While the overall rejection of a campus due to an important facility missing is 29.3 percent, Figure 2 shows that Mixed Race, African Americans, Asians, and Hispanics are more critical than the average.

A follow-up question asked which facility was missing. There was no difference of opinion between races for *Residential Facilities on Campus, Facilities in My Major, Classrooms, Technology, Varsity Athletic Facilities, Student Union, Recreation/Fitness Facilities,* and *Open Space.* Asians and Native Americans rejected a campus more often because of a lack of *Residential Facilities Off Campus.* Asians rejected a campus more often because of a lack of a *Library* and *Research/Laboratory Facilities.* African American and Mixed race rejected a campus because of *Other* facilities that were missing.

While the overall rejection of a campus due to an inadequate facility is 26.1 percent, Figure 3 shows that African American, Native American, and Asian students are more critical than the average.

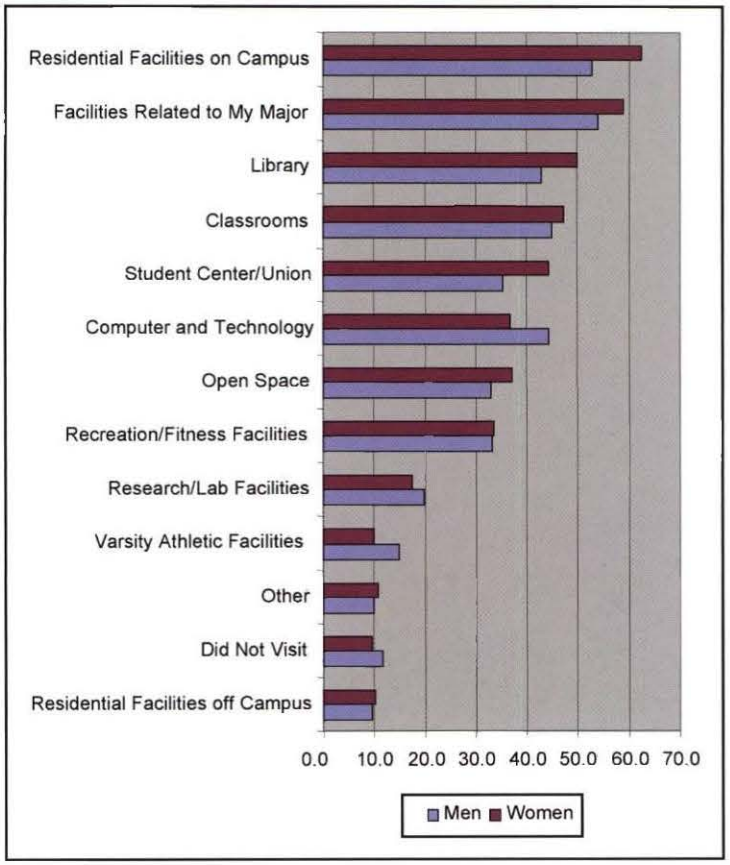
A follow-up question asked which facility was inadequate. African Americans were slightly more likely to reject an institution for inadequate *Residential Facilities on Campus, Residential Facilities Off Campus,* and *Other.* Asians were more likely to reject an institution for inadequate *Residential Facilities Off Campus* and *Research/Laboratory Facilities.* Native Americans and Mixed race students were more likely to reject an institution for inadequate *Residential Facilities Off Campus.* There was no difference for *Facilities in My Major, Classrooms, Library, Technology, Varsity Athletic Facilities, Student Union, Recreation/Fitness Facilities,* or *Open Space.*

While the overall rejection of a campus due to a poorly maintained facility is 16.6 percent, Figure 4 shows that African Americans are significantly more critical than the average, with Mixed Race, Hispanics, and Asians also more critical.

A follow-up question asked which facility was poorly maintained. African Americans were more likely to reject an institution for poorly maintained *Residential Facilities On Campus, Residential Facilities Off Campus, Classrooms, Technology, Research/Laboratory Facilities,* and *Student Union.* Asians were more likely to reject an institution for poorly maintained *Residential Facilities Off Campus, Facility in My Major,* and *Research/Laboratory Facilities.* Native Americans were more likely to reject an institution for poorly maintained *Varsity Athletic Facilities.* Mixed race were more likely to reject an institution for poorly maintained *Residential Facilities Off Campus, Facility in My Major,* and *Library.* There was no difference for *Recreation/Fitness Facilities* and *Open Space.*

The respondents were asked to pick one facility from a list of facilities that had the greatest impact on their decision. *Facilities in My Major* and *Other* dominated the results. Caucasian, African American, and Native American students cited

Figure 1. Important to See During Campus Visit by Gender (%)



Residential Facilities On Campus as important. *Technology* was important to Native Americans, and *Research/ Laboratory Facilities* was important to Asians. *Student Union* was important to Native Americans. *Open Space* was important to Caucasians.

Issues of Retention

The respondents were asked to state their overall satisfaction with the facilities on campus. All races except Native Americans feel about the same with Native Americans less satisfied then all others. The respondents were asked about their overall feelings for the campus. Caucasians and Hispanics were more enthusiastic about their campus than respondents of other races.

Institutional Comparative Analysis

Issues of Recruitment

A detailed analysis was completed for each institutional characteristic that was important to students at different institutional types. The full research report cross-references each institutional type against each of the institutional characteristics.

In order to simplify further analysis, the rest of the institutional comparative analysis is reported based on public institutions versus private institutions. A more refined analysis of the data can be completed if desired.

The respondents were asked which facilities were important in their decision. For *Engineering/Science Facilities* students attending both public and private institutions agree on importance. For *Facilities in My Major* and the *Bookstore*, students attending a public institution felt they were more important. For all other facilities students attending a private institution felt they were more important.

When asked which facilities were important to see, students attending public institutions felt it was more important to see *Residential Facilities Off Campus, Facilities in their Major, Engineering/Research Labs,* and *Technology* versus their private institution counterparts. Also, students attending a public institution tended to not visit the institution as often as their counterparts attending private institutions. Students attending private institutions felt it was more important to see *Residence Halls On Campus, Classrooms, Library, Varsity Athletic Facilities, Recreation/Fitness Facilities, Student Union/Center, Other,* and *Open Space* versus their public counterparts.

When asked about rejecting an institution because a facility was missing, 34.4 percent of the students attending private institutions had rejected an institution because it did not have a facility they felt was important, versus 26.8 percent for those students attending a public institution. Students attending private institutions were more discriminatory as they rejected institutions more often then their public counterparts for *Residential Facilities On Campus, Varsity Athletic Facilities, Student Union/Center, Recreation/Fitness Facilities, Open Space,* and *Other*. For all other facilities, students attending public and private institutions rejected an institution equally.

When asked about rejecting an institution because an important facility was inadequate, 32.6 percent of the students attending private institutions had rejected an institution because a facility was inadequate, versus 22.9 percent for those students attending a public institution. Students attending private institutions were more discriminatory as they rejected institutions more often then their public counterparts for all facilities, except for *Technology* which were rejected equally by students at both types of institutions and *Residential Facilities Off Campus* which were rejected more often by students at public institutions.

When asked about rejecting an institution because an important facility was poorly maintained, 24.3 percent of the students attending private institutions had rejected an institution because a facility was poorly maintained, versus 12.8 percent for those students attending a public institution. Students attending private institutions were more discriminatory as they rejected institutions more often then their public counterparts for all facilities, except for *Residential Facilities Off Campus* where they rejected them equally.

There is a significant difference of opinion on the facility that had the most impact on their choice decision between students at public versus private schools. Students attending public institutions indicated that *Residential Facilities Off Campus, Facilities in My Major, Technology, Engineer/Science*

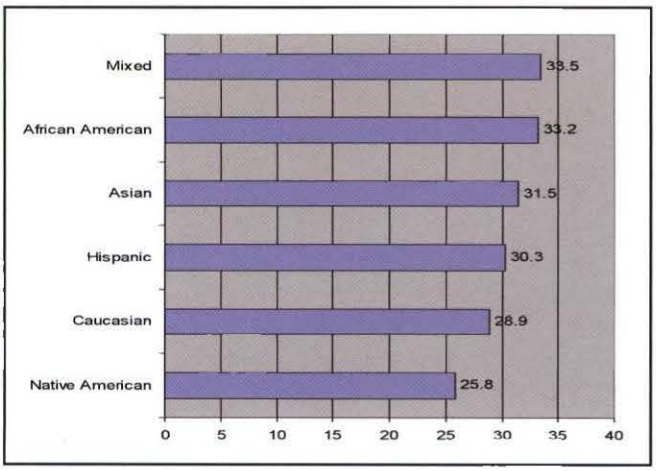
Table 3

Important Institutional Characteristic by Race

Institutional Characteristic	*More Important to:*
Preparation for a career	African Americans
Preparation for graduate school	African Americans, Asians
Excellent teachers	Asians
An attractive campus	African Americans
Accessible professors	African Americans
Excellent academic advising	African Americans
Challenging courses	Asians
Climate/weather	African Americans, Hispanics, Native Americans
Technology capabilities	African Americans, Asians
Strong major in field of interest	African Americans, Asians
Overall quality of campus facilities	African Americans
Prestige of the institution	African Americans, Asians
To play intercollegiate athletics	Hispanics, Asians
Extracurricular opportunities	Asians
Hands-on learning internships	African Americans, Asians
Customizable education	African Americans, Hispanics, Native Americans
Recommendation from friends or family	Asians
Location of the institution	African Americans, Hispanics

Labs, and *Recreation/Fitness Facilities* were more important in their enrollment decision then their counterparts at private institutions. Students attending private institutions indicated that *Residential Facilities On Campus, Classrooms, Varsity Athletic Facilities*, and *Open Space* were more important in their enrollment decision then their counterparts at public institutions. For the *Library, Student Union*, and *Other* categories, the students indicated similar levels of importance.

Figure 2. Race versus Missing Facility (%)



It is not surprising that students attending private institutions were more interested in *Residence Facilities On Campus*, as 87.3 percent of the students attending a private institution lived on campus their first year versus 60.7 percent at a public institution.

Students at private institutions indicated more often than those at public institutions that the good condition of facilities was important in their choice. Students at private institutions indicated more often than those at public institutions that they knew the campus was right for them when they first saw it.

Issues of Retention

The respondents were asked to identify their satisfaction with various facilities now that they are on campus. Students attending public institutions were more satisfied with their *Student Union, Recreation/Fitness Facilities, Library, Facilities in My Major, Technology, Exercise Facilities*, and the *Bookstore*. Students attending private institutions were more satisfied with their *Dining Halls, Residence Halls On Campus, Classrooms, Engineering/Science Facilities, Open Space*, and *Visual Arts Center*. For the other facilities the students were equally satisfied. In general, students attending public institutions are more satisfied with their school than those attending private schools. Students at private institutions indicated that they were more enthusiastic about their institution then their counterparts at public institutions.

Figure 3. Race versus Inadequate Facility (%)

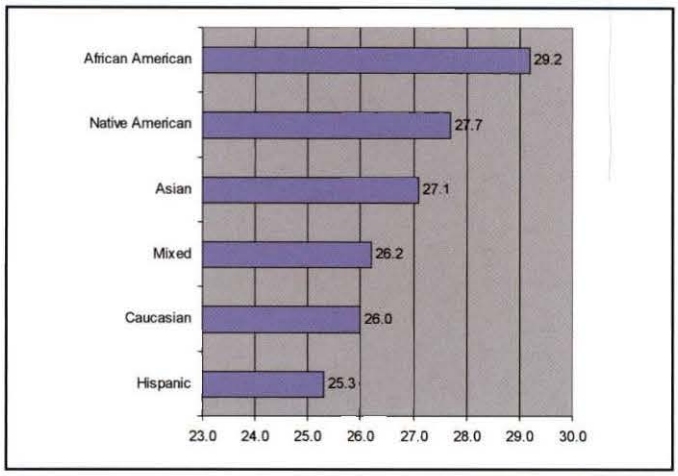
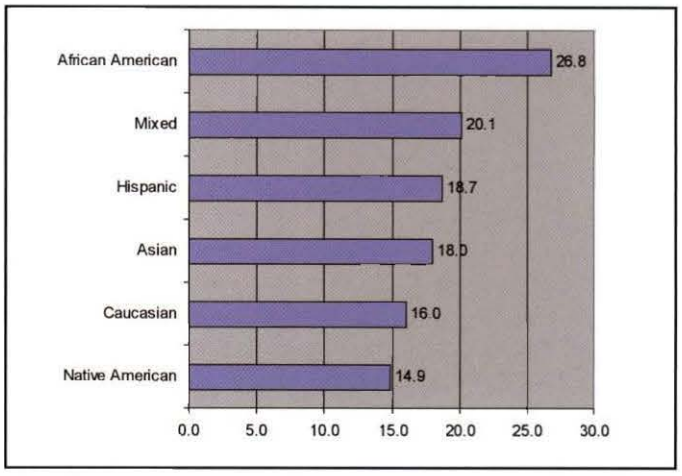


Figure 4. Race versus Poorly Maintained Facilities (%)



Other Comparative Analyses

Grade Point

There is a weak correlation that students with higher grade points tended to reject an institution because it did not have an important facility. However, those with the highest grade point were less likely to reject an institution. There is no difference between students with various grade points rejecting an institution because an important facility was inadequate. Students with a higher grade point were less likely to rule out an institution because of poor maintenance.

Students with a higher grade point evaluated the quality of maintenance as poorer versus students with a lower grade point.

There is no difference between students of various grade points and their satisfaction with campus facilities.

Students with a higher grade point are more enthusiastic about their college or university.

Students at private institutions have a slightly higher grade point.

Upperclassmen have a higher grade point than lowerclassmen. See Figure 5. Note the "sophomore slump" at the three highest grade point levels.

Females have a higher grade point than males.

Caucasian students have a higher grade point than non-Caucasian students.

Students who were home schooled are outperforming those from all other high school types.

There is a strong correlation of decreasing satisfaction with the college or university as students' enrollment status changes from first-year student to graduate student. There is a strong correlation of a decreasing view of the quality of maintenance as students' enrollment status changes from first-year to graduate student. There is a strong correlation of decreasing enthusiasm for their college or university as enrollment status changes from first-year to graduate student.

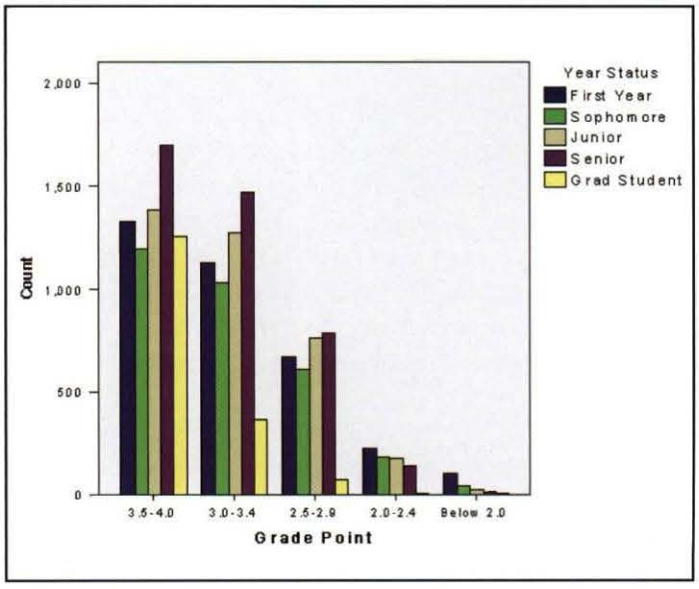
Voting Patterns

Since our survey was completed after the November 2004 U.S. Presidential elections, members of the Washington, D.C. Higher Education Secretariat asked APPA to include a question about election registration and voting. A total of 18.3 percent of the students reported that they registered to vote on campus, and 83.0 percent indicated that they had voted in the 2004 elections. Interestingly, students with a higher grade point were more likely to vote.

Transfer Students versus Non-transfer Students

Non-transfer students (students who are attending their institution of original choice) felt that the *Quality of the Facilities, Prestige, Attractive Campus, Intercollegiate Athletics, Extracurricular Activities,* and *Recommended by Friends/Family* were more important to them than for transfer students. Transfer students felt that *Strong Major, Preparation for Graduate School, Excellent Advising, Customizable Education, Technology,* and *Location* were more important to them than

Figure 5. Year-status versus Grade Point



The evidence suggests that as students move from underclassman to upperclassman, they become more critical of the institution and the institution's facilities.

for non-transfer students. For *Preparation for a Career, Excellent Teachers, Accessible Professors, Internships, Challenging Academics,* and *Climate/Weather,* the students felt the same.

For non-transfer students it was more important to see *Residential Facilities On Campus, Classrooms, Varsity Athletic Facilities, Student Union, Recreation/Fitness Facilities,* and *Open Space.* For transfer students it was more important to see *Residential Facilities off Campus, Library, Technology,* and *Research/Laboratory Facilities,* and they did not visit as often as non-transfer students. For *Facilities in My Major* and *Other* there was no difference.

There was no difference in the rejection rate of an institution by transfer or non-transfer students for a missing facility. Non-transfer students tended to reject an institution more often than transfer students for inadequate facilities. Non-transfer students tended to reject an institution more often than transfer students for poorly maintained facilities.

There is no difference in overall satisfaction of campus facilities between transfer and non-transfer students.

Non-transfer students are more enthusiastic about their college or university.

Conclusion

There are general trends that can be identified. The respondents tended to indicate that academic issues were at the top of their list when it came to choosing an institution. The campus and its facilities does play a role in the decision process but they are not necessarily a deciding factor, in some cases campuses were rejected for missing, inadequate or poorly maintained facilities. It may be safe to say that having quality facilities is a necessary but not sufficient condition to recruit and retain students.

There are differences between gender, race, students attending different types of institutions, and transfer and non-transfer students. For example, women and students attending private institutions are more discriminatory about missing, inadequate or poorly maintained facilities. Non-transfer students are interested in a range of facilities that will support their academic, living, and social life, while transfer students are more interested in facilities that will directly support their education.

There is not a correlation of grade point to satisfaction with campus facilities or enthusiasm for their institution.

The evidence suggests that as students move from underclassman to upperclassman, they become more critical of the institution and the institution's facilities.

Attention to these differences may help to fine tune recruitment and retention programs. Other correlations, trends and observations are left to the reader.

The full research report of ***the Impact of Facilities on Recruitment and Retention of Students*** will be published soon by APPA. The authors will present their findings at the Campus of the Future conference, in Honolulu on Monday, July 10, at 11:00 a.m.

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Maximizing Facility Results

by Jeff Roepsch

Higher Education in the United States spent over $12 billion on new construction in 2004 while struggling with $26 billion dollars in deferred maintenance. Clearly, colleges and universities around the country need to consider not only the upfront costs of construction projects, but also the costs associated with a building's operations and maintenance over the life of the facility.

Faced with increased competition, colleges and universities can become institutions of choice by taking a holistic picture of campus facilities and developing a plan that will allow them to grow strategically.

With many campus buildings aging 50 to 100 years, creating an equal balance among the following areas and understanding how they play a role in each facility on campus will help optimize financial and operational results. To maximize the benefits to institutions of higher learning, all five areas should be analyzed as part of the project development. These areas include:

1. ***Capital Investment*** The dollars required to build any facility on a campus are considerable. Capital investment refers to designing, constructing and completing the construction project. A critical question should be asked here: "Are the investment dollars being used in a way that will not only minimize the construction costs, but at the same time, maximize the building's efficiency?" Future costs of running, operating, and maintaining the facility should be controlled from the very beginning.

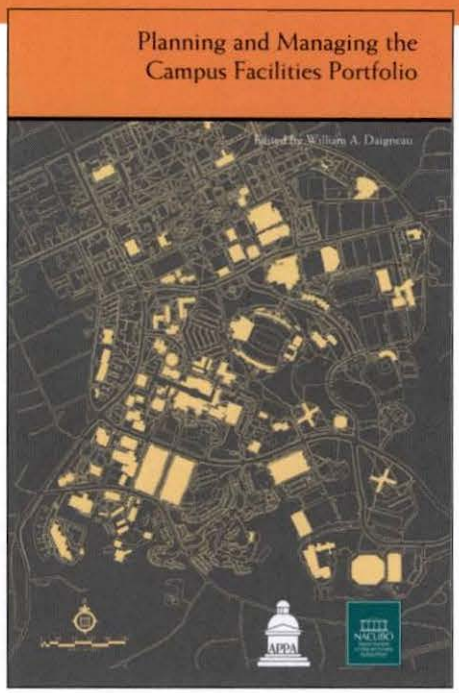
2. ***Future Operational Cost*** Once the building is completed, it becomes the responsibility of the college or university to operate the facility. While many donations to colleges are earmarked for new or modernized buildings, rarely do those donations cover the cost to operate the facility over its life. With proper planning and foresight, the complexities of operating a modern campus facility can be greatly reduced along with the associated costs. Building management systems, space planning and scheduling, and using the appropriate products for the intended environment all help to control the operating costs of a facility.
3. ***Future Utility Cost*** With rising energy prices around the country, utility costs are a primary concern in new construction. Understanding how a building will be heated and cooled will have a major impact on the future utility costs of the building. And, by using the appropriate technology for the building along with energy efficient boilers, chillers, and other HVAC equipment, colleges can plan for future utility costs more effectively. Having a utility purchasing strategy in place will also help save money.
4. ***Asset Life*** The cost of maintaining a building and providing for upgrades and improvements 10, 20, and even 40 years down the road must also be factored into the development of a facility. Will equipment need to be replaced more often, or can technology, proper service, and maintenance be used to optimize equipment life and keep up with the demand that is placed on the building? Knowing what major equipment services and replacements will be needed can help with budgeting and forecasting capital campaigns in the future.
5. ***Quality Environment*** At the heart of any campus building is the quality of the environment. Are the building's objectives truly being met? Is the atmosphere conducive to the intended use of the space? Providing a quality learning environment optimizes the use of a building, allows occupants to maximize their potential, and raises student and staff productivity.

The ability to capture the thoughts, priorities, and satisfaction levels of key stakeholders, administration, staff, and even faculty and students can help ensure a sense of unity and understanding. To assess facility-related needs and practices, many colleges have utilized a structured, interactive process with college and university personnel. The key is to truly address the specific business and financial goals up front, and to get the best value (guaranteed service, project management, procurement and purchasing capabilities, design, engineering, and mobilization ability, etc.).

Developing a long-term vision that focuses on the performance of buildings and the financial and business goals of the college will allow a more strategic way of looking at facilities in the future.

***Jeff Roepsch is in the advanced solutions business at Johnson Controls in Milwaukee, Wisconsin. He can be reached at jeffry.j.roepsch @jci.com. This is his first article for* Facilities Manager.**

Planning and Managing the Campus Facilities Portfolio



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The Bookshelf

Book Review Editor: Theodore J. Weidner, Ph.D., P.E., AIA

This month I present the views of a human resource professional on a book about relationships and collaboration. Add to that a book about health and safety for engineers (and other facility professionals). While these topics are very different, they still fall under the mantle of a facility professional's responsibilities. We affect the lives of everyone on our respective campuses everyday and into the future. These resources will help us develop and protect the people who make us look good.

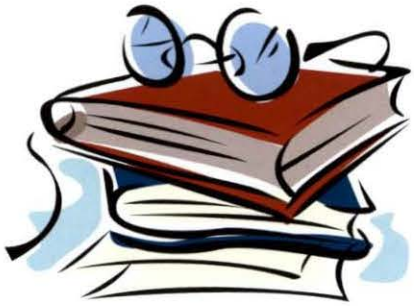
* * *

Safety and Health for Engineers, 2nd Ed., by Roger L. Brauer, Wiley, Hoboken, NJ, 2006, 722 pages, hardcover $94.95.

Every engineer must be concerned about health and safety, that's the premise for engineering licensure and for *Safety and Health for Engineers*. Because the topic touches on all fields of engineering, the book is both long and dense.

The book is clearly written as a textbook with review questions at the end of each chapter, but it can also be used as a reference book for practicing engineers and safety officials. The author builds the basis for safety within the profession sequentially.

Organized so that each engineering field is clearly identified, with the



hazards it charged with protecting against, the different chapters and the fundamentals of each field are identified. Practical issues of noise, chemicals, ventilation, explosives, protective equipment, and hazardous waste are addressed in a similar manner. Because of the approach taken by the author, the book is an excellent reference text for engineering students taking the IE exam. That is why it is a good reference for practicing engineers.

Additional chapters on emergencies, facilities, human behavior, procedures and training, safety management, and some interesting appendix materials make this book a must have for a busy facility officer. This is particularly true if there is no dedicated safety officer within the organization.

* * *

Radical Collaboration: Five Essential Skills to Overcome Defensiveness and Build Successful Relationships, by James W. Tamm and Ronald J. Luyet, Harper, New York, 2004, hardcover, $24.95.

No matter our specific role, we all have to work with and through others. Regrettably, that is where things usually get complicated. James W. Tamm and Ronald J. Luyet, the authors of *Radical Collaboration: Five Essential Skills to Overcome Defensiveness and Build Successful Relationships*, suggest that there are two types of work environments.

One is characterized by high trust, honesty, and mutual support and is created by employees who listen effectively, seek solutions rather than blame, and welcome feedback. The other is characterized by low trust, high blame, and risk avoidance and is maintained by employees who respond defensively and tend to see conflict as a battle to be won at any cost. The greatest danger of defensive behaviors is that they tend to incite similar responses from those around them, resulting in an ever expanding ripple effect of ineffective behaviors and culture. The solution, the authors propose, is for each person to take personal responsibility for maintaining, modeling, and restoring their own collaborative behaviors.

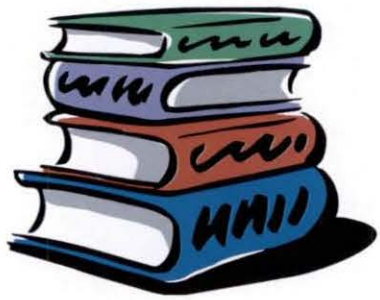
Their book serves as an easy-to-use and an accessible how-to manual presenting a series of concepts, self-assessments, and specific tactics and techniques to help the reader build awareness of how they interact with others and how to both maintain and reestablish collaborative behaviors and relationships under even stressful situations.

The five skills to build successful relationships mentioned in the title include: being aware of one's own behaviors and how they are perceived by others, the importance of speaking and hearing the truth, the often underestimated range of choices we have in how we act and react, being aware of how people want to be treated and perceived and how they respond when they think they are not being treated or perceived in those ways, and finally, how to use interest-based

Ted Weidner is assistant vice chancellor of facilities management & planning, University of Nebraska-Lincoln, Lincoln, Nebraska and president of Facility Asset Consulting. He can be reached at tweidner2@unlnotes.unl.edu.

collaborative negotiation and problem solving in conflict situations.

Many of the concepts in the book are based on the research behind the Fundamental Interpersonal Relations Orientation or FIRO theory, created by Dr. Will Schultz, when asked by the U.S. Navy to try to understand and predict how groups work together, particularly in stressful situations. In his research, Schulz found that people, regardless of culture or situation, want to feel significant, competent, and likable in varying degrees. Chances are, the authors say, if we look at why someone reacts defensively, it is probably because they fear they are at risk of being ignored, humiliated, deemed incompetent, or otherwise rejected. Knowing this, the authors propose, we have a key to leading them back to a more collaborative and effective mode of interaction and problem solving.



It is true that there are already many resources available to provide advice and guidance on effective communications and collaboration skills. And, given the challenge of actually doing it consistently well in all matter of situations with all sorts of people, that is probably a good thing. *Radical Collaboration* is a good addition. It covers a broad spectrum of concepts succinctly and well, and the assessments and exercises make the information accessible and easy to transfer to the work site. Additionally, each copy includes a unique code number that allows the reader to take the FIRO Element B assessment on-line and receive a personal profile that provides information on key characteristics that influence one's ability to collaborate.

—Reviewed by Suzanne Drew,
Director, Staff Development and Management, University of Nebraska, Lincoln, Nebraska.

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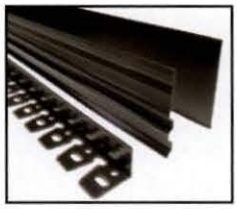

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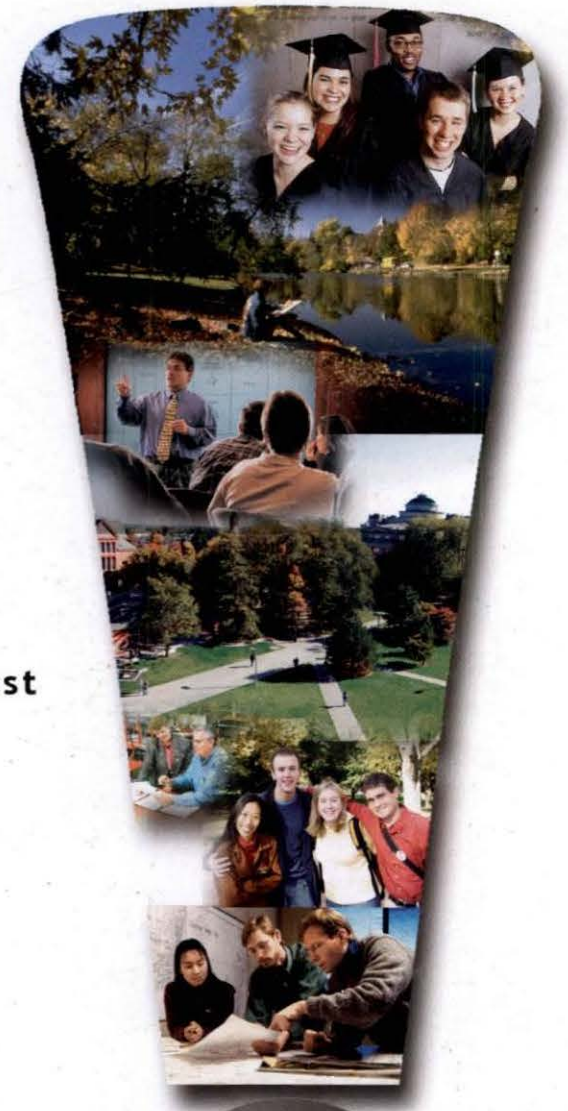

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